



BIDDING DOCUMENT
for

Post Saubhagya Rural households electrification works in Jodhpur Discom, Rajasthan under DDUGJY NEW Scheme

Sr. No.	Tender Specification No.
1	JDVVNL/TNTW-581
2	JDVVNL/TNTW-582
3	JDVVNL/TNTW-583
4	JDVVNL/TNTW-584
5	JDVVNL/TNTW-585
6	JDVVNL/TNTW-586
7	JDVVNL/TNTW-587
8	JDVVNL/TNTW-588

Corporate Identification Number (CIN) – U40109RJ2000SGC016483

Office of the Superintending Engineer (CSS)

Regd. Off. New Power House, Jodhpur 342003

Ph./Fax-0291-2742336/2745259,

E-mail secssjodhpur@gmail.com

Website:- www.energy.rajasthan.gov.in/jdvvnl

Tender document cost : Rs.2500+18%GST

Table of Contents

Section Nos.	Particulars	Page No.
1	Invitation for Bids (IFB)	1
2	Instruction to Bidders (ITB)	7
3	Bid Data Sheets (BDS)	35
4	General Conditions of Contracts (GCC)	41
5	Special Conditions of Contracts (SCC)	113
6	Sample forms and Procedures	117
7	Scope of Works	217



VOLUME I: (Contract Conditions & Scope of Works)

VOLUME I: SECTION I INVITATION FOR BIDS (IFB)



INVITATION FOR BIDS (IFB)

Post Saubhagya Rural households electrification works Jodhpur Discom, Rajasthan
Under
DDUGJY NEW Scheme
(DOMESTIC COMPETITIVE BIDDING)
(SINGLE STAGE THREE COVER BIDDING)

Key Dates

Date of Release of RFP/ NIT	08.11.2021
Date & Time of Start of bid Downloading	09.11.2021, 09:00 AM
Date & Time of Start of bid submission	09.11.2021, 09:00 AM
Date & Time of Closing of Bid Submission	23.11.2021, 06:00 PM
Date & Time of Opening of Bid	24.11.2021, 1:00 PM

FUNDING: DOMESTIC

- 1.0 This invitation for bids follows the procurement notice (Invitation for Bids) for the subject package(s) which also appeared in National and Regional Newspapers. This shall also be available on **Jodhpur Vidyut Vitran Nigam Limited** website given at para 5.0.
- 2.0 **Jodhpur Vidyut Vitran Nigam Limited**(hereinafter referred to as 'JdVVNL'/ 'Jodhpur Discom'/'Discom' have been entrusted to execute the Project i.e. **Post Saubhagya Rural households electrification works in Jodhpur, Barmer, Bikaner, Jalore, Jaisalmer and Sirohi District of Jodhpur Discom, Rajasthan under DDUGJY/SAUBHAGYA** on behalf of **Government of Rajasthan**. The execution of the project shall be funded out of the proceeds of financial assistance to be received by Government of Rajasthan/**Jodhpur Discom** from **REC Limited** and the ownership of the project shall remain vested with Government of Rajasthan. The project shall be executed by **Jodhpur Discom** on turnkey basis and all eligible payment under the project shall be made from the proceeds of financial assistance to be received by Government of Rajasthan/**Jodhpur Discom**. For the purpose of all procurement activities related to the aforesaid project, **Jodhpur Discom** shall be referred to as 'Employer' and Government of Rajasthan as "the Owner".
- 3.0 **Jodhpur Discom**, therefore, invites sealed bids from eligible bidders for the following package(s) for aforesaid project on Domestic Competitive Bidding basis:

Sr. No.	Tender Specification No./Lot	District	Block	Estimated tender value in Rs. Cr.
1	JDVVNL/TNTW-581	Jodhpur Lot-I	Baleser, Bap, Phalodi, Shergarh	42.01
2	JDVVNL/TNTW-582	Jodhpur Lot-II	Bilara, Bhopalgarh, Mandore, Osian, Luni	28.01
3	JDVVNL/TNTW-583	Barmer Lot-I	Barmer, Baytu, Chohtan, Sheo	31.74



4	JDVVNL/TNTW-584	Barmer Lot-II	Dhorimanna, Sindhari, Balotra, Siwana	29.30
5	JDVVNL/TNTW-585	Bikaner Lot-I	Bikaner, Kolayat, Lunkaransar	28.63
6	JDVVNL/TNTW-586	Bikaner Lot-II	Nokha, Sridungergarh	31.01
7	JDVVNL/TNTW-587	Jalore Sirohi	All	30.16
8	JDVVNL/TNTW-588	Jaisalmer	All	14.85

This Invitation for Bids extended through media, website or written communication or by any other means, and issuance of Bidding Documents as per para 7.0 below shall not be construed to mean that the prospective bidders to whom the Invitation for Bids has been extended and/or Bidding Documents have been issued is deemed to be an eligible bidder. The eligibility of the bidders shall be determined as per the provisions of Bidding Documents.

3.1 This Specification covers the following scope of works:

The scope of work under the subject package includes site survey, planning, design, engineering, assembly manufacturing, testing, supply, loading, transportation, unloading, insurance, delivery at site, handling, storage, installation, testing, commissioning and documentation of all items/material required to complete the **Post Saubhagya Rural households electrification works in Jodhpur, Barmer, Bikaner, Jalore, Jaisalmer and Sirohi District which inter-alia include construction of 11 kV & LT line, Installation of distribution transformer and providing service connection to rural households in respective districts.**

The above scope of work is indicative and the detailed scope of work is given in the Bidding Documents.

3.2 The completion period for **Post Saubhagya Rural households electrification works in Jodhpur Discom under DDUGJY NEW Scheme**, shall be the period as specified in ITB Sub-Clause 24.1(c).

3.3 Bidding will be conducted through the domestic competitive bidding procedures as per the provisions of ITB/BDS and the contract shall be executed as per the provisions of the Contract.

4.0 The detailed Qualifying Requirements (QR) are given in the Bidding Document.

5.0 The complete Bidding Documents including tender drawings and technical specifications are available at JdVVNL website <http://www.jdvvn.com>. Bidders who wish to participate in this bidding process must register on eproc.rajasthan.gov.in (bidders who registered on eproc.rajasthan.gov.in before 30.09.2011 must register again). Interested bidders can download the bid documents through e-tendering portal www.eproc.rajasthan.gov.in and commence preparation of bids to gain time. The bid documents provides detailed terms and conditions and technical details.

6.0 Interested eligible bidders may obtain further information from the office of **S.E (CSS), JdVVNL, Jodhpur** (address given at para 12.0 below) between 11:00 AM to 02:00 PM on all working days till the submission of Bidding Documents is open as per para 7.0 below.



7.0 The bid shall only be submitted through online procurement system of <https://eproc.rajasthan.gov.in> The bid document will be downloaded by the said online portal www.eproc.rajasthan.gov.in and Interested Bidder who wish to participate have to pay the bid cost of Rs.2500+GST @18% i.e. TOTAL RS **2950/-** only (Rs. Two Thousand Nine Hundred Fifty only) (Non- Refundable) by demand draft/banker cheque payable to Senior Account Officer [CPC], JDVVNL, Jodhpur and copy of receipt is to be enclosed along with the E-bid in pdf file & shall be deposited in the Office of **S.E. (CSS), JDVVNL**, Jodhpur one day prior to bid opening date.

The bids without having the bid cost will not be opened. To participate in this online bid, bidders will have to procure Digital Signature Certificate (Type-II or III) as per Information Technology Act-2000 using which they can sign their electronic bids. Bidders can procure the same from any CCA approved certifying agency i.e. TCS, Safecrypt, Ncode etc. Or they may contact e-procurement cell, Department of IT & C, Govt. of Rajasthan for future assistance, bidders who already have a valid digital Certificate need not to procure a new Digital Certificate.

Contact No. 0141-4022688(Help desk of RISL-10.00 AM to 6.00 PM)

E-mail: eproc@rajasthan.gov.in

Address: e-procurement cell, RISL, Yojana Bhawan, TilakMarg, C-Scheme, Jaipur.

Bidders should go through the website <http://www.eproc.rajasthan.gov.in> , should refer to the website and go through the link "Help for Contractors", "Information about DSC", "FAQ" and "Bidders Manual Kit" to know the process for submitting the electronic bids at the website.

The "Instructions to bidders" and other terms & conditions of this bid pertaining to the bidding process generally follows the guidelines of e-tendering system of the Govt. of Rajasthan available at URL <http://www.eproc.rajasthan.gov.in> . However, wherever there is any anomaly between the conditions referred to in this document and the GoR tendering system, the later shall be final.

The downloaded bid document shall be considered valid for participation in the bid process subject to submission of required bid document fee of Rs.25000+GST @18% i.e total Rs. 29500/- only (Rs. Twenty Nine thousand Five Hundred only) (Non-refundable) in the manner prescribed above. E-bid processing fee of Rs.1000 /- (Rupees One Thousand only) (Non-refundable) in Demand Draft/ banker cheque in favour of M.D. RISL to be payable at Jaipur and EMD/bid security can also be deposited in form of BG. A copy of the receipt of bid document fee, bid processing fee & EMD/bid security in pdf file must be enclosed along with the Technical bid/proposal failing which the bid will be summarily rejected.

All the communications/ correspondence including the bid document (Technical and Financial Bid) should be signed digitally and stamped on each page by the designated authorized representative of the bidder.

The fact of submission of bid to the Discom shall be deemed to constitute an agreement between the Bidder and the Discom whereby such bid shall remain open for acceptance by the Discom and Bidder shall not have option to withdraw his offer, impair or derogate the same. If the Bidder is notified during the period of validity of bid that his bid is accepted by the Discom, he shall be bound by the terms of agreement constituted by his bid and such acceptance thereof by the Discom, until formal contract of the same bid has been executed between him and the Discom in replacement of such agreement.

A Bidder or a JV shall not be allowed to submit bids for more than 3 packages.

8.0 In case of conflict between the provisions (relating to financial criteria /parameters) of the SBD and the GFR/RTTP Act-2012, the provisions of the later (i.e. GFR/RTTP Act) shall prevail.



- 9.0 Relevant clauses of Rajasthan Transparency in Public Procurement Act-2012 and Rules-2013 to be read with latest amendments time to time shall also be applicable.
- 10.0 A Single Stage Three Cover Bidding Procedure will be adopted and the bid process will proceed as per the **details** mentioned in this Bid Document.
- 10.1. Bids must be submitted through E-tendering process and Price breakup shall be submitted electronically. Late bids will be rejected. Bid Envelope i.e. Techno Commercial Part shall be opened on schedule date and time in the presence of the bidders' representatives who choose to attend in person at the address given. Price Bids shall be opened in the presence of the bidders' representatives who choose to attend at the time and date at the address given in the intimation for opening of Price bids in accordance with Clause 25 of ITB.

All bids must be accompanied by a bid security declaration to be submitted to the SE(CSS) as per Govt. of Rajasthan Order No. F2(1) finance/G&TSPFC-2017 Jaipur Dated 23/12/2020 in Form No.2 of Volume-I : Section- VI Sample Forms and Procedures (worth of bid security is 1% of estimated project cost)

Sr. No.	Tender Specification No./Lot	Estimated tender value in Rs. Cr.	Bid Security in Lakh Rs.
1	JDVVNL/TNTW-581	42.01	42.01*
2	JDVVNL/TNTW-582	28.01	28.01*
3	JDVVNL/TNTW-583	31.74	31.74*
4	JDVVNL/TNTW-584	29.30	29.30*
5	JDVVNL/TNTW-585	28.63	28.63*
6	JDVVNL/TNTW-586	31.01	31.01*
7	JDVVNL/TNTW-587	30.16	30.16*
8	JDVVNL/TNTW-588	14.85	14.85*

(* Bidder required to submit Bid Security Declaration instead of Bid Security as per notification)

- 11.0 EMPLOYER reserves the right to cancel/withdraw this invitation for bids without assigning any reason and shall bear no liability whatsoever consequent upon such a decision.
- 12.0 All correspondence with regard to the above shall be to the following address.

(By Post/In Person)

To,
Office of the SE (CSS), New power house premises,
Heavy Industrial Area, Jodhpur 342001 (Rajasthan),
Phone: 0291-2742336
Fax: 0291-2745259,
E - Mail: secssjodhpur@gmail.com

For more information, visit our site at <http://www.JdVVNL.com> or <http://eproc.rajasthan.gov.in>



VOLUME I: SECTION-II INSTRUCTION TO BIDDERS (ITB)



Volume-I: Section – II
INSTRUCTION TO BIDDERS (ITB)

Preamble:

This part, Instruction to Bidders (ITB), Section II of the Bidding Documents provides the information necessary for bidders to prepare responsive bids, in accordance with the requirements of the Discom. It also provides information on bid submission, opening and evaluation and on contract award. ITB Section II contains provisions that are to be used unchanged unless part Special Condition of Contract, Section V, which consists of provisions that supplement, amend, or specify in detail, information or requirements included in ITB Section II and that are specific to each procurement, states otherwise. If there is a conflict between the provisions of ITB Section – II & Special Condition of Contract Section – V, the provisions of Special Condition of Contract, Section – V shall prevail.

However, provisions governing the performance of the Contractor, payments under the contract or matters affecting the risks, rights and obligations of the parties under the contract are not included in this section but instead under Section – IV: General Conditions of Contract and/or Section – V: Special Conditions of Contract.

Discom has decided to place orders of DDUGJY NEW on full turnkey basis excluding Energy Meters which will be issued as "Free Issue Item". The technical specification for all items including high value items as per latest MM specifications approved by the Discom will be considered for DDUGJY NEW. The copy of these specification will be sent to REC for intimation. Since the technical specifications of Discom will be considered so the CPP rates for high value items are not applicable.

Further in all matters arising out of the provisions of this Section – II and the Section-III of the Bidding Documents, the laws of the Union of India shall be the governing laws and courts of Jodhpur, Rajasthan shall have exclusive jurisdiction.

(A) Introduction

1.0 General Instructions

1.1 The **Jodhpur Vidyut Vitran Nigam Limited**, (implementer of the project on behalf of Government of Rajasthan ("GoR"/"Owner") hereinafter called 'Employer/JDVVNL/Jodhpur Discom/the Discom' will receive bids in respect of equipment to be furnished and erected as set-forth in the accompanying Specifications. All bids shall be prepared and submitted by bidders in accordance with these instructions. For the purpose of execution of the contract, the contractual activities shall be performed by the Employer "for and on behalf of the Owner" except in cases where the Owner itself is statutorily required to do so.

1.2 **Source of funds:** The Owner named in the Bidding Documents intends to use the capital subsidy (60% of cost of the infrastructures in the project) under DDUGJY NEW Scheme, a Government of India flagship program for providing grid based connections to consumers 30% to be procured through loan from FIs/Bank and balance 10% shall be contributed by the Discom for this project.

1.2.1 All the payments under the contract for the package for which this invitation for Bids is issued shall be made by the Discom i.e. Jodhpur Discom {who is also named as Project Implementing Agency (PIA) by Ministry of Power/GoI} named in Biding Documents.

1.3 For the purpose of implementation of subject package, Project Implementation Agency (Jodhpur Discom) shall be referred as Employer and the Government of Rajasthan shall be referred as "The Owner".

2.0 Eligibility of Bidder:

2.1 This Invitation for Bids, issued by Employer/Owner is open to all firms including company (ies), Government Owned Enterprises registered and incorporated in India as per Company Act, 1956/2013 (with amendment from time to time) barring Government department as well as foreign bidders/MNCs not registered and incorporated in India and those bidders with whom



business is banned by the Employer/Owner and other distribution companies of Rajasthan (Jaipur Vidyut Vitran Nigam Ltd./JVVN/ Jaipur Discom and Ajmer Vidyut Vitran Nigam Ltd./AVVN/ Ajmer Discom).

- 2.2 A Bidder shall not have a conflict of interest. Any Bidders found to be have a conflict of interest shall be disqualified. The bidder may be considered to have conflict of interest with one or more parties in this bidding process, if:
- 2.2.1 They have a controlling partner in common,
 - 2.2.2 They receive or have received any direct or indirect subsidy from any of them; or
 - 2.2.3 They have the same legal representative for purpose of this bid; or
 - 2.2.4 They have a relationship with each other, directly or through common third parties, that puts them in position to have access to information about or influence on the bid of another Bidder, or influence the decisions of the Employer/Owner regarding this bidding process; or
 - 2.2.5 A bidder submits more than one bid in the bidding process, either individually [including bid submitted as agent /authorised representative on behalf of one or more manufacturer(s) or through Licensee – Licensor route, wherever permitted as per the provision of Qualification requirement for Bidders] or as partner in a joint venture, except for alternative offers permitted under Invitation to Bid. This results in disqualification of all such bids. However, this does not limit the participation of a Bidder as a sub-contractor in another Bid, or of a firm as a sub-contractor in more than one bid; or
 - 2.2.6 A Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specification of the materials and services/works that are subject of the bid, or
 - 2.2.7 The Bidder, directly or indirectly shall not be a dependent agency of the Employer/Owner.
 - 2.2.8 A prequalification process will be conducted prior to the bidding process, or conducted during process of the bidding, this bidding is open only to prequalified Bidders.

Note:- It is clarified that undertaking for not have a conflict of interest required to be submitted by the bidder, in case of JV , required jointly / individual from all partner.

- 2.3 This bidding is open to any manufacturer or erector or distribution licensee or distribution franchisee who provides satisfactory evidence concerning the following that he:
- 2.3.1 is a qualified manufacturer or erector or distribution licensee or distribution franchisee who can supply, erect, test and commission of the type specified and has adequate technical knowledge and practical experience;
 - 2.3.2 does not anticipate change in the ownership during the proposed period of work (if such a change is anticipated, the scope and effect thereof shall be defined);
 - 2.3.3 has adequate financial stability and status to meet the financial obligation pursuant to the scope of the works (the Bidders should submit at least 2 copies of their audited profit and loss account and balance sheet for the last five years);



- 2.3.4 has adequate field services organisation to provide the necessary field erection and management services required to successfully erect, test and commission the equipment as required by the Specifications and Documents; and
- 2.3.5 has established quality assurance systems and organisation designed to achieve high levels of equipment reliability, both during his manufacturing and field installation activities.
- 2.4 The above stated requirements are a minimum and Employer reserves the right to request for any additional information and also reserves the right to reject the Proposal of any Bidder, if in the opinion of Employer, the qualification data is incomplete or the Bidder is found not qualified to satisfactorily perform the Contract.

3.0 Eligible Plant: Equipment and Services

- 3.1 For the purposes of these Bidding Documents, the words "facilities," "plant and equipment," "installation services," etc., shall be construed in accordance with the respective definitions given to them in the General Conditions of Contract.
- 3.2 All plant and equipment to be supplied and installed and services carried out under the contract shall have their origin in our country only.

4.0 Cost Of Bidding

- 4.1 The Bidder shall bear all costs and expenses associated with preparation and submission of its bid including post-bid discussions, technical and other presentations etc, and Employer will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

(B) The Bidding Documents

5.0 Contents of bidding documents:

- 5.1 The goods and services required, bidding procedures and Contract terms are prescribed in the Bidding Document. The Bidding Document is a compilation of the following and shall include amendments, if any, thereto:

VOLUME – I: Condition of contract:

Section I: Invitation for Bid (Section - IFB)

Section II: Instructions to Bidders (Section - ITB)

Section III: Bid Data sheets (BDS)

Section IV: General Conditions of Contract (GCC)

Section V: Special Conditions of Contract (SCC)

Section VI: Sample Forms and Procedures (FP)

1. Bid Form & Price Schedule
 - 1.1 Bid Form
 - 1.2 Price Schedule
2. Bid Security Form
3. Form of Notification by the Employer to the Bank
 - 3.a Applicable for forfeiture of Bank Guarantee
 - 3.b Applicable for conditional claim pending extension of Bank Guarantee by the bidder.
4. Form of 'Notification of Award of Contract'
 - 4(a) Form of 'Notification of Award of Contract' for Supply of Plant and equipment



- 4(b) Form of 'Notification of Award of Contract' for Installation of Plant and equipment
5. Form of Contract Agreement
Alternative A
Alternative B
- 5.1 Appendix-1: Terms and Procedures of Payment:
11KV, Distribution Transformer, LT and Service connection
- 5.2 Appendix-2: Price Adjustment
- 5.3 Appendix-3: Insurance Requirements
- 5.4 Appendix-4: Time Schedule
- 5.5 Appendix-5: List of Approved Subcontractors
- 5.6 Appendix-6: Scope of Works and Supply by the Employer
- 5.7 Appendix-7: List of Document for Approval or Review
- 5.8 Appendix-8: Guarantees, Liquidated Damages for Non-Performance
6. Performance Security Form
7. Bank Guarantee Form for Advance Payment
8. Form of Taking over Certificate
9. Form of Indemnity Bond to be executed by the Contractor for the Equipment handed over in one lot by Employer for performance of its contract.
10. Form of Indemnity Bond to be executed by the Contractor for the Equipment handed over in instalment by Employer for performance of its contract.
11. Form of Authorisation Letter
12. Form of Trust Receipt for Plant, Equipment and Materials received
13. Form of Extension of Bank Guarantee
14. Form of Power of Attorney for Joint Venture
15. Form of Undertaking by the Joint Venture Partners
16. Format for Evidence of Access to or Availability of Credit/ Facilities
17. Form of Operational Acceptance
18. Form of Safety Plan to be submitted by the Contractor within sixty days of award of contract
19. Form of joint deed of undertaking by the Sub-contractor along with the bidder /contractor
20. Form of Certificate of Financial Parameters for QR

Section VII: Scope of Works

VOLUME-II: PMS, QUALITY ASSURANCE & EVALUATION MECHANISM, BID FORMS AND PRICE SCHEDULES

- Section-I: PMS, Quality Assurance & Evaluation Mechanism (QAM), Documentation & PMA
Section-II: Bid Forms
Section-III: Price Schedules

Volume-III: TECHNICAL SPECIFICATIONS & DRAWINGS

- Section-I: Technical Specifications
Section-II: Tender Drawings

- 5.2 Understanding of bid documents: A prospective Bidder is expected to examine all instructions, forms, terms, technical specifications, tender drawings and scope of works in the Bid documents and fully inform himself as to all the conditions and matters which may in any way affect the scope of work or the cost thereof. Failure to furnish all information required in the Bid document or submission of a Bid not substantially responsive to the Bid document in every respect will be at the Bidder's risk and may result in the rejection of its bid.

6.0 Clarifications on Bid Documents;



- 6.1 If the prospective Bidder finds discrepancies or omissions, in specifications and document or is in doubt as to the true meaning of any part, he shall at once make a request, in writing, for an interpretation/clarification, to Employer at his mailing address indicated in Bidding Documents in the IFB Clause 12.0. Similarly, if a Bidder feels that any important provisions in the documents, such as Governing laws, Taxes and Duties, Defect Liability, Limitation of Liability, Settlement of Disputes, Arbitration, Form of Contact Agreement, Price Adjustment, Bid Guarantees, Contract Performance Guarantee, Compensation for Delay, Payments Terms, Schedule of Execution/Completion of works, will be unacceptable, such an issue should be raised as above. Employer, then, will issue interpretation(s) and clarification(s) as he may think fit in writing or modification of the Bidding Documents that it receives no later than seven (7) days prior to original deadlines prescribed for submission of bids by Employer. The Employer shall not be obliged to respond to any request for clarification received later than the above period. Further, mere request for clarification received from the Bidder shall not be a ground for seeking extension in the deadline for submission of bids. Written copies of Employer's response (including an explanation of the query but not identification of its source) will be sent to all prospective bidders that have received the Bidding Documents / uploaded to the e-portal under amendment or addendum.

Address of the Employer:

Jodhpur Vidyut Vitaran Nigam Limited
Office of the SE (CSS), New power house premises,
Heavy Industrial Area, Jodhpur 342001 (Rajasthan)
Phone: 0291-2742336
Fax: 0291-2745259
E - Mail: secssjodhpur@gmail.com

- 6.2 Verbal clarification and information given by Employer or his employee(s) or his representative(s) shall not in any way be binding on Employer.
- 6.3 LOCAL CONDITIONS: It will be imperative on each Bidder to fully inform himself of all local conditions and factors, which may have any effect on the execution of the Contract covered under these documents and specifications. Employer shall not entertain any request for clarifications from the Bidders, regarding such local conditions. It must be understood and agreed that such factors have properly been investigated and considered while submitting the Proposals. No claim for financial adjustment to the Contract, awarded under these specifications and documents, will be entertained by Employer. Neither any change in the time schedule of the Contract nor any financial adjustments arising thereof shall be permitted by the Employer, which are based on the lack of such clear information or its effect on the cost of the Works to the Bidder.

6.4 **Deleted**

6.5 **Deleted**

7.0 Amendment to Bidding Document

- 7.1 At any time prior to the deadline for submission of bids, the Employer may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify the Bidding Document by amendment (s).
- 7.2 The amendment will be uploaded in e-portal or notified in writing or e-mail (where tender is already uploaded) or notified by email to all prospective Bidders, Bidders are required to regularly check / visit the web-portal for e-procurement and to immediately acknowledge receipt of any such amendments, and it will be assumed that the information contained therein will have been taken into account by the Bidder in its bid. The Employer will bear no responsibility or liability arising out of non-receipt of the same in time or otherwise.



- 7.3 In order to afford prospective Bidders reasonable time in which to take the amendment into account in preparing their bids, the Employer may, at its discretion, extend the deadline for the submission of bid, in such cases, the Employer shall notify in writing or e-mail / upload amended/ extended deadline on web-portal for e-procurement and website of the employer.
- 7.4 All notifications and clarifications also be uploaded by Employer on his web portal / tender portal.
- 7.5 Such amendments, clarifications, etc., shall be binding on the Bidders and will be given due consideration by the Bidders while they submit their bids and invariably enclose such documents as a part of the bid.

(C) Preparation of Bids

8.0 Language of Bid

The bid prepared by the Bidder and all correspondences and documents relating to the bid, exchanged by the Bidder and Employer shall be written in the English language, provided that any printed literature furnished by the Bidder may be written in another language so long as accompanied by an English translation of its pertinent passages. Failure to comply with this may disqualify a bid. For purposes of interpretation of the bid, the English translation shall govern.

9.0 Documents Comprising The Bid

- 9.1 The bidding shall be on e-tendering basis. On due date of submission of bids, bids shall be submitted by the Bidder under "Single Stage – Bid Envelope with three covers" procedure of bidding.

They shall be submitted on <http://eproc.rajasthan.gov.in> in electronic format in the following manner:

- **Cover-I:-** The cover one consist the following documents.

Sl. No	Document Type	Document Format
1	Tender Fee	Scanned copy of the receipt tender fee
2	Tender Processing Fee	Scanned copy of the receipt(A-9) tender processing fee
3	Bid Security	Scanned copy of bid security declaration in Form No.2 of Volume-I : Section- VI Sample Forms and Procedures

The bidders are advised that tender cost, original Bid Security declaration and e-tender processing fees of RISL are to be deposited at Office of the SE (CSS) JDVVNL, Jodhpur well in time so that sufficient time available for uploading the scanned copy of proof of deposits on eproc in cover-I.

- **Cover-2:-** This cover shall consist of Techno-Commercial Bid (To be filled in pdf format). This shall comprise of the following documents:
 - a) Bid Form (Bid Envelope) duly completed and signed by the Bidder, together with all Attachments (available in Volume-II). All Attachments have been identified in ITB Sub-Clause 9.3 below.
 - b) Technical Data Sheets (available in Volume-II), if any, duly completed by the Bidder.



The techno commercial Envelope shall be submitted by bidders at notified date and time in hard copies also.

- **Cover -3:-** For Financial/ Price Bid Consist the details of prices as per Price Schedule in MS Excel Format (.xls format of price Bid).

Price bid in form of Price schedule shall be uploaded by bidder on schedule date and time of submission of bids. The price schedule shall be uploaded by the bidder on web portal on which the NIT is floated on due date and time for submission of bids. The locked price bid shall be opened on notified date and time in presence of participating bidders who have qualified technically and commercially.

The price bids shall be locked and opened on notified date and time pertains to technically and commercially cleared bidders in presence of participating bidders. Due intimation shall be given to technically and commercially cleared bidders about date and time of opening of on-line bids.

9.2 Alternative bids shall not be permitted.

9.3 Each Bidder shall submit with its Techno - Commercial Part (Bid Envelope) the following attachments. The Bidders are also required to refer Volume-II Section-II Bid Forms for attachment related information.

- a. Attachment 1: Bid Security declaration: A bid security declaration shall be furnished in Form No.2 of Volume-I : Section- VI Sample Forms and Procedures in accordance with ITB Clause 13 & ITB Clause 16.
- b. Attachment 2: Power of Attorney: A power of attorney, duly notarized, indicating that the person(s) signing the bid has (ve) the authority to sign the bid and thus that the bid is binding upon the Bidder during full period of its validity, in accordance with ITB Clause 14. **Power of Attorney shall be executed on Non –Judicial stamp papers of Rs 500/- duly notarized purchased in the name of Bidder.**
- c. Attachment 3: Bidder’s Eligibility and Qualifications: In the absence of prequalification, documentary evidence establishing that the Bidder is eligible to bid in accordance with ITB Clause 2 and is qualified to perform the contract in accordance with Qualification of the Bidder provided in BDS, if its bid is accepted.

The documentary evidence of the Bidder’s eligibility to bid shall establish to the Employer’s satisfaction that the Bidder, at the time of submission of its bid, is eligible as defined in ITB Clause 2.

The documentary evidence of the Bidder’s qualifications to perform the contract, if its bid is accepted, shall establish to the Employer’s satisfaction that the Bidder has the financial, technical, production, procurement, shipping, installation and other capabilities necessary to perform the contract, and, in particular, meets the experience and other criteria outlined in the Qualification Requirement for the Bidders in BDS and shall also include the complete annual reports together with Audited statement of accounts of the company for last five financial years of its own (separate) immediately preceding the date of submission of bid.(i.e. FY 16-17, FY 17-18, FY 18-19, FY 19-20, FY 20-21)

[Note I. In the event the Bidder is not able to furnish the above information of its own (i.e., separate), being a subsidiary company and its accounts are being consolidated with its Group/ Holding/ Parent company, the Bidder should submit the audited balance sheet, income statement, other information



pertaining to it only (not of its Group/Holding/Parent company) duly certified by any one of the authority [(i) Statutory Auditor of the Bidder/(ii) Company Secretary of the Bidder a (iii) A certified Public Accountant] certifying that such information/documents are based on the audited accounts as the case may be.

Note II. Similarly, if the Bidder happens to be a Group/Holding/ Parent company, the Bidder should submit the above documents/information of its own (i.e., exclusive of its subsidiaries) duly certified by any one of the authority mentioned in Note I above certifying that these information/documents are based on audited accounts, as the case may be.]

Unless otherwise mentioned in BDS, bids submitted by a joint venture having not more than three partners with one partner as lead partner, if allowed as per stipulated Qualification Requirements in BDS, shall comply with the following requirements:

- i. The bid shall include all the information required for Attachment 3 as described above for each joint venture partner.
- ii. The bid shall be signed so as to be legally binding on all partners.
- iii. One of the partners responsible for performing a key component of the contract shall be designated as leader; this authorization shall be evidenced by submitting with the bid a power of attorney signed by legally authorized signatories as per Form-14 of Volume-I : Section-VI (Sample Forms and Procedures).
- iv. The leader shall be authorized to incur liabilities and receive instructions for and on behalf of any and all partners of the joint venture, and the entire execution of the contract, including payment, shall be done exclusively with the leader, provided otherwise requested by the joint venture and agreed between the Employer and the leader.
- v. All partners of the joint venture shall be liable jointly and severally for the execution of the contract in accordance with the contract terms.
- vi. A copy of the agreement entered into by the joint venture partners shall be submitted with the bid as per Form-15 of Volume-I : Section-VI (Sample Forms and Procedures), including interalia delineation of responsibilities and obligations of each partners appended thereto, notwithstanding the joint and several liability.
- vii. The joint venture agreement should indicate precisely the responsibility of all members of JV in respect of planning, design, manufacturing, supply, installation, commissioning and training.
- viii. All members of JV should have active participation in execution during the currency of the contract. This should not be varied/modified subsequently without prior approval of the Employer; and
- ix. In order for a joint venture to qualify, each of its partners or combination of partners must meet the minimum criteria listed in the Qualification Requirement for the Bidder in enclosed BDS for an individual Bidder for the component of the contract they are designated to perform. Failure to comply with this requirement will result in rejection of the joint venture bid.



- x. A firm can be a partner in only one joint venture; bids submitted by joint ventures or consortia including the same firm as partner will be rejected.
- xi. In the case of a Bidder who offers to supply and/or install plant and equipment under the contract that the Bidder did not manufacture or otherwise produce and/or install, the Bidder shall
 - (i) have the financial and other capabilities necessary to perform the contract;
 - (ii) have been duly authorized by the manufacturer or producer of the related plant and equipment or component as per proforma in Attachment 8 to supply and/or install that item in the Employer's country; and
 - (iii) be responsible for ensuring that the manufacturer or producer complies with the requirements of ITB Sub-Clause 3.2 and meets the minimum criteria listed for an individual Bidder for that item.

- d. Attachment 4: Eligibility and Conformity of the Facilities- Documentary evidence established in accordance with ITB Clause 3 that the facilities offered by the Bidder in its bid are eligible and conform to the Bidding Documents.

The documentary evidence of the eligibility of the facilities shall consist of a statement on the country of origin of the plant and equipment offered, which shall be confirmed by a certificate of origin issued at the time of shipment.

- e. Attachment 5: Subcontractors Proposed by the Bidder: The Bidder shall include in its bid details of all major items of supply or services that it proposes to purchase or sublet, and shall give details of the name and nationality of the proposed Subcontractor, including vendors, for each of those items. Bidders are free to list more than one Subcontractor against each item of the facilities. Their participation should be confirmed with a letter of intent between the parties, as needed, in Attachment 8. Quoted rates and prices will be deemed to apply to whichever Subcontractor is appointed, and no adjustment of the rates and prices will be permitted.

The Bidder shall be responsible for ensuring that any Subcontractor proposed complies with the requirements of ITB Clause 2, and that any plant, equipment or services to be provided by the Subcontractor comply with the requirements of ITB Clause 3 and Qualification Requirement for the Bidder, enclosed as BDS.

The Employer reserves the right to delete any proposed Subcontractor from the list prior to award of contract, and after discussion between the Employer and the Contractor, the Appendix-5 of Volume-I: Section VI. Form of Contract Agreement shall be completed, listing the approved Subcontractors for each item concerned. The Sub-Contractor who are banned/ blacklisted by the distribution companies will not be considered.

- f. Attachment 6: Deviations: In order to facilitate evaluation of bids, deviations, if any, from the terms and conditions or Technical Specifications shall be listed in Attachment 6 to the bid. The Bidder is required to provide the cost of withdrawal for such deviations. However, the attention of the bidders is drawn to the provisions of ITB Sub-Clause 22.3 regarding the rejection of bids that are not substantially responsive to the requirements of the Bidding Documents.



Bidder's attention is also drawn to the provisions of ITB Sub-Clause 22.3.1.

- g. Attachment 8: Manufacturer's Authorisation Form
- h. Attachment 9: Work Completion Schedule.
- i. Attachment 10: Guarantee Declaration for **no load and load losses of transformers shall not exceed the values (Energy efficacy level 2) given in IS 1180 (Part-I):2014 & IS 2026 (with up-to-date amendments, if any)**
- j. Attachment 11: Information regarding ex-employees of Employer in Bidder's firm.
- k. Attachment 12: Price Adjustment Data
- l. Attachment 14: Integrity Pact: The Bidder shall complete the accompanying Integrity Pact, which shall be applicable for bidding as well as contract execution, duly signed on each page by the person signing the bid and shall be returned by the Bidder in two (2) originals along with the Techno - Commercial Part in a separate packet, duly superscripted with 'Integrity Pact'. **The Bidder shall submit the Integrity Pact on a non-judicial stamp paper of Rs. 500/- duly notarised.**

If the Bidder is a joint venture, the Integrity Pact shall be signed by all the partners or consortium members.

Bidder's failure to submit the Integrity Pact duly signed in Original along with the Bid or subsequently pursuant to ITB Sub-Clause 21 .1 shall lead to outright rejection of the Bid.

- m. Attachment 15: Option for Initial Advance (either Interest Bearing Initial Advance or No Initial Advance) and Information for E-payment, PF details and declaration regarding Micro/Small & Medium Enterprises

In this Attachment, the Bidder is required to clearly mention whether the Bidder would opt for Interest bearing initial advance in addition to providing the other information as above.

- n. Attachment 16: Additional Information:
 - i. Certificate from their Banker(s) (as per prescribed formats in Form 16, Volume-I: Section-VI (Sample Forms and Procedures)) indicating various fund based/non fund based limits sanctioned to the Bidder and the extent of utilization as on date. Such certificate should have been issued not earlier than three months prior to the date of bid opening. Wherever necessary the Employer may make queries with the Bidders' Bankers.
 - ii. Detailed information on any litigation or arbitration arising out of contracts completed or under execution by it over the last five years. A consistent history of awards involving litigation against the Bidder or any partner of JV may result in rejection of Bid.
 - iii. Any other information which the Bidder intends to furnish.
- o. Attachment 17: Declaration for tax exemptions, reductions, allowances or benefits



- p. Attachment 18: Declaration
- (i) Bidder shall also furnish information/documentation in support that the Bidder have adequate design infrastructure and erection facilities and capacity and procedures including quality control related to the work.
- (ii) The Bidder shall furnish the CV and experience details of a project manager with 15 years' experience in executing such contract of comparable nature including not less than five years as manager.
- q. Attachment 19: Bank Guarantee verification checklist



10.0 Bid Form and Price Schedules:

The Bidder shall complete the Bid Form(s) and submit three covers online and Techno-commercial Bid (Cover 2) shall be submitted in hard copy also on due date and time of submission of bid. The appropriate Price Schedules (Price BOQ) furnished in the Bidding Documents as indicated therein, shall be uploaded on web portal on due date and time of submission of bids.

11.0 Bid Prices:

11.1 Unless otherwise specified in the Technical Specifications, bidders shall quote for the entire facilities on a "single responsibility" basis such that the total bid price covers all the Contractor's obligations mentioned in or to be reasonably inferred from the Bidding Documents in respect of the design, manufacture, including procurement and subcontracting (if any), delivery, construction, installation and completion of the facilities. This includes all requirements under the Contractor's responsibilities for testing, pre-commissioning and commissioning of the facilities and, where so required by the Bidding Documents, the acquisition of all permits, approvals and licenses, etc.; the operation, maintenance and training services and such other items and services as may be specified in the Bidding Documents, all in accordance with the requirements of the General Conditions of Contract. Items against which no price is entered by the Bidder will not be paid for by the Employer when executed and shall be deemed to be covered by the prices for other items.

11.2 Bidders are required to quote the price for the commercial, contractual and technical obligations outlined in the Bidding Documents. If a Bidder wishes to make a deviation, such deviation shall be listed in Attachment 6 of its bid. The Bidder is required to provide the cost of withdrawal for such deviations.

11.3 Bid price shall mean the price evaluated on the basis of premium/ discount quoted on basic price by each bidder in his proposal for the complete scope of works. Bidder has to quote the same separately in the manner and detail called for in the Price Schedules:

Schedule 1 For Supply of Plant and Equipment inclusive of all Applicable Statutory Taxes, transportation, insurance and other incidental services applicable for supply of Plant & Equipment time being in force.

Schedule 2: For Erection including Installation Services for Erection, Testing and Commissioning including Local Transportation inclusive of all Applicable Statutory Taxes time being in force.

Bidders shall note that the Bid Price above plant and equipment included in Schedule No. 1 above exclude materials used for civil, building and few other construction/erection works. All such materials shall be included and priced under Schedule No. 2, Installation Services.

11.3.1 It shall be the responsibility of the bidders to pay all statutory taxes, duties and levies to the concerned authorities for such surplus material, which would otherwise have been, lawfully payable. The bidders shall submit an indemnity bond to keep Employer harmless from any liability, before release of such material to the bidder by Employer. Notwithstanding anything, wherever applicable/mentioned in the bidding documents, Excise Duty (ED), Sales Tax or VAT, entry tax, the same shall be read/treated as per applicable provisions of GST.

11.3.2 Set/Lot/Lump sum shall be governed as per the requirement of the corresponding item description read in conjunction with relevant provisions of Technical Specifications.

11.4 In the schedules,



- a. Plant Imported goods shall not be acceptable. Only indigenous goods shall be acceptable in the contract.
- b. Deleted.
- c. Installation Charges provided in schedule 2 and shall include rates and prices for all labour, Contractor's equipment, temporary works, materials, consumables and all matters and things of whatsoever nature, provision of operations and maintenance manuals, etc. wherever identified in the Bidding Documents as necessary for the proper execution of all installation services except those provided in Schedule 1. The discount/ premium shall be quoted by the Bidder.
- d. Not Applicable**
- e. The Bidder shall include the GST as applicable in their GST invoice and Employer would not bear any liability on this account. Employer on behalf of the Owner shall, however, deduct such taxes at source as per the rules and issue Tax Deducted at Source (TDS) Certificate to the bidder.
- f. The Bidder shall include GST on Services as applicable in their invoices and Employer would not bear any liability whatsoever on this account. Employer (or the Employer on behalf of the Owner) shall, however, deduct such tax at source as per the rules and issue necessary Certificate to the Contractor
- g. The Bid price shall include insurance charges as per insurance requirement mentioned in Section - IV: General Conditions of Contract (GCC) and Appendix-3: Insurance Requirements to Form of Contract Agreement as contained in Volume-I: Section VI (Sample Forms and Procedures) of the Bidding Documents. Bidder shall further note that the Employer shall not be liable to make any payment/ reimbursement to the Contractor whatsoever for insurance of Contractor's Plant and Machinery.

11.5 The prices shall be in accordance with the following:

The prices shall be in accordance with Appendix-2 of section-VI: Sample forms and procedures

11.6 An additional performance security shall be taken from successful bidder in case of un-balance bid as per Finance (G&T) Deptt., GoR, Jaipur notification dated 22th Oct., 2021

12.0 Bid Currencies

12.1 Prices provided in the Schedules shall be quoted in Indian Rupees Only.

13.0 :

13.1 The Bidder shall furnish, as part of its bid, a bid security declaration in lieu of bid security @ 1 % of estimated project cost as stipulated in the **Bid Documents BID SECURITY DECLARATION on Rajasthan Non Judicial Stamp paper @ Rs. 50.00 with 30% surcharge duly signed by the authorized signatory and notarized. The details are mentioned in Clause 10.1 of Volume I: Section I: Invitation for Bids (IFB). The Original** bid security declaration in Form No.2 of Volume-I : Section- VI Sample Forms and Procedures shall be submitted **in office of the SE(CSS), Jodhpur Discom, Jodhpur.** Worth of Bid Security*: **(1% of estimated project cost)**
Scanned copy of the same is to be uploaded on Bidding Portal in Cover-1. Both hard copy submission and online submission of scanned copy as prescribed is essential otherwise the bid [Technical Bid (Cover-2 & Financial Bid (Cover-3)] in electronic form will not be opened of that bidder.



- 13.2 Any bid not accompanied by a bid security declaration shall be rejected by the Employer as being nonresponsive, pursuant to ITB Sub-Clause 22.4. The bid security declaration of a joint venture must be in the name of all the partners/lead partner in the joint venture submitting the bid.
- 13.3 Deleted
- 13.4 Deleted
- 13.5 The bid security may be forfeited

bid security amount specified in the Term and Condition of Bid shall be forfeited, in the following cases, namely :-

- a) when bidder withdraw or modify our bid after opening of bids;
- b) when bidder do not execute the agreement, if any, after placement of supply/work order within the specified period;
- c) when bidder fail to commence the supply of the goods or service or execute work as per supply/work order within the time specified;
- d) when bidder do not deposit the performance security within specified period after the supply/work order is placed; and
- e) if bidder breach any provision of code of integrity prescribed for bidding specified in the Act and Chapter VI of these rules.

In addition to above, the State Government shall debar to bidder from participating in any procurement process undertaken for a period not exceeding three years in case where the entire bid security or any part thereof is required to be forfeited by procuring entity.

This Bid Securing Declaration shall expire if:-

- i. bidder is not the successful Bidder;
- ii. the execution of agreement for procurement and performance security is furnished by bidder in case bidder is successful bidder;
- iii. thirty days after the expiration of the Bid.
- iv. the cancellation of the procurement process; or
- v. the withdrawal of bid prior to the deadline for presenting bids, unless the bidding documents stipulate that no such withdrawal is permitted.

(a) Deleted

- 13.6 No interest shall be payable by the Employer on the above Bid Security.

14.0 Period of Validity of Bid

- 14.1 Bids shall remain valid for the period of 120 days after the date of opening of Techno - Commercial Part i.e. Bid Envelope, prescribed by the Employer, pursuant to ITB Sub-Clause 20.1. A bid valid for a shorter period shall be rejected by the Employer as being non-responsive.
- 14.2 In exceptional circumstance, the Employer may solicit the Bidder's consent to an extension of the bid validity period. The request and responses thereto shall be made in writing or by e-mail. If a Bidder accepts to prolong the period of validity, the bid security shall also be



suitably extended. A Bidder may refuse the request without forfeiting its bid security. A Bidder granting the request will not be required or permitted to modify its bid.

15.0 Format and Signing of Bid

- 15.1 All copies of the bid shall be typed or clearly hand written and shall be signed (all the pages) by a person duly authorized to sign on behalf of the bidder, in token of acceptance of all the terms and conditions of the bidding document. This authorization shall consist of a written confirmation as specified in the bidding document and shall be attached to the e-bid in electronic mode.
- 15.2 Any amendments such as interlineations, erasures, or overwriting shall be valid only if they are signed or initialled by the authorized person signing the bid. The bid must contain the name, address and place of business of the person or persons making the bid and must be signed and sealed by the Bidder under his usual signature. The name(s) of all the persons signing should also be typed or printed below the signature.
- Bid by a partnership must be furnished with full names of all partners and be signed with the partnership firm name, followed by the signature (s) and designation (s) of the authorized partner (s) or other authorized representative (s).
 - Bids by corporation/ company must be signed with the legal name of the corporation/ company by the President, Managing Director or by the Secretary or other person or persons authorized to bid on behalf of such corporation/company in the matter.
 - A bid by a person who affixes to his signature the word 'President', 'Managing Director' 'Secretary', 'Agent' or other designation without disclosing his principal will be liable to be summarily rejected.
- 15.3 The bid, consisting of the documents listed in ITB Clause 9, shall be typed or written in indelible ink and shall be signed by the Bidder or a person or persons duly authorized to bind the Bidder to the contract. The latter authorization shall be indicated by written power of attorney accompanying the bid and submitted as Attachment 2 to the Bid under ITB Sub-Clause 9.3. All pages of the bid, except for un-amended printed literature, shall be initiated by the person or persons signing the bid and shall be serially numbered.
- 15.4 The bid shall contain no alterations, omissions or additions, unless such corrections are initiated by the person or persons signing the bid.

(D) Submission of Bids

16.0 Sealing and Marking of Bids

- 16.1 No alteration should be made to form of the bid specification and annexure. The bid must comply entirely with the specifications.
- 16.2 The bid and all accompanying documents shall be in English language and shall be signed digitally by a responsible and authorized person. The name, designation and authority of signatory shall be stated in the bid. Address for submission of Bids and its modification and withdrawal, if any, shall be as per IFB Clause 12.0. Also, refer to IFB Clause 3.1, 7.0, 10.1, 11.0 & 12.0 for details pertaining to deadline for submission of DD/bid security declaration, as specified for Bid Processing Fees, Cost of Bid Documents and bid security declaration – up to date and time of bid closing, if any, deadline for submission of bid, deadline for opening of bid, title of bid and details of package specification numbers. **The bidders are advised that tender cost, original Bid Security declaration and e-tender processing fees of RISL are to be deposited at Office of the SE (CSS) JDVVNL, Jodhpur well in time so that sufficient time available for uploading the scanned copy of proof of deposits on eproc in cover-I**
- 16.3 Bids should be filled in only with ink or typed and must be submitted online after signed digitally each and every page/ schedule. In case, pursuant to Ministry of Finance, GOI's



Circular dated 17th July, 2012, the Bank Guarantee is issued using SFMS Platform by the bank's located in India, the copy of such Bank Guarantee shall be submitted by the bidder along with the Bid Envelope.

- 16.4 All additions, alterations and over writings in the bid must be clearly initialled by the authorized signatory to the bidder.
- 16.5 The bidder should quote the prices strictly in the manner as indicated herein, failing which bid is liable for rejection. The rate/ prices shall be in words as well as in figures. This must not contain any additions, alterations, overwriting, cuttings or corrections and any other marking which leave any room for doubt.
- 16.6 It is also mandatory for the bidders to quote the price as per Price Schedules given in the bid Document.
- 16.7 The contract awarding authority will not be responsible to accept any cost involved in the preparation or submission of the bids.
- 16.8 **Each of the pages of offered documents must have proper Page No. The table of content in the beginning of offer must be mentioned.**
- 16.9 The requirement of submission of item wise GTP, Test reports and manufacturers authorization shall be required from the successful bidder (s) only. However, participating bidder(s) shall have to submit confirmation/ DECLARATION to the effect that in the event of order, they shall submit aforesaid documents with the proposal for approval of sub-vendors.
- 16.10 Employer can ask the bidder to submit any document in original.

16.11 **Online Submission of Bid:**

Bid must be submitted online in the electronic formats as per clause 9.3 above. The formats attached / details desired here and all blanks in the bid and the annexure of the specifications must be duly filled. The complete forms, annexure shall be considered as part of contract documents in the case of successful bid.

16.12 **Submission of Bid in Hard Copies:**

The Bidder shall submit the Techno Commercial Bid in hard copy also marked as Bid Envelope (Techno – Commercial Part) containing the documents mentioned at ITB Clause 9 in the following manner. These envelopes shall then be sealed in an outer envelope.

The envelopes shall

- (a) be addressed to the Employer at the address given in the **BDS**, and
- (b) bear the contract name indicated in the **BDS**, the Invitation for Bids title and number indicated in the **BDS**, and the statement "Do Not Open Before [date]," to be completed with the time and date specified in the **BDS**, pursuant to ITB Sub-Clause 20.1.

All the envelopes shall also indicate the name and address of the Bidder so that the bid can be returned unopened in case it is declared "late."

If the outer envelope is not sealed and marked as required by ITB Sub-Clause 16.12 above, the Employer will assume no responsibility for the bid's misplacement or premature opening. If the outer envelope discloses the Bidder's identity, the Employer will not guarantee the anonymity of the bid submission, but this disclosure will not constitute grounds for bid rejection.

However, if there is a discrepancy between Online Bid and Bid in Hard copies submitted by the bidders, the details given in the online Bid will prevail.

Address for submission of Bids and its modification and withdrawal, if any, shall be as per IFB Clause 12.0.

17.0 Deadline for Submission of Bids



17.1 Bids must be received by the Employer at the address specified under ITB Sub-Clause 16.2 no later than the time and date stated in the BDS. In the event of the specified date for the submission of bids being declared a holiday for the Employer, the bids will be received upto the appointed time on the next working day. Bids once received by the Employer shall not be returned except otherwise provided in the Bidding Documents. Address for submission of Bids and its modification and withdrawal, if any, shall be as per IFB Clause 12.0. Also, refer to IFB Clause 3.1, 7.0, 10.1, 11.0 & 12.0

17.2 The Employer may, at its discretion, extend this deadline for submission of bids by amending the Bidding Documents in accordance with ITB Sub-Clause 7.3 for the reasons specified therein at any time prior to opening of bids by the Employer pursuant to ITB Clause 20, in which case all rights and obligations of Employer and bidders will thereafter be subject to the deadline as extended.

18.0 Late Bids

18.1 Any bid received by the Employer after the bid submission deadline prescribed by the Employer, pursuant to ITB Clause 17, will be rejected and returned unopened to the Bidder.

19.0 Modification and Withdrawal of Bids

19.1 The Bidder may modify or withdraw its bid after submission, provided that modification or written notice of withdrawal is received by the Employer prior to the deadline prescribed for bid submission.

19.2 A Bidder may substitute, or modify its bid after it has been submitted before the deadline prescribed for submission of bids as per e-tendering process.

19.3 The Bidder may re-submit the modified bid on the E-Procurement website prior to the deadline prescribed for bid submission. Address for submission of Bids and its modification and withdrawal, if any, shall be as per IFB Clause 12.0. Also, refer to IFB Clause 3.1, 7.0, 10.1, 11.0 & 12.0

19.4 A Bidder wishing to withdraw its bid shall notify the Employer in writing or through withdrawal option on web portal for e-procurement prior to the deadline prescribed for bid submission. Address for submission of Bids and its modification and withdrawal, if any, shall be as per IFB Clause 12.0. The notice of withdrawal shall

(a) be addressed to the Employer at the address named in the **BDS**, and

(b) bear the contract name, the IFB number, and the words "Bid Withdrawal Notice." Bid withdrawal notices received after the bid submission deadline will be ignored, and the submitted bid will be deemed to be a validly submitted bid.

19.5 No bid may be withdrawn in the interval between the bid submission deadline and the expiration of the bid validity period specified in ITB Clause 14. Withdrawal of a bid during this interval may result in the Bidder's forfeiture of its bid security, pursuant to ITB Sub-Clause 13.6.

(E). Bid Opening and Evaluation

20.0 Opening of Bid Envelope/Cover by Employer



- 20.1 The Employer will open the Bid Envelope/Cover i.e. Techno – Commercial Part in public, including withdrawals and modifications made pursuant to ITB Clause 19, in the presence of bidders' designated representatives who choose to attend, at the time, date, and location stipulated in the **BPS**. The bidders' representatives who are present shall sign a register evidencing their attendance. In the event of the specified date for the submission of bids being declared a holiday for the Employer, the bids will be received upto the appointed time on the next working day. Address for submission of Bids and its modification and withdrawal, if any, shall be as per IFB Clause 12.0. Also, refer to IFB Clause 3.1, 7.0, 10.1, 11.0 & 12.0
- 20.2 Envelopes marked "Withdrawal" shall be opened first and the name of the Bidder shall be read out. Bids for which an acceptable notice of withdrawal has been submitted pursuant to ITB Clause 19 shall be returned unopened.
- 20.3 For all other Bids, the bidders' names, deviation having cost of withdrawal, if any, the presence of bid security, Integrity Pact and any such other details as the Employer may consider appropriate, will be announced by the Employer at the opening. Subsequently, all envelopes marked "Modification" shall be opened and the submissions therein read out in appropriate detail. No bid shall be rejected at bid opening except for late bids pursuant to ITB Clause 18. Such bids shall be returned to the Bidder unopened. However, opening of bid, whether or not accompanied with the bid security and/or Integrity Pact, shall not be construed to imply its acceptability which shall be examined in detail pursuant to the provisions contained in this Section-II.

On behalf of Employer, the Integrity Pact will be signed by its representative at the time of Bid Opening. One original of the Integrity Pact will be retained by Employer and the other original will be returned to the representative of the bidders present during bid opening. If the Bidder's representative is not present during the Bid Opening, the other original shall be sent to the bidder by post/courier.

- 20.4 The Employer shall prepare minutes of the bid opening in the form of Bid Opening Statement, including the information disclosed to those present in accordance with ITB Sub-Clause 20.3.
- 20.5 Bids not opened and read out at bid opening shall not be considered further for evaluation, irrespective of the circumstances and shall be returned to the Bidder unopened.

21.0 Clarification of Bids

- 21.1 During bid evaluation, the Employer may, at its discretion, ask the Bidder for a clarification of its bid. In case of erroneous/non submission of documents related to/identified in ITB Sub-Clause 9.3 (b) and (n) or Deed of Joint Undertaking pursuant to ITB Sub-Clause 9.3 (c) & (e), required to be submitted by the Bidder as per the provisions of the Bidding Documents, the Employer may give the Bidder not more than 3 working days' notice to rectify/furnish such documents, failing which the bid shall be rejected. The request for clarification and the response shall be in writing, and no change in the price or substance of the bid shall be sought, offered or permitted.

22.0 Preliminary Examination of Bid Envelope

- 22.1 The Employer will examine the bids to determine whether they are complete, whether required sureties have been furnished, whether the documents have been properly signed, and whether the bids are generally in order.
- 22.2 The Employer may waive any minor informality, nonconformity or irregularity in a bid that does not constitute a material deviation, whether or not identified by the Bidder in Attachment



6 to its bid, and that does not prejudice or affect the relative ranking of any Bidder as a result of the technical and commercial evaluation, pursuant to ITB Clause 24.

22.3 Prior to the detailed evaluation, the Employer will determine whether each bid is of acceptable quality, is complete and is substantially responsive to the Bidding Documents. Any deviations, conditionality or reservation introduced in Attachment-6 and/or in the Bid Form, Technical Data Sheets and covering letter, or in any other part of the bid will be reviewed to conduct a determination of the substantial responsiveness of the bidder's bid. For purposes of this determination, a substantially responsive bid is one that conforms to all the terms, conditions and specifications of the Bidding Documents without material deviations, objections, conditionalities or reservations. A material deviation, objection, conditionality or reservation is one (i) that affects in any substantial way the scope, quality or performance of the contract; (ii) that limits in any substantial way, inconsistent with the Bidding Documents, the Employer's rights or the successful Bidder's obligations under the contract; or (iii) whose rectification would unfairly affect the competitive position of other bidders who are presenting substantially responsive bids.

22.3.1 Bids containing deviations from critical provisions relating to GCC Clauses 2.14 (Governing Law), 8 (Terms of Payment), 9.3 (Performance Security), 10 (Taxes and duties), 21.2 (Completion Time Guarantee), 22 (Defect Liability), 23 (Functional Guarantee), 25 (Patent Indemnity), 26 (Limitation of Liability), 38 (Settlement of Disputes), 39 (Arbitration) and Appendix 2 to the Form of Contract Agreement (Price Adjustment) will be considered as non-responsive.

22.3.2 Regarding deviations, conditionality or reservations introduced in the bid, which will be reviewed to conduct a determination of substantial responsiveness of the Bidder's bid as stated in ITB Sub-Clause 22.3, the order of precedence of these documents to address contradictions, if any, in the contents of the bid, shall be as follows:

- I. Covering Letter
- II. Bid Form
- III. Attachment-6: Deviations
- IV. Technical Data Sheet

Contents of the document at Sr. No. I above will have overriding precedence over other documents (Sr. No. II to IV above). Similarly, contents of document at Sr. No. II above will have overriding precedence over other documents (Sr. No. III to IV above), and so on.

22.4 If a bid is not substantially responsive, it will be rejected by the Employer, and may not subsequently be made responsive by the Bidder by correction of the nonconformity. The Employer's determination of a bid's responsiveness is to be based on the contents of the bid itself without recourse to extrinsic evidence.

23.0 Qualification

23.1 The Employer will ascertain to its satisfaction whether Bidders determined having submitted substantially responsive bids are qualified, as per the Qualification Requirement specified in **Annexure – A (BDS)** to satisfactorily perform the contract. The Employer shall be the sole judge in this regard and the Employer's interpretation of the Qualification Requirement shall be final and binding.

23.2 The determination will take into account the Bidder's financial, technical capabilities including production capabilities, in particular the Bidder's contract work in hand, future commitments & current litigation and past performance during execution of contracts that have been awarded by the Employer on the Bidder. It will be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder in Attachment 3 to the bid, as well as such other information as the Employer deems necessary and appropriate. This shall,



however, be subject to assessment that may be carried out, if required, by the Employer as per the provisions of Annexure – A (BDS).

- 23.3 The Employer may waive any minor informality, nonconformity or irregularity in a bid that does not constitute a material deviation, affecting the capability of the Bidder to perform the Contract.
- 23.4 An affirmative determination will be a prerequisite for the Employer to evaluate the Techno - Commercial Part and to intimate successful bidders to be present on new date, time & location to open the online price schedules of the Bidder. A negative determination will result in rejection of the Bidder's bid.
- 23.5 The bid from those bidders shall not be accepted who failed to submit Performance Security on issue of Letter of Intent (LoI)/Letter of Award (LoA) for any other contract of Employer in past 3 years.

24.0 Evaluation of Techno - Commercial Part (Bid envelope)

24.1 The Employer will carry out a detailed evaluation of the bids of the qualified bidders in order to determine whether the technical aspects are in accordance with the requirements set forth in the Bidding Documents. In order to reach such a determination, the Employer will examine the information supplied by the bidders, pursuant to ITB Clause 9, and other requirements in the Bidding Documents, taking into account the following factors:

- (a) overall completeness and compliance with the Technical Specifications and Drawings; deviations from the Technical Specifications as identified in Attachment 6 to the bid and those deviations not so identified; suitability of the facilities offered in relation to the environmental and climatic conditions prevailing at the site; and quality, function and operation of any process control concept included in the bid. The bid that does not meet minimum acceptable standards of completeness, consistency and detail will be rejected for non-responsiveness.
- (b) Achievement of specified performance criteria by the facilities
- (c) The Time for Completion for all the Packages shall be 45 days from the date of Notification of Award through Letter of Intent. Compliance with the time schedule called for in the corresponding Appendix to the Form of Contract Agreement and evidenced as needed in a milestone schedule provided in the bid;

Time schedule (program of performance)

The plant and equipment covered by this bidding shall have the 'Taking Over' by the Employer after successful Completion within the period specified in **BDS**. Bidders are required to base their prices on the time schedule given in Appendix 4 [Volume-I: Section-VI (Sample Forms and Procedures)] to the Form of Contract Agreement (Time Schedule) or, where no time schedule is given in Appendix 4, on the Completion date(s) given above. No credit will be given to earlier completion. Bids offering completion beyond the specified period are liable to be rejected.

- (d) Type, quantity and long-term availability of mandatory and recommended spare parts and maintenance services
- (e) Any other relevant technical factors that the Employer deems necessary or prudent to take into consideration.
- (f) Any deviations to the commercial and contractual provisions stipulated in the Bidding Documents.



- (g) Details furnished by the bidder in response to the requirements specified in Volume-II of the Bidding Documents.
- (h) The acceptability of the vendors and subcontractors proposed in Attachment 5 to be used by the Bidder will be evaluated. Should a vendor or subcontractor, for the items other than those covered under BDS, be determined to be unacceptable, the bid will not be rejected, but the Bidder will be required to substitute an acceptable vendor or subcontractor without any change to the bid price.
- (i) The no load and load losses of transformer shall not exceed the values (**Energy efficiency level 2**) given in IS 1180 (Part-I):2014 & IS 2026 (with up-to-date amendments, if any). In case, Technical Losses found to be more than specified values, transformers shall be rejected.
- (j) Bank Guarantee submitted against Bid Security shall be verified independently from issuing bank. On receipt of certification from issuing bank, eligibility of bidder shall be decided for opening of price bid.

25.0 Opening of Price Schedules (ON-LINE) by Employer

- 25.1 Price Part of only those Bidders shall be opened on-line who are determined as having submitted substantially responsive bids and are ascertained to be qualified to satisfactorily perform the Contract, pursuant to ITB Clause 23 and 24. Such Bidders shall be intimated about the date and time for opening of Price Part by the Employer. A negative determination of the bids pursuant to ITB Clause 23 and 24, shall be notified by the Employer to such Bidders and the price bid uploaded by them shall not be opened.
- 25.2 The Employer will on-line open Price Bid at the specified time and date in the presence of bidders' designated representatives who choose to attend, at the time, date, and location stipulated in the intimation for opening of price bid. The bidders' representatives who are present shall sign a register evidencing their attendance.
- 25.3 The bidders' names, the Bid Prices or any discounts/premium, and any such other details as the Employer may consider appropriate, will be announced by the Employer at the opening. The prices and details as may be read out during the bid opening and recorded in the Bid Opening Statement would not be construed to determine the relative ranking amongst the Bidders, or the successful Bidder, and would not confer any right or claim whatsoever on any Bidder. The successful Bidder (also referred to as the L₁ Bidder) shall be determined as per the provisions of this Section - II and considered for award of contract as provided in ITB Clause 30.
- 25.4 The Employer shall prepare minutes of the bid opening, including the information disclosed to those present in accordance with ITB Sub-Clause 25.3.
- 25.5 Bids not opened and read out at bid opening shall not be considered further for evaluation, irrespective of the circumstances.

26.0 Conversion to Single Currency

- 26.1 This shall not be applicable as domestic firms are required to quote the prices in Indian Rupees only.

27.0 Evaluation of Price Bids

- 27.1 The Employer will examine the Price Bids to determine whether they are complete, whether any computational errors have been made and whether the bids are generally in order.



The Price Bids containing any deviations and omissions from the contractual and commercial conditions and the Technical Specifications which have not been identified in the Bid Envelope are liable to be rejected.

- 27.2 Arithmetical errors will be rectified on the following basis. If there is a discrepancy between the unit price and the total price, which is obtained by multiplying the unit price and quantity specified by the Employer, the unit price shall prevail, and the total price shall be corrected. However, in case of items quoted without indicating any quantity or the items for which the quantities are to be estimated by the Bidder, the total price quoted against such items shall prevail. If there is a discrepancy between words and figures, the amount in words will prevail.

The percentage discount/premium is offered in Price Bid Schedules, the same shall be considered in full on the Total price component (by proportionately reducing/increasing Total price of individual items), in case of award. Further, Conditional discounts/premium, if any, offered by the bidder shall not be taken into consideration for evaluation

The total price or the total bid price to be identified in Bid Form for this purpose, irrespective of the discrepancy between the amount for the same indicated in words or figures shall be rectified in line with the procedure explained above.

If the Bidder does not accept the correction of errors as per this clause, its bid will be rejected and the amount of Bid Security shall be forfeited

- 27.3 The comparison shall be on the total price after adding total price arrived in Schedule 1 & Schedule 2, after applying applicable discounts/premium offered by Bidder. The Bidders shall be ranked in ascending order of total amount after adding total price arrived in Schedule 1 & Schedule 2, after applying applicable discounts/premium offered by Bidder. The Bidder with the lowest total amount after adding Schedule 1 & 2, shall be considered as successful bidder for next step of process.

The Employer's comparison will also include the costs resulting from application of the evaluation procedures described in ITB Sub-Clause 27.4 & 27.5.

- 27.4 The Employer's evaluation of a bid will take into account, in addition to the bid prices indicated in Price Schedule Nos. 1 & 2(online price schedules), the following costs and factors that will be added to each Bidder's bid price in the evaluation using pricing information available to the Employer, in the manner and to the extent indicated in ITB Sub-Clause 27.5 and in the Technical Specifications:

- (a) the cost of all quantifiable deviations and omissions from the contractual and commercial conditions and the Technical Specifications as identified in the evaluation of Bid Envelope, and other deviations and omissions not so identified;
- (b) ~~the functional guarantees of the facilities offered~~ - **deleted**
- (c) the performance of the equipment offered(Applicable for 16/10/5 KVA, 11/0.250kV, 1-phase Distribution Transformer.);

Bidder shall state the guaranteed performance or efficiency of the Equipment, named in the **BPS**, in response to the Technical Specifications. Equipment offered shall have a minimum (or a maximum, as the case may be) level of guarantees specified in the Technical Specifications to be considered responsive. Bids offering plant and equipment with guarantees less (or more) than the minimum (or maximum) specified shall be rejected.

- (d) the extra cost of work, services, facilities, etc., required to be provided by the Employer or third parties;



- (e) any other relevant factors listed in **BPS**.

The estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the contract, shall not be taken into account in bid evaluation.

27.5 Pursuant to ITB Sub-Clause 27.4, the following evaluation methods will be followed:

- (a) Contractual and commercial deviations

The evaluation shall be based on the evaluated cost of fulfilling the contract in compliance with all commercial, contractual and technical obligations under this Bidding Documents. In arriving at the evaluated cost, towards deviations identified in the evaluation of bid, the cost of withdrawal indicated by the bidder in Attachment-6 of the Bid Form will be used. If such a price is not given, the Employer will make its own assessment of the cost of such a deviation for the purpose of ensuring fair comparison of bids.

- (b) ~~Functional Guarantees of the facilities~~

~~For the purposes of evaluation, the adjustment specified in the Technical Specifications will be added to the bid price for each drop (or excess) in the responsive functional guarantees offered by the Bidder, below (or above) either a norm of one hundred (100) or the value committed in the responsive bid with the most performing functional guarantees, as specified in the Technical Specifications. DELETED~~

- (c) ~~Performance Guarantees of the Equipments~~

~~For the purposes of evaluation, the adjustment specified in the **BDS** will be added to the bid price. DELETED~~

- (d) Work, services, facilities, etc., to be provided by the Employer

Where bids include the undertaking of work or the provision of services or facilities by the Employer in excess of the provisions allowed for in the Bidding Documents, the Employer shall assess the costs of such additional work, services and/or facilities during the duration of the contract. Such costs shall be added to the bid price for evaluation.

27.6 Any adjustments in price that result from the above procedures shall be added, for purposes of comparative evaluation only, to arrive at an "Evaluated Bid Price." Bid prices quoted by bidders and rectified as per ITB Sub Clause 27.2 shall remain unaltered.

28.0 Purchase/ Domestic preference:

No preference shall be given to any bidder

29.0 Confidentiality and Contacting the Employer

29.1 After the public opening of bids, information relating to the examination, clarification, and evaluation of bids and recommendations concerning awards shall not be disclosed to Bidders or other persons not officially concerned with this process until the publication of contract award. From the time of bid opening to the time of contract award, if any Bidder wishes to contact the Employer on any matter related to its bid, it should do so in writing.



29.2 Any effort by a Bidder to influence the Employer in the Employer's bid evaluation, bid comparison or contract award decisions may result in rejection of the Bidder's bid. The Employer shall be the sole judge in this regard.

(F). **Award of Contract**

30.0 Award Criteria

30.1 Subject to ITB Clause 31, the Employer will award the contract to the successful Bidder (also referred to as the L₁ Bidder) whose bid has been determined to be substantially responsive and to be the lowest evaluated bid, further provided that the Bidder is determined to be qualified, as per the Qualification Requirement specified in BDS to perform the contract satisfactorily.

30.2 The Employer may request the Bidder to withdraw any of the deviations listed in the winning bid.

At the time of Award of Contract, if so desired by the Employer, the bidder shall withdraw the deviations listed in Attachment 6 to the Bid Form at the cost of withdrawal stated by him in the bid. In case the bidder does not withdraw the deviations proposed by him, if any, at the cost of withdrawal stated by him in the bid, his bid will be rejected and his bid security forfeited.

Bidder would be required to comply with all other requirements of the Bidding Documents except for those deviations which are accepted by the Employer.

30.3 The Employer reserves the right to vary the quantity of any of the spares and/or delete any items of spares altogether at the time of Award of Contract.

30.4 The mode of contracting with the successful bidder will be as per stipulation outlined in GCC Sub-Clause 2.1 and briefly indicated below:

30.4.1 The award shall be made as follows:

- (i) First Contract: For supply of all equipment and materials including applicable taxes and duties.
- (ii) Second Contract: For providing all services i.e. inland transportation for delivery at site, insurance, unloading, storage, handling at site, installation, Testing and Commissioning including performance testing in respect of all the equipment supplied under the "First Contract" and any other services specified in the Contract Documents.

Both contracts will contain a cross fall breach clause specifying that breach of one will constitute breach of the other.

30.5 **Contract Agreement Documentation:** The sequence of contract agreement documentation is given here under:

- a. Issuance of Letter of Intent (LoI) by owner and its unconditional acceptance by the bidder within two weeks from date of issuance of LoI
- b. Mutual agreement on PERT chart / Project Execution Plan duly signed and accepted by turnkey contractor and Employer within two weeks from date of acceptance of LoI
- c. Submission of Contract Performance Security, within 7 (Seven) days from date of LoI, against supply & erection contract as per clause 9.3.1 of GCC
- d. Letter of Award by owner and its unconditional acceptance by the bidder. Letter of Award shall be issued only after mutual agreement & acceptance on PERT chart/Project execution plan (as per 30.5 (b) above) and on timely submission of Contract Performance Security against supply & erection contracts. The acceptance of LoA should be provided with 3 (Three) days from date of issue of LoA. LoA shall include details of



- i. Pre-bid discussion
 - ii. Post-bid negotiation/discussions
 - iii. PERT chart
 - iv. Contract Performance Guarantee
- e. Contract Agreement shall be signed, on unconditional acceptance of Letter of Award by turnkey contractor, within 7 (seven) days from date of issue of Letter of Award and submission and acceptance of contract performance guarantees (against supply as well as erection contracts).

31.0 Employer's Right to Accept any Bid and to Reject any or all Bids

- 31.1 The Employer reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids at any time prior to award of contract, without thereby incurring any liability to the affected Bidder or bidders or any obligation to inform the affected Bidder or bidders of the grounds for the Employer's action.

32.0 Notification of Award

- 32.1 Prior to the expiration of the period of bid validity, the Employer will notify the successful Bidder in writing through Letter of Intent (LoI), that its bid has been technically and commercially accepted. The bidder shall provide unconditional acceptance of LoI within 3 days. Bidder will also submit PERT Chart/Project Execution Plan within 7 days from date of LoI. PERT Chart/Project Execution Plan shall be signed, accepted and mutually agreed by successful bidder and owner within 7 days from date of acceptance by LoI. Contract Performance Security shall be submitted by the successful bidder within 7 days from date of LoI. Thereafter, detailed letter of award shall be issued by owner. On unconditional acceptance of Letter of Award, contract agreement shall be signed on submission and acceptance of contract performance security. The notification of award (Letter of Intent) will constitute the formation of the contract.

The awarded/tendered quantity can be increased or decreased by 50% during the Contract in accordance with the RTPP Act- 2012 and Rules – 2013 mentioned thereof.

- 32.2 The Employer shall publish the results on its website, identifying the bid and Specification numbers and the following information: (i) name of each Bidder who submitted a Bid; (ii) bid prices as read out at bid opening; (iii) name and evaluated prices of each Bid that was evaluated; (iv) name of bidders whose bids were rejected and the reasons for their rejection; and (v) name of the winning Bidder, and the price it offered, as well as the duration and summary scope of the contract awarded.

The Employer shall promptly respond in writing to any unsuccessful Bidder who, after notification of award in accordance with above, requests in writing the grounds on which its bid was not selected.

- 32.3 Upon the successful Bidder's furnishing of the performance security pursuant to ITB Clause 34 and their independent verification from issuing bank and acceptance thereof, the Employer will promptly discharge the bid securities, pursuant to ITB Sub-Clause 13.4 & 13.5.

33.0 Signing the Contract Agreement

- 33.1 At the same time as the Employer notifies the successful Bidder that its bid has been accepted through Letter of Award/Intent, the Employer in consultation with the Bidder will prepare the Contract Agreement provided in the Bidding Documents, incorporating all agreements between the parties.



- 33.2 On unconditional acceptance of Letter of Award, contract agreement shall be signed on submission and acceptance of contract performance security and furnishing of an additional performance security (to be taken from successful bidder in case of un-balance bid as per Finance (G&T) Deptt., GoR, Jaipur notification dated 22th Oct., 2021). The contract agreement shall be signed within 7 days from date of issue of LOA.
- 33.3 **As per notification dated 06.11.2020, Finance Deptt.(Tax Div.), GoR, the contract agreement shall be executed on Rajasthan Non-Judicial Stamp Paper worth 0.15% of Contract value or maximum Rs. 25,00,000/-, whichever is less for each work order.**

34.0 Performance Security

- 34.1 Within seven days (7) days after receipt of the notice of award through LoI, the successful Bidder shall furnish the performance security for **3% (Three percent)** of the contract price in line with the requirement of Qualification Requirements, in the amount given in the **BDS** and in the form provided in Volume-I : Section VI, Sample Forms and Procedures, of the Bidding Documents. The performance security of a joint venture shall be in the name of lead partner of joint venture. **An additional performance security shall be taken from successful bidder in case of un-balance bid as per Finance (G&T) Deptt., GoR, Jaipur notification dated 22th Oct., 2021**
- 34.2 Failure of the successful Bidder to comply with the requirements of ITB Clause 33 or Clause 34.1 shall constitute sufficient grounds for the annulment of the award and forfeiture of the bid security, in which event the Employer may make the award to the next lowest evaluated Bidder or call for new bids.
- 34.3 Till receipt and acceptance of contract performance securities of successful bidder, validity of all bids shall be kept valid to facilitate action as per clause 34.2 above.

In addition to the Performance Security of 10% of the Contract Price, the successful bidder is required to furnish additional performance security (ies), if applicable, as per Clause no. 4 of Joint Deed of Undertaking mentioned at Sl. No. 19 of Section – VI: Sample Forms and Procedures.

34A Additional Performance Security (Applicable in case of un- balance Bid as per notification Dt 22.10.2021 issued by Finance(G&T) Dept., GOR in RTPP Rule 2013):-

- (a) In addition to Performance Security an additional Performance Security shall be taken from the successful bidder in case of un-balance Bid. The Additional Performance Security shall be equal to 50% of un-balance Bid amount. The Additional Bid Security shall be deposited in lump sum by the successful Bidder before execution of Contract Agreement. The additional Performance Security shall be deposited through demand draft/Bank Guarantee**

Explanation:- For the purpose of this rule-

- (i) Unbalanced Bid means any Bid below more than 15% of estimated Bid Value.**
- (ii) Estimated Bid Value means value of subject matter of procurement mention in bidding documents by the procuring entity.**
- (iii) Unbalanced Bid Amount means positive difference of eighty five percent of estimated Bid value minus Bid Amount quoted by the Bidder.**
- (b) The Additional Performance Security shall be refunded to the contractor after satisfactory completion of the entire work. The Additional Performance Security**



shall be forfeited by the Procuring Entity when work is not completed within stipulated period by the contractor.

35.0 Fraud and Corruption

It is the Employer's policy that requires the Bidders, suppliers and contractors and their subcontractors under the contracts to observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, the Employer:

(a) defines, for the purpose of this provision, the terms set forth below as follows:

- (i) "corrupt practice" is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;
- (ii) "fraudulent practice" is any act or omission, including a misrepresentation, that knowingly or recklessly misleads or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;
- (iii) "collusive practice" is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;
- (iv) "coercive practice" is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;
- (v) "obstructive practice" is
 - (aa) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Employer's investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation;

or

- (bb) acts intended to materially impede the exercise of the Employer's inspection and audit rights.
- (b) will reject a proposal for award if it determines that the bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for the contract in question;
- (c) will sanction a firm or individual, including declaring ineligible, either indefinitely or for a stated period of time, to be awarded a contract if it at any time determines that the firm has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for, or in executing, a contract; and
- (d) will have the right to require that the provision be included in Bidding Documents and in contracts, requiring Bidders, suppliers, and contractors and their sub-contractors to permit the Employer to inspect their accounts and records and other documents relating to bid submission and contract performance and to have them audited by auditors appointed by the Employer.



VOLUME-I: SECTION – III BID DATA SHEETS (BDS)



BID DATA SHEETS (BDS)

QUALIFICATION OF THE BIDDER

for

Post Saubhagya Rural households electrification works in Jodhpur, Barmer, Bikaner, Jalore, Jaisalmer and Sirohi District of Jodhpur Discom, Rajasthan Under DDUGJY NEW Scheme

Qualification of bidder will be based on meeting the minimum pass/fail criteria specified in **1.0 Pre-qualifying criteria Part-A** and **2.0 Pre-qualifying criteria Part-B** as demonstrated by the Bidder's responses in the corresponding Bid Schedules. The bidder shall also be required to meet the following qualification criteria.

Subcontractors' technical experience and financial resources shall not be taken into account in determining the Bidder's compliance with the qualifying criteria. The bid can be submitted by an Indian individual firm only or by Joint Venture firm having Indian partner firms only. *(The years referred in this section w.r.t 'Qualification of the Bidder' should be considered as financial year e.g. Last year should be F.Y.2020-21 ending 31st March 2021)*

Notwithstanding anything stated herein above, the Employer reserves the right to assess the capacity and capability of the bidder, should the circumstances warrant such assessment in an overall interest of the Employer. The employer reserves the right to waive minor deviations if they do not materially affect the capability of the Bidder to perform the contract.

1.0 Pre-qualification criteria – Part A:

1.01 Technical:

PART I, II and III are deleted

1.01.1 Deleted

1.01.2 The bidder should possess "A" Class license issued by the Electrical inspectorate of Govt of Rajasthan/Central Inspectorial organization of Govt. of India/ other state Govt. In case bid submitted by joint venture firm, any of the partner should possess "A" class electrical license.

In case bidder is a distribution Licensee under Electricity Act 2003, contractor License is not required. In case bidder is a Distribution Franchisee under Electricity Act 2003 it should possess "A" Class license issued by Electrical Inspectorate of Govt. of Rajasthan/Central Inspectorial organization of Govt. of India/ other state Govt. or avail it within a month from the date of award of contract.

1.01.3 Work experiences of the bidder as per above shall be considered only if the works have been executed under Govt./semi-Govt./autonomous body of Central/State Govt./Electricity Power Utility/ Power Dept. in India only.

In case of distribution licensee / Distribution Franchisee, the bidder shall provide the self-certification and CA audited annual accounts and reports of meeting the criteria as mentioned in clause 1.02 below.

**1.02 Techno-Commercial:**

1.02.1 For the purpose of this bid, the bidder shall meet all the following requirements:-

- i) The Bidder must have satisfactorily erected and commissioned turnkey works of lines of 11kV < Line both (or higher) voltage class, Sub-Station, the cumulative value of which shall not be less than the estimated district wise/ lot wise project cost in the last five financial years (**up to 31.03.2021**).
- ii) Deleted
- iii) Deleted
- iv) For the purpose of meeting the above requirements, only that turnkey contract shall be considered which has contract value of not less than Rs.50 lakhs individually and order is placed on or after 01.04.2008

As Documentary proof against clause 1.02.1 (i), Bidder shall submit work completion certificate issued by officer not below the rank of XEN duly dispatched from the concerned Office.

In case a bidder is quoting for more than one project, Pre-Qualification requirement shall be examined on the basis of sum of project wise requirements of experience of all quoted projects.

Sr. No.	Tender Specification No.	District	Estimated tender value in Rs. Cr.
1	JDVVNL/TNTW-581	Jodhpur Lot-I	42.01
2	JDVVNL/TNTW-582	Jodhpur Lot-II	28.01
3	JDVVNL/TNTW-583	Barmer Lot-I	31.74
4	JDVVNL/TNTW-584	Barmer Lot-II	29.30
5	JDVVNL/TNTW-585	Bikaner Lot-I	28.63
6	JDVVNL/TNTW-586	Bikaner Lot-II	31.01
7	JDVVNL/TNTW-587	Jalore Sirohi	30.16
8	JDVVNL/TNTW-588	Jaisalmer	14.85

1.02.2 Net Worth for the **each of the** last three Financial Years (FY18-19, FY19-20, FY20-21) should be **positive**. *Net worth means the sum total of the paid up capital and free reserves (excluding reserves created out of revaluation) reduced by aggregate value of accumulated losses (including debit balance in profit and loss account for current year) and intangible assets.*

1.02.3 Minimum Annual Turnover (MAT) in **any one** of last five financial years (FY16-17, FY17-18, FY18-19, FY19-20, FY20-21) of the bidder should not be less than **50%** of estimated project cost. In case a bidder is quoting for more than one project, Pre-Qualification requirement shall be examined on the basis of sum of project wise requirements of MAT of all quoted projects. Package wise MAT requirements are:

Sr. No.	Tender Specification No.	District	Estimated tender value in Rs. Cr.	Package wise MAT Requirement (Rs. In Cr.)
1	JDVVNL/TNTW-581	Jodhpur Lot-I	42.01	21.01
2	JDVVNL/TNTW-582	Jodhpur Lot-II	28.01	14.00
3	JDVVNL/TNTW-583	Barmer Lot-I	31.74	15.87
4	JDVVNL/TNTW-584	Barmer Lot-II	29.30	14.65
5	JDVVNL/TNTW-585	Bikaner Lot-I	28.63	14.32
6	JDVVNL/TNTW-586	Bikaner Lot-II	31.01	15.51
7	JDVVNL/TNTW-587	Jalore Sirohi	30.16	15.08
8	JDVVNL/TNTW-588	Jaisalmer	14.85	7.43

1.02.4 Bidder shall have liquid assets (LA) and/ or evidence of access to or availability of fund based credit facilities of not less than **10%** of the estimated total project cost and the Banker should confirm that the Credit facility is earmarked for the Work specified under Bid on receipt of the Bid. *Liquid assets would include cash (and equivalents), bank deposits, securities that can be freely traded and receivables which has general certainty of getting received.* In case a bidder is quoting for more than one project, Pre-Qualification requirement shall be examined on the basis of sum of project wise requirements of LA of all quoted projects. Package wise LA requirements are:

Sr. No.	Tender Specification No.	District	Estimated tender value in Rs. Cr.	Package wise LA Requirement (Rs. Cr.)
1	JDVVNL/TNTW-581	Jodhpur Lot-I	42.01	4.201
2	JDVVNL/TNTW-582	Jodhpur Lot-II	28.01	2.801
3	JDVVNL/TNTW-583	Barmer Lot-I	31.74	3.174
4	JDVVNL/TNTW-584	Barmer Lot-II	29.30	2.930
5	JDVVNL/TNTW-585	Bikaner Lot-I	28.63	2.863
6	JDVVNL/TNTW-586	Bikaner Lot-II	31.01	3.101
7	JDVVNL/TNTW-587	Jalore Sirohi	30.16	3.016
8	JDVVNL/TNTW-588	Jaisalmer	14.85	1.485

1.02.5 Incase a bid is submitted by a Joint Venture (JV), all the partners of the JV shall meet, individually, the qualification set forth at para 1.02.2 and collectively the requirement of para 1.02.1 , 1.02.3 & 1.02.4. The figures for each of the partner of the joint venture shall be added together to determine the bidder's compliance with the minimum qualifying criteria set out in para 1.02.01, 1.02.3 & 1.02.4; however in order for a joint venture to qualify, the partner(s) of joint venture must meet the following minimum criteria:



1.02.5.1 Lead partner shall meet, not less than 40% of the criteria given at Para 1.02.1, Para 1.02.3 & Para 1.02.4 above

AND

1.02.5.2 Each of the other partner(s) shall meet not less than 25% of the criteria given at Para 1.02.3 & 1.02.4 above

Note: In case the bid is submitted by a Joint Venture, the bid security of a joint venture must be in the name of all the partners / lead partner in the joint venture submitting the bid.

1.02.6 Failure to comply with this requirement will result in rejection of the joint venture's bid. Sub contractors' experience and resources shall not be taken into account in determining the bidder's compliance with qualifying criteria. Experience of Subsidiary Company shall be considered as the Bidder's experience. The main bidder shall provide a declaration of its subsidiary company and shall furnish necessary documentary proof.

1.02.7 Bids may also be submitted by joint venture firms (having not more than three partners with one partner as lead partner). One of the partners shall be nominated as lead partner, and the lead partner shall be authorized to incur liabilities and receive instruction for and on behalf of any and all partners of the joint venture and the entire execution of the contract including receipt of payment shall be done exclusively through the lead partner. This authorization shall be evidenced by submitting a power of attorney signed by legally authorized signatories of all the partners as per proforma in Form 14 of Volume I Section VI.

1.02.8 All partner of the joint venture shall be liable jointly and severally for the execution of the contract in accordance with the contract terms and a copy of the agreement entered into by the joint venture partners having such a provision shall be submitted with the bid.

1.02.9 A statement to this effect shall be included in the authorization mentioned under para 1.02.7 above as well as in the Bid Form and in the Contract Form (in case of a successful bid);

2.0 Pre-qualification criteria – Part B:

The Bidder shall also furnish following documents/details with its bid:

2.01.1 A certificate from banker (as per format No 16) indicating various fund based/non fund based limits sanctioned to the bidder and the extent of utilization as on date. Such certificate should have been issued not earlier than three months prior to the date of bid opening. Wherever necessary, the employer may make queries with the Bidders' bankers.

2.01.2 The complete annual reports together with Audited statement of accounts of the company for last five years (FY16-17, FY17-18, FY18-19, FY19-20, FY20-21) of its own (separate) immediately preceding the date of submission of bid.

2.01.3 Note:

2.01.3.1 In the event the bidder is not able to furnish the information of its own (i.e. separate), being a subsidiary company and its accounts are being consolidated with its group/holding/parent company, the bidder should submit the audited balance sheets, income statements, other information pertaining to it only (not of its group/Holding/Parent



Company) duly certified by any one of the authority [(i) Statutory Auditor of the bidder /(ii) Company Secretary of the bidder or (iii) A certified Public Accountant] certifying that such information/documents are based on the audited accounts as the case may be.

2.01.3.2 Similarly, if the bidder happens to be a Group/Holding/Parent Company, the bidder should submit the above documents/information of its own (i.e. exclusive of its subsidiaries) duly certified by any one of the authority mentioned in Note - 2.01.3.1 above certifying that these information/ documents are based on the audited accounts, as the case may be.

2.01.4 Litigation History:

2.01.4.1 The bidder should provide detailed information on any litigation or arbitration arising out of contracts completed or under execution by it over the last five years. A consistent history of awards involving litigation against the Bidder or any partner of JV may result in rejection of Bid.

2.01.4.2 Notwithstanding anything stated hereinabove, the Employer reserves the right to assess the capacity and capability of the bidder, should the circumstances warrant such assessment in an overall interest of the Employer. The Employer reserves the right to waive minor deviations if they do not materially affect the capability of the Bidder to perform the contract.

LIST OF ELIGIBLE SCHEDULED COMMERCIAL PRIVATE INDIAN BANKS

Sl. No.	Name of Banks
1	HDFC Bank Ltd.
2	Axis Bank Ltd.
3	Kotak Mahindra Bank Ltd.
4	Federal Bank Ltd.
5	Indusind Bank Ltd.
6	Development Credit Bank Ltd.
7	ING Vysya Bank Ltd.
8	Karnataka Bank Ltd.
9	Karur Vysya Bank Ltd.
10	Ratnakar Bank Ltd.
11	South Indian Bank Ltd.
12	Yes Bank Ltd.
13	ICICI Bank
14	IDFC Bank



VOLUME I: SECTION – IV GENERAL CONDITIONS OF CONTRACT (GCC)



GENERAL CONDITIONS OF CONTRACT (GCC)

Preamble

The Section-IV of the Bidding Documents is named as General Conditions of Contract (GCC) and provides all the rights and obligations of the parties under the Contract. This Section contains provisions which are to be used unchanged unless Section - V named as Special Conditions of Contract (SCC) states otherwise as any changes in GCC or any complementary information that may be needed has been shown in SCC. If there is a conflict between the provisions of Section - IV & Section - V, the provisions of Section - V shall prevail.

A. Definitions and Interpretation

1. Definitions

- 1.1. The following words and expressions shall have the meanings hereby assigned to them:
- (a) "Settlement Committee" means the committee formed by Employer to make a decision on or to settle any dispute or difference between the Employer and the Contractor referred to him or her by the parties pursuant to GCC Sub-Clause 38.1 hereof.
 - (b) "Associate" means a party who has been conjoined by the Contractor to independently execute a pre-selected part of facilities of the contract and grant him the associated contractual rights and obligations, without diluting the overall responsibility of the contractor in respect of the Facilities under the contract.
 - (c) "Collaborator" or "Parent Company" means the firms/corporations who has provided technological support to the manufacturer for establishing production line for the specific Equipment.
 - (d) "Commissioning" means operation of the Facilities or any part thereof, if any, as per GCC Sub-Clause 1.1(e) by the Contractor as specified in the Technical Specifications, which operation is to be carried out by the Contractor as provided in GCC Sub-Clause 20.1.3 (Commissioning), for the purpose of Trial - Operation (GCC Sub-Clause 20.1.4).
 - (e) "Completion" means that the Facilities (or a specific part thereof where specific parts are specified in the **GCC Clause 1.1 (ee)**) have been completed operationally and structurally and put in a tight and clean condition and that all works in respect of pre-commissioning of the Facilities (or a specific part thereof where specific parts are specified in the **GCC Clause 1.1 (ee)**) has been completed (wherever required, as per Technical Specifications) and Commissioning followed by Trail - Operation has been completed, as provided in GCC Sub-Clause 20.1 (Completion of Facilities) hereof.
 - (f) "Contract" means the Contract Agreement entered into between the Employer and the Contractor together with the Contract Documents referred to therein.
 - (g) "Contract Documents" means the documents listed in Clause 1.1 of Article 1 (Contract Documents) of the Form of Contract Agreement (including any amendments thereto); Volume-I:Section-VI.
 - (h) "Contract Price" means the sum specified in Clause 2.1 of Article 2 (Contract Price) of the Contract Agreement, subject to such additions or deductions



therefrom, as may be made pursuant to the Contract. For the purpose of Liquidated Damages and Contract Performance Guarantee, the "Contract Price" means the sum specified in Clause 2.1 of Article 2 (Contract Price) of the Contract Agreement.

- (i) "Contractor" means the firms whose bid to perform the Contract has been accepted by the Employer and is named in the Contract Agreement, and includes the legal successors or permitted assigns of the Contractor.
- (j) "Contractor's Equipment" means all plant, facilities, equipment, machinery, tools, apparatus, appliances or things of every kind required in or for installation, completion and maintenance of Facilities that are to be provided by the Contractor, but does not include Plant and Equipment, or other things intended to form or forming part of the Facilities.
- (k) "Contractor's Representative" means any person nominated by the Contractor and approved by the Employer in the manner provided in GCC Sub-Clause 13.2 (Contractor's Representative and Construction Manager) hereof to perform the duties delegated by the Contractor.
- (l) "Day" means calendar day of the Gregorian Calendar.
- (m) "Defect Liability Period" means the period of validity of the warranties given by the Contractor commencing at Completion of the Facilities or a part thereof, if any, as per GCC Sub-Clause 1.1(e), during which the Contractor is responsible for defects with respect to the Facilities (or the relevant part thereof) as provided in GCC Clause 22 (Defect Liability) hereof.
- (n) "Effective Date" means the date of notice of award through LoI from which the Time for Completion shall be determined.
- (o) "Employer" means the firm/corporation/ government entity, Jodhpur Vidyut Vitran Nigam Limited ("JDVVNL"/"Jodhpur Discom"), (Address provided in Clause 12.0 of IFB) who is responsible for getting the Facilities implemented. The Employer may be Owner himself or an agency appointed by the Owner (State/Central PSU) and shall include the legal successors or permitted assigns of the Employer.

The Employer is:

Jodhpur Vidyut Vitran Nigam Limited
Office of the SE (CSS), New power house premises,
Heavy Industrial Area, Jodhpur 342001 (Rajasthan)
Phone: 0291-2742336
Fax: 0291-2745259
E - Mail: sessjodhpur@gmail.com

For the purpose of execution of the contract, the contractual activities shall be performed by the Employer "for and on behalf of the Owner" except in cases where the Owner itself is statutorily required to do so.

- (p) "Facilities" means the Plant and Equipment to be supplied and installed, as well as all the Installation Services to be carried out by the Contractor under the Contract.



- (q) "GCC" means the General Conditions of Contract hereof.
- (r) "Guarantee Test(s)" means the test(s) specified in the Technical Specifications to be carried out to ascertain whether the Facilities or a specified part thereof is able to attain the Functional Guarantees specified in the Technical Specifications in accordance with the provisions of GCC Sub-Clause 20.2.1 (Guarantee Test) hereof during/after successful Commissioning followed by Trial - Operation.
- (s) "Installation Services" means all those services ancillary to the supply of the Plant and Equipment for the Facilities, to be provided by the Contractor under the Contract; e.g., transportation and provision of marine or other similar insurance, inspection, expediting, site preparation works (including the provision and use of Contractor's Equipment and the supply of all construction materials required), installation, testing, pre-commissioning, commissioning, operations, maintenance, the provision of operations and maintenance manuals, training, etc.
- (t) "Month" means calendar month of the Gregorian Calendar.
- (u) "Notification of Award" means the official notice through LoI issued by the Employer notifying the Contractor that his bid has been accepted.
- (v) "Operational Acceptance" means the acceptance by the Employer of the Facilities (or any part of the Facilities where the Contract provides for acceptance of the Facilities in parts), which certifies the Contractor's fulfillment of the Contract in respect of Functional Guarantees of the Facilities (or the relevant part thereof) in accordance with the provisions of GCC Sub-Clause 20.2.2 (Operational Acceptance) hereof after successful Commissioning followed by Trial - Operation.
- (w) "Owner" means the firm/corporation/government entity, named in the SCC, who has decided to set up the Facilities and shall include the legal successors or permitted assigns of the Owner. Here, the Owner is Government of Rajasthan ("GoR").
- (x) "Plant and Equipment" means permanent plant, equipment, machinery, apparatus, articles and things of all kinds to be provided and incorporated in the Facilities by the Contractor under the Contract (including the spare parts to be supplied by the Contractor under GCC Sub-Clause 3.3 hereof), but does not include Contractor's Equipment.
- (y) "Pre-commissioning" means the testing, checking and other requirements specified in the Technical Specifications that are to be carried out by the Contractor in preparation for Commissioning as provided in GCC Sub-Clause 20.1.2 (Pre-Commissioning) hereof.
- (z) "Project Manager" or "Engineer" or "Engineer - in Charge" means the person appointed by the Employer in the manner provided in GCC Sub-Clause 13.1 hereof to perform the duties delegated by the Employer.
- (aa) "SCC" means the Special Conditions of Contract.
- (bb) "Site" means the land and other places upon which the Facilities are to be installed, and such other land or places as may be specified in the Contract as forming part of the Site.



- (cc) "Subcontractor"/"vendor"/"sub-vendor" means firms/ corporations/government entities to whom execution of any part of the Facilities, including preparation of any design or supply of any Plant and Equipment, is sub-contracted directly or indirectly by the Contractor with the consent of the Employer in writing, and includes its legal successors or permitted assigns.
- (dd) "Taking Over" means the Employer's written acceptance of the Facilities under the Contract, after successful Trial – Operation for the specified period in accordance with the Contract, as provided in GCC Sub-Clause 20.1.5.
- (ee) "Time for Completion" means the time within which Completion of the Facilities is to be attained in accordance with the scope of work and specifications, as a whole (or of a part of the Facilities where a separate Time for Completion of such part has been prescribed below) and "Taking Over" by the Employer is to be attained.

Time for Completion:

Sl. No.	Activities	Time of completion schedule with effective from date of LoI
1.	<p>Taking Over by the Employer upon successful Completion of Post Saubhagya Rural households electrification works in Jodhpur, Barmer, Bikaner, Jalore, Jaisalmer and Sirohi District of Jodhpur Discom, Rajasthan under DDUGJY NEW on behalf of Government of Rajasthan.)</p> <p>Specification Nos. as specified in the IFB Document Volume I Section I of Bidding Documents</p>	<p>The work shall be completed and Taking Over by the Employer within the 06(six) months from date of Letter of Intent.</p> <ol style="list-style-type: none">1. First 2 (two) months: 20 % of total awarded work including commencement and survey.2. In the next 2(two) months:40% of total awarded work(i.e. 60% work of total awarded value in 04 months)3. In remaining 2(two) months: 40% of total awarded work(i.e. 100% work of total awarded value in 06 months)

2. Interpretation

2.1 Contract

2.1.1 The Contracts to be entered into with the successful Bidder shall be as defined below:

- **First Contract:** For supply of all equipment and materials (Supply Contract)
- **Second Contract:** For providing all erection services including inland transportation for delivery at site, insurance, unloading, storage, handling at site, installation, Testing and Commissioning including performance testing in respect of all the equipment supplied under the "First Contract", and any other services specified in the Contract Documents (Services Contract).



- 2.1.2 The award of two separate Contracts shall not in any way dilute the responsibility of the Contractor for the successful completion of the facilities as per Specification and a breach in one Contract shall automatically be construed as a breach of the other Contract(s) which will confer a right on the Employer to terminate the other Contract(s) also at the risk and the cost of the Contractor.
- 2.1.3 The Contract will be signed in two originals and the Contractor shall be provided with one signed original and the second will be retained by the Employer.
- 2.1.4 The Contractor shall provide free of cost to the Employer all the engineering data, drawing and descriptive materials submitted with the bid, in at least two (2) copies to form a part of the Contract immediately after Notification of Award.
- 2.1.5 Subsequent to signing of the Contract, the Contractor at his own cost shall provide the Employer with at least Two (2) true copies of Contract Agreement within 7 days after signing of the Contract.

2.2 Contract Documents

All documents forming part of the Contract (and all parts thereof) are intended to be correlative, complementary and mutually explanatory, subject to Article 1.2 (Order of Precedence) of the Contract Agreement. The Contract shall be read as a whole.

2.3 Language

The ruling language of the Contract and the language for communications shall be English.

2.4 Singular and Plural

The singular shall include the plural and the plural the singular, except where the context otherwise requires.

2.5 Headings

The headings and marginal notes in the General Conditions of Contract are included for ease of reference, and shall neither constitute a part of the Contract nor affect its interpretation.

2.6 Entire Agreement

Subject to GCC Sub-Clause 12.4 hereof, the Contract constitutes the entire agreement between the Employer and Contractor with respect to the subject matter of Contract and supersedes all communications, negotiations and agreements (whether written or oral) of parties with respect thereto made prior to the date of Contract.

2.7 Amendment

No amendment or other variation of the Contract shall be effective unless it is in writing, is dated, expressly refers to the Contract, and is signed by a duly authorized representative of each party hereto.



2.8 Independent Contractor

The Contractor shall be an independent contractor performing the Contract. The Contract does not create any agency, partnership, joint venture or other joint relationship between the parties hereto.

Subject to the provisions of the Contract, the Contractor shall be solely responsible for the manner in which the Contract is performed. All employees, representatives or Subcontractors engaged by the Contractor in connection with the performance of the Contract shall be under the complete control of the Contractor and shall not be deemed to be employees of the Employer, and nothing contained in the Contract or in any subcontract awarded by the Contractor shall be construed to create any contractual relationship between any such employees, representatives or Subcontractors and the Employer.

2.9 Joint Venture

If the Contractor is a joint venture of two or more firms, all such firms shall be jointly and severally bound to the Employer for the fulfillment of the provisions of the Contract and shall designate one of such firms to act as a leader with authority to bind the joint venture. The composition or the constitution of the joint venture shall not be altered without the prior written consent of the Employer.

2.10 Non-Waiver

2.10.1 Subject to GCC Sub-Clause 2.10.2 below, no relaxation, forbearance, delay or indulgence by either party in enforcing any of the terms and conditions of the Contract or the granting of time by either party to the other shall prejudice, affect or restrict the rights of that party under the Contract, nor shall any waiver by either party of any breach of Contract operate as waiver of any subsequent or continuing breach of Contract.

2.10.2 Any waiver of a party's rights, powers or remedies under the Contract must be in writing, must be dated and signed by an authorized representative of the party granting such waiver, and must specify the right and the extent to which it is being waived.

2.11 Severability

If any provision or condition of the Contract is prohibited or rendered invalid or unenforceable, such prohibition, invalidity or unenforceability shall not affect the validity or enforceability of any other provisions and conditions of the Contract.

2.12 Country of Origin

"Origin" means the place where the materials, equipment and other supplies for the Facilities are mined, grown, produced or manufactured, and from which the services are provided. Plant and equipment are produced when, through manufacturing, processing or substantial and major assembling of components, a commercially recognized product results that is substantially different in basic characteristics or in purpose or utility from its components.

2.13 Notices



- 2.13.1 Unless otherwise stated in the Contract, all notices to be given under the Contract shall be in writing, and shall be sent by personal delivery, special courier, telegraph, facsimile or Electronic Data Interchange (EDI) to the address of the relevant party set out in the Contract Agreement, with the following provisions:
- (a) Any notice sent by telegraph, facsimile or EDI shall be confirmed within two (2) days after dispatch by notice sent by special courier, except as otherwise specified in the Contract.
 - (b) Any notice sent by special courier shall be deemed (in the absence of evidence of earlier receipt) to have been delivered ten (10) days after dispatch. In proving the fact of dispatch, it shall be sufficient to show that the envelope containing such notice was properly addressed, stamped and conveyed to the postal authorities or courier service for transmission by special courier. Provided further that whenever the postal authorities or courier service provide a proof of delivery, the same shall also be applicable for presenting the fact of dispatch.
 - (c) Any notice delivered personally or sent by telegraph, facsimile or EDI shall be deemed to have been delivered on date of its dispatch.
 - (d) Either party may change its postal, facsimile or EDI address or addressee for receipt of such notices by ten (10) days' notice to the other party in writing.
- 2.13.2 Notices shall be deemed to include any approvals, consents, instructions, orders and certificates to be given under the Contract.
- 2.14 **Governing Law & its Jurisdiction**
The Contract shall be governed by and interpreted in accordance with laws of Union of India and the Courts of Jodhpur, Rajasthan shall have exclusive jurisdiction in all matters arising under this Contract.

B. Subject Matter of Contract

3. Scope of Facilities

- 3.1 **Standards and Regulations:** Following CEA regulations shall be applicable during execution of work:
- a. Construction Regulation – Central Electricity Authority (Technical Standards for construction of electrical plants and electric lines) Regulation, 2010 (as amended time to time)
 - b. Safety Regulation for construction and O&M - Central Electricity Authority (Safety requirements for construction, Operation and Maintenance of electrical plants and electric lines) Regulation, 2011 (as amended time to time)
 - c. Connectivity Regulation – Technical Standard for connectivity to the grid (Amendment) Regulation 2013; Technical Standards for connectivity of the Distributed Generation resources, 2013; Central Electricity Authority (Grid Standard) Regulation, 2010 (as amended time to time)
 - d. Metering Regulations – Central Electricity Authority (Installation and Operation of meters) Regulations, 2006; Central Electricity Authority (Installation and Operation of meters) (Amendment) Regulations, 2010 and 2015 (as amended time to time)



- e. Central Electricity Authority (Measures relating to safety and Electric supply regulations), 2010 and amendment regulation 2015 (as amended time to time)
- 3.2 Unless otherwise expressly limited in the Technical Specifications, the Contractor's obligation shall include the provision of all Plant and Equipment and the performance of all Installation Services required for the design, the manufacture (including procurement, quality assurance, construction, installation, associated civil works, Pre-commissioning and delivery) of the Plant and Equipment and the installation, completion, commissioning and performance testing of the facilities in accordance with the plans, procedures, specifications, drawings, codes and any other documents as specified in the Technical specifications. Such specifications include, but are not limited to, the provision of supervision and engineering services; the supply of labour, materials, equipment, spare parts (as specified in GCC Sub-Clause 3.3 below) and accessories; Contractor's Equipment; construction utilities and supplies; temporary materials, structures and facilities; transportation (including without limitation, custom clearance, port handling, unloading and hauling to, from and at the Site); storage and training except for those supplies, works and services that will be provided or performed by the Employer, as set forth in Appendix-6 (Scope of Works and Supply by the Employer) to the Contract Agreement.
- 3.3 The Contractor shall, unless specifically excluded in the Contract, perform all such work and/or supply all such items and materials not specifically mentioned in the Contract but that can be reasonably inferred from the Contract as being required for attaining Completion of the Facilities as if such work and/or items and materials were expressly mentioned in the Contract.
- 3.4 The Contractor shall ensure the availability of spare parts required for the operation and maintenance of the Facilities to the Employer for a minimum period of 5 years from Completion of the Facilities. The Contractor shall carry sufficient inventories to ensure an ex-stock supply of consumable spares for the plant and equipment. If so desired by the Employer, the Contractor shall submit the specifications, price and the terms and conditions relating to the supply thereof for such spares identified by the Employer with validity period of 6 months within 7 days of receipt of request from Employer for its consideration and placement of order.
- 3.5 The Contractor shall guarantee that in the event of termination of production of spare parts by the Contractor or his Sub-Contractor:
- (i) The Contractor shall send advance notification to the Employer of the pending termination, with 2 (two) years' time to permit the Employer to procure needed requirements, and
 - (ii) Following such termination, the Contractor shall furnish at no cost to the Employer the blueprints, drawings and specification of the spare parts, if requested.
- 3.6 In case the Contractor fails to supply the spares parts in accordance with the terms stipulated above, the Employer shall sanction the Contractor declaring them ineligible for a stated period of time for future projects.

4. Time for Commencement and Completion

- 4.1 The Contractor shall commence work on the Facilities from the Effective Date of Contract i.e. date of issuance of Letter of Intent (LoI) and without prejudice to GCC Sub-Clause 21.2 hereof, the Contractor shall thereafter proceed with the Facilities in accordance with the



time schedule specified in the corresponding Appendix – 4 (Time Schedule) to the Contract Agreement of Volume-I: Section-VI (Sample Forms and Procedures).

4.2 The Contractor shall attain Completion of the Facilities (or of a part where a separate time for Completion of such part is specified in the Contract) within the time stated under Time for Completion or within such extended time to which the Contractor shall be entitled under GCC Clause 34 hereof.

4.3 Deleted

5. Contractor's Responsibilities

5.1 The Contractor shall design, manufacture (including associated purchases and/or subcontracting), install and complete the Facilities with due care and diligence in accordance with the Contract.

5.2 The Contractor confirms that it has entered into this Contract on the basis of a proper examination of the data relating to the Facilities (including any data as to boring tests) provided by the Employer, and on the basis of information that the Contractor could have obtained from a visual inspection of the Site (if access thereto was available) and of other data readily available to it relating to the Facilities as of the date seven (7) days prior to bid submission. The Contractor acknowledges that any failure to acquaint itself with all such data and information shall not relieve its responsibility for properly estimating the difficulty or cost of successfully performing the Facilities.

5.3 The Contractor shall acquire in its name all permits, approvals and/or licenses from all local, state or national government authorities or public service undertakings in the country where the Site is located that are necessary for the performance of the Contract, including, without limitation, visas for the Contractor's and Subcontractor's personnel and entry permits for all imported Contractor's Equipment. The Contractor shall acquire all other permits, approvals and/or licenses that are not the responsibility of the Employer under GCC Sub-Clause 6.3 hereof and that are necessary for the performance of the Contract.

5.4 The Contractor shall comply with all laws in force in India. The laws will include all local, state, national or other laws that affect the performance of the Contract and bind upon the Contractor. The Contractor shall indemnify and hold harmless the Employer from and against any and all liabilities, damages, claims, fines, penalties and expenses of whatever nature arising or resulting from the violation of such laws by the Contractor or its personnel, including the Subcontractors and their personnel, but without prejudice to GCC Sub-Clause 6.1 hereof.

5.5 Any Plant, Material and Services that will be incorporated in or be required for the Facilities and other supplies shall have their origin as specified under GCC Sub-Clause 2.12 (Country of Origin).

5.6 The Contractor shall permit the Employer to inspect the Contractor's accounts and records relating to the performance of the Contractor.

5.7 First-aid: The Contractor shall provide necessary first-aid facilities for all his employees, representatives and workmen working at the Site. Enough number of Contractor's personnel shall be trained in administering first-aid.

5.8 Cleanliness: The Contractor shall be responsible for keeping the entire area allotted to him clean and free from rubbish, debris etc. during the period of Contract. The Contractor shall



employ enough number of special personnel to thoroughly clean his work-area at least once in a day. All such rubbish and scrap material shall be stacked or disposed off in a place to be identified by the Project Manager. Materials and stores shall be so arranged to permit easy cleaning of the area. In areas where equipment might drip oil and cause damage to the floor surface, a suitable protective cover of a flame resistant, oil proof sheet shall be provided to protect the floor from such damage.

Similarly the labour colony, the offices and the residential areas of the Contractor's employees and workmen shall be kept clean and neat to the entire satisfaction of the Project Manager. Proper sanitary arrangement shall be provided by the Contractor, in the work-areas, office and residential areas of the Contractor.

- 5.9 Fire Protection: The work procedures that are to be used during the erection shall be those, which minimize fire hazards to the extent practicable. Combustible materials, combustible waste and rubbish shall be collected and removed from the Site at least once each day. Fuels, oils and volatile or inflammable materials shall be stored away from the construction and equipment and materials storage areas in safe containers. Un-treated materials shall not at all be used at Site for any other purpose unless otherwise specified. If any such materials are received with the equipment at the Site, the same shall be removed and replaced with acceptable materials before moving into the construction or storage area.

Similarly, corrugated paper fabricated cartons etc. will not be permitted in the construction area either storage or for handling of materials. All such materials used shall be of waterproof and flame resistant type. All other materials such as working drawings, plans etc., which are combustible but are essential for the works to be executed shall be protected against combustion resulting from welding sparks, cutting flames and other similar fire sources.

All the Contractor's supervisory personnel and sufficient number of workers shall be trained for firefighting and shall be assigned specific fire protection duties. Enough of such trained personnel must be available at the Site during the entire period of the Contract.

The Contractor shall provide enough fire protection equipment of the types and numbers for the warehouses, office, temporary structures, labour colony area etc. Access to such fire protection equipment shall be easy and kept open at all times.

- 5.10 Security: The Contractor shall have total responsibility for all equipment and materials in his custody/stores, loose, semi-assembled and/or erected by him at Site. The Contractor shall make suitable security arrangements including employment of security personnel to ensure the protection of all materials, equipment and works from theft, fire, pilferage and any other damages and loss. All materials of the Contractor shall enter and leave the project site only with the written permission of the Project Manager in the prescribed manner.
- 5.11 Contractor's Area Limits: The Project Manager will mark-out the boundary limits of access roads, parking spaces, storage and construction areas for the Contractor and the Contractor shall not trespass the areas not so marked out for him. The Contractor shall be responsible to ensure none of his personnel move out of the areas marked out for his operations. In case of such a need for the Contractor's personnel to work out of the areas marked out for him, the same shall be done only with the written permission of the Project Manager.
- 5.12 Contractor's Co-Operation with the Employer: In case where the performance of the erection work by the Contractor affects the operation of the system facilities of the

Employer, such erection work of the Contractor shall be scheduled to be performed only in the manner stipulated by the Project Manager and the same shall be acceptable at all times to the Contractor. The Project Manager may impose such restrictions on the facilities provided to the Contractor such as electricity, water, etc. as he may think fit in the interest of the Employer and the Contractor shall strictly adhere to such restrictions and co-operate with the Project Manager. It will be the responsibility of the Contractor to provide all necessary temporary instrumentation and other measuring devices required during start-up and operation of the equipment systems, which are erected by him. The Contractor shall also be responsible for flushing and initial filling of all the oil and lubricants required for the equipment furnished and erected by him, so as to make such equipment ready for operation. The Contractor shall be responsible for supplying such flushing oil and other lubricants unless otherwise specified elsewhere in the document and specifications.

- 5.13 **Updation of Progress on IT based Online Monitoring Tool:** Contractors will have to update their on-field progress on the IT based online monitoring tool on regular basis as per the guidelines issued by Discom/REC/ issued from time to time and subsequent amendments if any.
- 5.14 Contractor shall adhere to Quality Assurance Plan (QAP) issued by REC and details of the same will be provided by the Discom.

6. Employer's Responsibilities

- 6.1 Employer shall provide Single & Three phase Energy Meters free of cost to turnkey contractors. For this, turnkey contractor has to provide timeline for requirement of material supported with site survey reports and including reports on deployment of sufficient manpower for erection, testing and commissioning of these materials. The requirement of meters must be conveyed to Employer in writing at least 7 days in advance. However the Discom may provide any item as free issue item besides items mentioned in the bidding document for which erection charges will be paid as per contract.
- 6.2 The Employer shall ensure the accuracy of all information and/or data to be supplied by the Employer as described in the corresponding Appendix - 6 (Scope of Works and Supply by the Employer) to the Contract, except when otherwise expressly stated in the Contract.
- 6.3 The Employer shall be responsible for acquiring and providing legal and physical possession of the Site and access thereto, and for providing possession of and access to all other areas reasonably required for the proper execution of the Contract, including all requisite rights of way, as specified in the corresponding Appendix - 6 (Scope of Works and Supply by the Employer) to the Contract Agreement. The Employer shall give full possession of and accord all rights of access thereto on or before the date(s) specified in that Appendix.
- 6.4 The Employer shall acquire and pay for all permits, approvals and/or licenses from all local, state or national government authorities or public service undertakings in the country where the Site is located which such authorities or undertakings require the Employer to obtain them in the Employer's name, are necessary for the execution of the Contract (they include those required for the performance by both the Contractor and the Employer of their respective obligations under the Contract), including those specified in Appendix 6 (Scope of Works and Supply by the Employer) to the Contract Agreement.
- 6.5 If requested by the Contractor, the Employer shall use its best endeavors to assist the Contractor in obtaining in a timely and expeditious manner all permits, approvals and/or licenses necessary for the execution of the Contract from all local, state or national government authorities or public service undertakings that such authorities or



undertakings require the Contractor or Subcontractors or the personnel of the Contractor or Subcontractors, as the case may be, to obtain.

- 6.6 Unless otherwise specified in the Contract or agreed upon by the Employer and the Contractor, the Employer shall provide sufficient, properly qualified operating and maintenance personnel; shall supply and make available all raw materials, utilities, lubricants, chemicals, catalysts, other materials and facilities; and shall perform all work and services of whatsoever nature, to enable the Contractor to properly carry out Commissioning, all in accordance with the provisions of Appendix 6 (Scope of Works and Supply by the Employer) to the Contract Agreement at or before the time specified in the program furnished by the Contractor under GCC Sub-Clause 14.2 (Program of Performance) hereof and in the manner thereupon specified or as otherwise agreed upon by the Employer and the Contractor.
- 6.7 The Employer shall be responsible for the continued operation of the Facilities after Taking Over, in accordance with GCC Sub-Clause 20.1.5.
- 6.8 All costs and expenses involved in the performance of the obligations under this GCC Clause 6 shall be the responsibility of the Employer.
- 6.9 Facilities to be provided by the employer:
- a) Space: Land for Contractor's Office, Store, Workshop etc. –
The Project Manager shall at his discretion and for the duration of execution of the Contract make available at site, land for construction of Contractor's field office, workshop, stores, magazines for explosives in isolated locations, assembling yard, etc. required for execution of the Contract. Any construction of temporary roads, offices, workshop, etc. as per plan approved by the Project Manager shall be done by the Contractor at his cost.
 - b) Electricity (Construction Power supply): Where power supply is available with the Employer for construction purpose the same will be provided at the job site at one point of the distribution system on chargeable basis for consumption in works. Electricity provided for construction site will be of 440 volts, 3 phase, 50 cycles and 230 volts, 1 phase, 50 cycles. Contractor shall provide and install all necessary switchgears, wiring fixtures, bulbs and other temporary equipment for further distribution and utilization of energy for power and lighting and shall remove the same on completion of the work. Should, however, electricity be used in the Contractor's labour/staff colony, the power so consumed shall be charged at the prevailing tariff rate of State as prevalent for that area at the time of its use; the supply may be withdrawn if the power is used for purposes other than for the work of the project.
 - c) Water: Free supply of water will be made available for the construction purpose wherever water is available and the same shall be given at an agreed single point at the Site. Any further distribution will be the responsibility of the Contractor. Free drinking water, if available, will also be provided at one agreed point in the Site. Further distribution either to his labour colony or his work Site or to his office shall be the responsibility of the Contractor. If water source is not available with the employer at site for construction works, the contractor at his own cost shall arrange the water supply.



C. Payment

7. Contract Price

- 7.1 The Contract Price shall be as specified in Article 2 (Contract Price and Terms of Payment) of the Form of Contract Agreement.
- 7.2 The Contract Price shall be subject to adjustment in accordance with the provisions of Appendix 2 (Price Adjustment) to the Contract Agreement. The Contract Price shall be increased or reduced on account of variation in quantity in accordance with Clause 33 of GCC.
- 7.3 Subject to GCC Sub-Clauses 5.2 and 6.1 hereof, the Contractor shall be deemed to have satisfied itself as to the correctness and sufficiency of the Contract Price, which shall, except as otherwise provided for in the Contract, cover all its obligations under the Contract.

8. Terms of Payment

- 8.1 The Contract Price shall be paid as specified in the corresponding Appendix – 1 (Terms and Procedures of Payment) to the Contract Agreement of Volume-I: Section-VI (Sample Forms and Procedures). The procedures to be followed in making application for and processing payments shall be those outlined in the same Appendix.
- 8.1.1 The mounting accessories/structure supplied along with any material like circuit breaker, Lightening arrestor, Capacitor Bank, Control Panel, Isolator, AB Switch, CT/PT etc. as part of main equipment shall not be paid extra under Price Schedules. The equipment price in all such cases shall be inclusive of its mounting accessories/structure. For example: if Circuit Breaker has been supplied along with its mounting structure, the contractor shall not be paid separately for mounting structure/accessories associate with Circuit Breaker.
- 8.2 All payments shall be made in Indian Rupees under the Contract.
All the payments up to 60% of project cost of infrastructure to the Contractor shall be made by Jodhpur Discom strictly out of the funds received from REC Limited ("REC") on behalf of the Owner, 30% of infrastructure cost shall be arranged by Owner from REC loan/loan from other FIs/own resources and 10% of infrastructure cost shall be arrange by utility from own resources.
- 8.3 The Project Manager shall within twenty-one (21) days after receipt of invoices enclosing requisite documents as per payment terms release the payment through electronic mode in designated bank account of the contractor.

9. Securities

- 9.1 **Issuance of Securities**
The Contractor shall provide the securities specified below in favor of the Employer at the times, and in the amount, manner and form specified below.
- 9.2 **Advance Payment Security**
- 9.2.1 The Contractor shall, within fifteen (15) days of the notification of contract award, provide a security in an amount equal to the advance payment calculated in accordance with the corresponding Appendix - 1 (Terms and Procedures of Payment) to the Contract Agreement, and in the same currency(ies) with initial validity of up to ninety



(90) days beyond the date of Completion of the Facilities in accordance with GCC Sub-Clause 20.1. The same shall be extended by the Contractor time to time till ninety (90) days beyond the actual date of Completion of the Facilities, as may be required under the Contract.

9.2.2 The security shall be in the Form of unconditional Bank Guarantee attached hereto in Volume-I: Section VI - Sample Forms and Procedures. The security shall be discharged after completion of the facilities or relevant part thereof. The advance guarantee shall be reduced on two occasions. First reduction shall be on receipt of 50% supply cost of equipment and second reduction shall be on receipt of 75% supply cost of equipment. The advance BG shall also proportionately reduced to 50% and 25% value respectively of initial advance BG.

- Procedure for submission, reduction of Advance Payment Security is detailed in Appendix-1: Terms and Procedures of payments (refer Volume-I : Section-VI (Sample Forms and Procedures)

9.3 Performance Security

9.3.1 The Contractor shall, **within seven (7) days** of the notification of Letter of Intent, provide a performance security for the due performance of the Contract in the amount equivalent to THREE percent (3%) of the Contract Price, with a validity upto ninety (90) days beyond the Defect Liability Period. The same shall be extended by the Contractor time to time till ninety (90) days beyond the actual Defect Liability Period, as may be required under the Contract.

Apart from the Contractor's performance security, the Contractor shall be required to arrange additional performance securities, if applicable as per Clause no. 4 of Joint Deed of Undertaking mentioned at Sl. No. 19 of Volume-I: Section-VI (Sample Forms and Procedures), within seven (7) days of the notification of award in favour of the Employer in the form acceptable to the Employer. The said security(ies) shall be required to be extended time to time till ninety (90) days beyond the actual Defect Liability Period, as may be required under the Contract.

The Performance Security (ies) to be furnished by the Contractor under the Contract shall be in favour of the Employer. The Owner shall also be entitled to enforce these performance security (ies).

9.3.2 The performance security shall be in the Form of unconditional Bank Guarantee attached hereto in the Volume-I: Section VI - Sample Forms and Procedures.

9.3.3 Reduction in the security pro rata to the Contract Price of any part of the Facilities is not admissible. However, if the Defects Liability Period has been extended on any part of the Facilities pursuant to GCC Sub-Clause 22.8 hereof, the Contractor shall issue an additional security in an amount proportionate to the Contract Price of that part. The security shall be returned to the Contractor immediately after its expiration, provided, however, that if the Contractor pursuant to GCC Sub-Clause 22, is liable for an extended warranty obligation, the performance security shall be reduced to ten percent (10%) of the value of the component covered by the extended warranty.

9.3.4 In case of award of the contract to a Joint Venture, the Bank Guarantees for performance security and the Bank Guarantee for advance payment shall be submitted in the name of all the partner(s) of the Joint Venture "OR" in the name of Lead Partner in the Joint Venture submitting the bid.



9.4 Issuing Banks

The Bank Guarantee for Advance Payment Security and Performance Security are to be provided by the Contractor, which should be issued either:

- (a) by a Public Sector Bank located in India, or
- (b) a scheduled Indian Bank having paid up capital (net of any accumulated losses) of Rs. 1,000 Million or above (the latest annual report of the Bank should support compliance of capital adequacy ratio requirement) *as per attached list only* **[List is placed at Annexure-I to Section-V (SCC)]**, or

9.5 Indemnity

9.5.1 For the equipment/material to be provided by the Contractor, it will be the responsibility of the Contractor to take delivery, unload and store the materials at Site and execute an Indemnity Bond and obtain authorization letter from Employer as per proforma enclosed at Serial No. 9 – 'Form for Indemnity Bond to be executed by the Contractor' of Volume-I : Section VI (Sample Forms and Procedures), in favour of the Employer against loss, damage and any risks involved for the full value of the materials. This Indemnity Bond shall be furnished by the Contractor before commencement of the supplies and shall be valid till the scheduled date of Taking Over of the equipment by the Employer.

9.5.2 In case of divisible Contracts, where the Employer hands over his equipment to the Contractor for executing the Contract, then the Contractor shall, at the time of taking delivery of the equipment through Bill of Landing or other dispatch documents, furnish trust Receipt for Plant, Equipment and Materials and also execute an Indemnity Bond in favour of the Employer in the form acceptable to the Employer for keeping the equipment in safe custody and to utilize the same exclusively for the purpose of the said Contract. Samples of proforma for the Trust receipt and Indemnity Bond are enclosed at Serial No. 10 of Volume-I: Section VI (Sample Forms and Procedures). The Employer shall also issue a separate Authorization Letter to the Contractor to enable him to take physical delivery of plant, equipment and materials from the Employer as per proforma enclosed under Section VI (Sample Forms and Procedures).

9A Acceptance of Bank Guarantees:-

IT enabled confirmation system shall be used in addition to existing paper based confirmation system for verification of Bank Guarantee from issuing bank as under:

- i. Getting confirmation through digitally signed secured e-mails from issuing banks;
- ii. Online verification on company portal with user id and password followed by 2nd stage authentication system generated One Time Password (OTP) on portal for reconfirmation;
- iii. E-mail confirmation followed by 2nd stage authentication by system generated SMS through registered mobile and confirmation through SMS to the verifying officer.

Employer shall evolve its own procedure adopting any one or more of the above methods for ensuring genuineness of Bank Guarantees, which is compatible with the guidelines of Banks / Reserve Bank of India in addition to existing paper based confirmation system.

10. Taxes and Duties



- 10.1 The Contractor shall be entirely responsible for payment of all taxes, duties, license fees and other such levies legally payable/incurred until delivery of the contracted supplies to the Employer.

If it is statutory requirement to make deductions towards such taxes and duties or any other applicable taxes and duties, the same shall be made by the Employer and a certificate for the same shall be issued to the Contractor.

- 10.2 The Contractor shall be solely responsible for the taxes that may be levied on the Contractor's persons or on earnings of any of his employees and shall hold the Employer indemnified and harmless against any claims that may be made against the Employer. The Employer does not take any responsibility whatsoever regarding taxes under Indian Income Tax Act, for the Contractor or his personnel. If it is obligatory under the provisions of the Indian Income Tax Act, deduction of Income Tax at source shall be made by the Employer.

- 10.3 Deleted

a) Deleted

b) Deleted

- 10.4 Deleted

- 10.5 The Bidder shall include GST on Services as applicable in their invoices and Employer would not bear any liability whatsoever on this account. Employer (or the Employer on behalf of the Owner) shall, however, deduct such tax at source as per the rules and issue necessary Certificate to the Contractor.

- 10.6 The Bidder shall include the GST as applicable in their GST invoice and Employer would not bear any liability on this account. Employer on behalf of the Owner shall, however, deduct such taxes at source as per the rules and issue Tax Deducted at Source (TDS) Certificate to the bidder.

- 10.7 For the purpose of the Contract, it is agreed that the Contract Price specified in Article 2(Contract Price and Terms of Payment) of the Contract Agreement is based on the GST ("Goods & Services Tax") and other taxes prevailing at the date seven (07) days prior to the last date of bid submission (hereinafter called "Tax" in this GCC Sub-clause 10.7). ~~If any rates of Tax are increased or decreased, a new Tax is introduced, an existing Tax is abolished, or any change in interpretation or application of any Tax occurs in the course of the performance of the Contract, which was or will be assessed on the Contractor in connection with performance of the Contract, an equitable adjustment of the Contract price shall be made to fully take into account~~ **any such change by addition to the Contract price or deduction therefrom**, as the case may be, in accordance with GCC Clause 31 (Changes in Laws and Regulations) hereof.

Any downward variation in the applicable rates of existing taxes/duties or abolition of existing taxes/duties shall be passed on by the Contractor to the Discom irrespective of the timing of supply while in case of upward variation the same shall be allowed to the Contractor upto the stipulated delivery time. Any statutory levy and taxes imposed after submission of bids shall be on the Discom's account.

~~In respect of raw materials, intermediary components etc and bought out items, neither the Employer nor the Contractor shall be entitled to any claim arising due to increase or decrease in the rate of Tax, introduction of a new Tax or abolition of an existing Tax in the course of the performance of the Contract.~~



Notwithstanding anything, wherever applicable/mentioned in the bidding documents, Exice Duty (ED), Sales Tax or VAT, entry tax, service tax, the same shall be read/treated as per applicable provisions of GST and GST shall be paid as per applicable rates on submission of GST invoices.

The contractor shall furnish the relevant details/ documents for this purpose, as may be required by PIA

10.8 Deleted.

D. Intellectual Property

11. Copy Right

11.1 The copyright in all drawings, documents and other materials containing data and information furnished to the Employer/Owner by the Contractor herein shall remain vested in the Contractor or, if they are furnished to the Employer/Owner directly or through the Contractor by any third party, including supplies of materials, the copyright in such materials shall remain vested in such third party.

The Employer/Owner shall however be free to reproduce all drawings, documents and other material furnished to the Employer for the purpose of the Contract including, if required, for operation and maintenance.

11.2 The copyright in all drawings, documents and other materials containing data and information furnished to the Contractor by the Employer/Owner herein shall remain vested in the Employer/Owner.

12. Confidential Information

12.1 The Employer and the Contractor shall keep confidential and shall not, without the written consent of the other party hereto, divulge to any third party any documents, data or other information furnished directly or indirectly by the other party hereto in connection with the Contract, whether such information has been furnished prior to, during or following termination of the Contract. Notwithstanding the above, the Contractor may furnish to its Subcontractor(s) such documents, data and other information it receives from the Employer to the extent required for the Subcontractor(s) to perform its work under the Contract, in which event the Contractor shall obtain from such Subcontractor(s) an undertaking of confidentiality similar to that imposed on the Contractor under this GCC Clause 12.

12.2 The Employer shall not use such documents, data and other information received from the Contractor for any purpose other than the operation and maintenance of the Facilities. Similarly, the Contractor shall not use such documents, data and other information received from the Employer for any purpose other than the design, procurement of Plant and Equipment, construction or such other work and services as are required for the performance of the Contract.

12.3 The obligation of a party under GCC Sub-Clauses 12.1 and 12.2 above, however, shall not apply to that information which

(a) now or hereafter enters the public domain through no fault of that party



- (b) can be proven to have been possessed by that party at the time of disclosure and which was not previously obtained, directly or indirectly, from the other party hereto
 - (c) otherwise lawfully becomes available to that party from a third party that has no obligation of confidentiality.
- 12.4 The above provisions of this GCC Clause 12 shall not in any way modify any undertaking of confidentiality given by either of the parties hereto prior to the date of the Contract in respect of the Facilities or any part thereof.
- 12.5 The provisions of this GCC Clause 12 shall survive termination, for whatever reason, of the Contract.

E. Execution of the Facilities

13. Representatives

- 13.1 If the Project Manager is not named in the Contract, then within seven (7) days of the Effective Date, the Employer shall appoint and notify the Contractor in writing of the name of Project Manager. The Employer may from time to time appoint some other person as the project Manager in place of the person previously so appointed, and shall give a notice of the name of such other person to the Contractor without delay. The Employer shall take all reasonable care to see that no such appointment is made at such a time or in such a manner as to impede the progress of work on the Facilities. The Project Manager shall represent and act for the Employer at all times during the currency of the Contract. All notices, instructions, orders, certificates, approvals and all other communications under the Contract shall be given by the Project Manager, except as herein otherwise provided. All notices, instructions, information and other communications given by the Contractor to the Employer under the Contract shall be given to the Project Manager, except as herein otherwise provided.
- 13.2 Contractor's Representative & Construction Manager
- 13.2.1 If the Contractor's Representative is not named in the Contract, then within seven (7) days of the Effective Date, the Contractor shall appoint the Contractor's Representative and shall request the Employer in writing to approve the person so appointed. If the Employer makes no objection to the appointment within Three(3) days, the Contractor's Representative shall be deemed to have been approved. If the Employer objects to the appointment within three(3) days giving the reason therefor, then the Contractor shall appoint a replacement within seven (7) days of such objection, and the foregoing provisions of this GCC Sub-Clause 13.2.1 shall apply thereto.
- 13.2.2 The Contractor's Representative shall represent and act for the Contractor at all times during the currency of the Contract and shall give to the Project Manager all the Contractor's notices, instructions, information and all other communications under the Contract. All notices, instructions, information and all other communications given by the Employer or the Project Manager to the Contractor under the Contract shall be given to the Contractor's Representative or, in its absence, its deputy, except as herein otherwise provided. The Contractor shall not revoke the appointment of the Contractor's Representative without the Employer's prior written consent, which shall not be unreasonably withheld. If the Employer consents thereto, the Contractor shall appoint some other person as the Contractor's Representative, pursuant to the procedure set out in GCC Sub-Clause 13.2.1.



- 13.2.3 The Contractor's Representative may, subject to the approval of the Employer (which shall not be unreasonably withheld), at any time delegate to any person any of the powers, functions and authorities vested in him or her. Any such delegation may be revoked at any time. Any such delegation or revocation shall be subject to a prior notice signed by the Contractor's Representative, and shall specify the powers, functions and authorities thereby delegated or revoked. No such delegation or revocation shall take effect unless and until a copy thereof has been delivered to the Employer and the Project Manager. Any act or exercise by any person of powers, functions and authorities so delegated to him or her in accordance with this GCC Sub-Clause 13.2.3 shall be deemed to be an act or exercise by the Contractor's Representative.
- 13.2.3.1 Notwithstanding anything stated in GCC Sub-Clause 13.1 and 13.2.1 above, for the purpose of execution of Contract, the Employer and the Contractor shall finalize and agree to a Contract Co-ordination Procedure and all the communication under the Contract shall be in accordance with such Contract Coordination Procedure.
- 13.2.4 From the commencement of installation of the Facilities at the Site until Operational Acceptance, the Contractor's Representative shall appoint a suitable person as the construction manager, (hereinafter referred to as "the Construction Manager"). The Construction Manager shall supervise all work done at the Site by the Contractor and shall be present at the Site through-out normal working hours except when on leave, sick or absent for reasons connected with the proper performance of the Contract. Whenever the Construction Manager is absent from the Site, a suitable person shall be appointed to act as his or her deputy.
- 13.2.5 The Employer may by notice to the Contractor object to any representative or person employed by the Contractor in the execution of the Contract who, in the reasonable opinion of the Employer, may behave inappropriately, may be incompetent or negligent, or may commit a serious breach of the Site regulations provided under GCC Sub-Clause 18.3. The Employer shall provide evidence of the same, whereupon the Contractor shall remove such person from the Facilities.
- 13.2.6 If any representative or person employed by the Contractor is removed in accordance with GCC Sub-Clause 13.2.5, the Contractor shall, where required, promptly appoint a replacement.

14. Work Program

14.1 Contractor's Organization

The Contractor shall supply to the Employer and the Project Manager a chart showing the proposed organization to be established by the Contractor for carrying out work on the Facilities. The chart shall include the identities of the key personnel together with the curricula vitae of such key personnel to be employed within seven (7) days of the Effective Date. The Contractor shall promptly inform the Employer and the Project Manager in writing of any revision or alteration of such an organization chart.

14.2 Joint Survey

- a) After award of contract, a detailed GPS based survey shall be required to be done by the contractor along with Discom's Authorized Engineer to assess actual quantum of work and a single line diagram shall be prepared on AutoCAD with mentioning GPS coordinates on political map with fair correctness. **The contractor shall also submit the soft copy of the single line diagram so prepared.** The contractor shall have to execute the works in accordance with the



quantities so assessed and approved by the Discom. Further the contractor is also to carry out the detailed survey of individual work as per work order placed on them, to finalize route/ marking of the lines, pole spotting, Sub-stations, to finalize different configurations of RMUs & its associated equipment for various locations and other activities.

Successful bidder shall carry out the joint survey within **07 (Seven) days** after award of contract (issue of LOI) and submit the inception report for approval of BOQ in respect of supply & erection of material duly signed by contractor's representative & Discom officer. He shall also prepare the route of 11 KV, LT lines, location of distribution transformer on the district/town/city/village map. The final route map of 11 KV & LT lines shall be prepared and submitted by the bidder showing the proposed pole position, ground clearance, conductor sag and various crossings i.e. railway lines, communication lines, EHT lines, rivers, road and stream crossings on the map.

At the time of submission of joint survey report, necessary proposal for forest, railway, highway and river crossing be submitted within the commencement period, otherwise delay in submission shall be on the part of contractor. However, wherever such approvals are required from the concerned authorities the delay in receipt of approval from the date of submission of proposal by contractor through Engineer In-charge (To the statutory agency) shall not be on the part of contractor.

The road restoration charges, clearance charges for forest, railways, highway, river crossing etc. wherever applicable shall be reimbursed by the Discom on actual basis against the documentary proof of having deposited the same with the respective civic authority through the invoice submitted for road restoration charges actually paid to civic authority along with receipt. However, the contractor has to submit the estimate against road cut restoration charges issued by local civic agency to Nodal Officer of the Discom for pre- examination /verification for according prior approval and only after approval these charges are to be deposited by the contractor with the respective local civic authority which shall be reimbursed by the Discom on the production of documentary proof having deposited the charges on actual basis. The permission for any required road cut is also to be arranged by the bidder/Contractor from the concerned civic agency. All assistance for coordinating in this regard will be provided by the Discom.

For the extra items identified at the time of Joint Survey or as per field requirement, the erection and supply charges shall be paid on the basis of prevailing Standard Issue Rates (SIR) for the material and CLRC rates for erection.

b) Check Survey of Pole Locations

The check survey has to be conducted by the Contractor to locate and peg marks pole position on ground confirming to the approved profile and pole schedule. The Changes, if required, after detailed survey in the preliminary pole schedule shall be carried out by the Contractor and he shall thereafter submit a final pole schedule for the approval of Employer (PM). The pole schedule shall show position of all Poles, type of Poles, span length, type of foundation for each pole and the deviation at all angles as set out with other details.

- i.) Details En-route: - All topographical permanent features, such as trees, telecommunication lines, buildings etc, 5.5 meter on either side of the alignment shall be detailed on the route plan.
- ii.) Clearance from ground building, trees etc.:- Clearance from ground buildings, trees and telephones lines shall be provided in conformity



with the Electricity Act, 2003, as amended up to date. The bidder shall select the height of the poles such that all the electrical clearances are maintained.

- iii.) The minimum planting depth of poles shall be governed by IS: 1678, However, if due to the ground conditions e.g. water logged area etc. depth of planting of poles shall be suitably increased, with appropriate extension arrangement in order to maintain the required clearances the vendor will submit the details of the same on case to case basis.
- iv.) Appropriate Guarding arrangement shall be used for crossings of electric line / telecom line / road / drain / canal crossing and at all points as per statutory requirements. The Contractor shall provide provide/install anti-climbing devise and danger plates on all poles and DTstations.

14.3 Program of Performance

Within seven (7) days after the date of Notification of Award, the Contractor shall prepare and submit to the Project Manager a detailed program of performance of the Contract (L2 Network) in the form of the Critical Path Method (CPM), the PERT network, or other internationally used programs and showing the sequence in which it proposes to design, manufacture, transport, assemble, install and pre-commissioning the Facilities, as well as the date by which the Contractor reasonably requires that the Employer shall have fulfilled its obligations under the Contract so as to enable the Contractor to execute the Contract in accordance with the program and to achieve Completion, Commissioning and Acceptance of the Facilities in accordance with the Contract. The program so submitted by the Contractor shall accord with the Time Schedule included in Appendix-4 (Time Schedule) to the Contract Agreement and any other dates and periods specified in the Contract. The Contractor shall update and revise the program as and when appropriate or when required by the Project Manager, but without modification in the Times for Completion under GCC Sub-Clause 4.2 and any extension granted in accordance with GCC Clause 34, and shall submit all such revisions to the Project Manager.

14.4 Progress Report

The Contractor shall monitor progress of all the activities specified in the program referred to in GCC Sub-Clause 14.2 above, and supply a progress report to the Project Manager every month and as & when required.

The progress report shall be in a form acceptable to the Project Manager and shall indicate: (a) percentage completion achieved compared with the planned percentage completion for each activity; and (b) where any activity is behind the program, giving comments and likely consequences and stating the corrective action being taken.

14.5 Progress of Performance

If at any time the Contractor's actual progress falls behind the program referred to in GCC Sub-Clause 14.2, or it becomes apparent that it will so fall behind, the Contractor shall, at the request of the Employer or Project Manager, prepare and submit to the Project Manager a revised program, taking into account the prevailing circumstances, and shall notify the Project Manager of the steps being taken to expedite progress so as to attain Completion of the Facilities within the Time for Completion under GCC Sub-Clause 4.2, any extension thereof entitled under GCC Sub-Clause 34.1, or any extended period as may otherwise be agreed upon between the Employer and the Contractor.



14.6 Work Procedures

The Contract shall be executed in accordance with the Contract Documents and the procedures given in the section on Sample Forms and Procedures of the Contract Documents.

The Contractor may execute the Contract in accordance with its own standard project execution plans and procedures to the extent that they do not conflict with the provisions contained in the Contract.

14.7 It is emphasized to conduct weekly contract review meeting with senior most officers of Contractor at their headquarters or at project site. Employer shall decide venue of such monthly contract review meeting. In this meeting, 45 days rolling plan of mobilisation of materials and manpower shall be reviewed. Progress of works achieved on ground shall also be reviewed along with all pending issues related to availability of fronts, payments, contractual issues, if any, etc. Minutes of the meeting shall be issued by Employer within a week time. Performance of contractor shall be reviewed based on commitment and actual achievement on ground. Planning, commitment, review and evaluation of performance of contractor through this meeting shall be under overall agreed project execution plan (PERT Chart).

14.8 It is also emphasized to conduct monthly contract review meeting with sub-contractor in presence of senior most officers of the Contractor at their headquarters or at project site. Employer shall decide venue of such review meeting. In this meeting, 45 days rolling plan of mobilisation of materials and manpower shall be reviewed. Progress of works achieved on ground shall also be reviewed along with all pending issues related to availability of fronts, payments, contractual issues, if any, etc.

~~14.9 Retrieval of material~~

15. Subcontracting

The Contractor may, after informing the Project Manager and getting his written approval, assign or sub-let the Supply Contract or any part thereof other than for raw material, for minor details or for any part of the plant for which makes are identified in the Contract. Suppliers of the equipment not identified in the Contract or any change in the identified suppliers shall be subjected to approval by the Project Manager. The experience list of equipment vendors under consideration by the Contractor for this Contract shall be furnished to the Project Manager for approval prior to procurement of all such items/equipment.

Field execution of the contract shall not be sub-contracted without written permission of the Employer. On case to case basis, if employer gets satisfied with, permission for sub-contracting entire or part project execution work may be permitted (level-1). However, further sub-letting of field execution works by sub-contractor (Level-2) shall not be acceptable by employer. In case of further sub-letting of contract, it would be construed as non-performance and breach of the contract. Contractual action shall then be initiated as per provisions of the contract.

Such assignment/sub-letting shall not relieve the Contractor of any obligation, duty or responsibility under the Contract.

15.1 The corresponding Appendix (List of Approved Subcontractors) to the Contract Agreement specifies major items of supply or services and a list of approved



Subcontractors against each item, including vendors. Insofar as no Subcontractors are listed against any such item, the Contractor shall prepare a list of Subcontractors for such item for inclusion in such list. The Contractor may from time to time propose any addition to or deletion from any such list. The Contractor shall submit any such list or any modification thereto to the Employer for its approval in sufficient time so as not to impede the progress of work on the Facilities. Such approval by the Employer for any of the Subcontractors shall not relieve the Contractor from any of its obligations, duties or responsibilities under the Contract.

- 15.2 For items or parts of the Facilities not specified in the corresponding Appendix (List of Approved Subcontractors) to the Contract Agreement **for Supply Contract(s)**, the Contractor may employ such Subcontractors as it may select, at its discretion.

16. Design and Engineering

16.1 Specifications and Drawings

- 16.1.1 The Contractor shall execute the basic and detailed design and the engineering work in compliance with the provisions of the Contract, or where not so specified, in accordance with good engineering practice.

The Contractor shall be responsible for any discrepancies, errors or omissions in the specifications, drawings and other technical documents that it has prepared, whether such specifications, drawings and other documents have been approved by the Project Manager or not, provided that such discrepancies, errors or omissions are not because of inaccurate information furnished in writing to the Contractor by or on behalf of the Employer.

- 16.1.2 The Contractor shall be entitled to disclaim responsibility for any design, data, drawing, specification or other document, or any modification thereof provided or designated by or on behalf of the Employer, by giving a notice of such disclaimer to the Project Manager.



16.2 Codes and Standards

Wherever references are made in the Contract to codes and standards in accordance with which the Contract shall be executed, the edition or the revised version of such codes and standards current at the date seven (7) days prior to date of bid submission shall apply unless otherwise specified. During Contract execution, any changes in such codes and standards shall be applied after approval by the Employer and shall be treated in accordance with GCC Clause 33.

16.3 Approval/Review of Technical Documents by Project Manager

16.3.1 The Contractor shall prepare (or cause its Subcontractors to prepare) and furnish to the Project Manager the documents listed in Appendix-7 (List of Documents for Approval or Review) to the Contract Agreement for its approval or review as specified and as in accordance with the requirements of GCC Sub-Clause 14.2 (Program of Performance).

Any part of the Facilities covered by or related to the documents to be approved by the Project Manager shall be executed only after the Project Manager's approval thereof.

GCC Sub-Clauses 16.3.2 through 16.3.7 shall apply to those documents requiring the Project Manager's approval, but not to those furnished to the Project Manager for its review only.

16.3.2 Within twenty one (21) days after receipt by the Project Manager of any document requiring the Project Manager's approval in accordance with GCC Sub-Clause 16.3.1, the Project Manager shall either return one copy thereof to the Contractor with its approval endorsed thereon or shall notify the Contractor in writing of its disapproval thereof and the reasons therefore and the modifications that the Project Manager proposes.

16.3.3 The Project Manager shall not disapprove any document, except on the grounds that the document does not comply with some specified provision of the Contract or that it is contrary to good engineering practice.

16.3.4 If the Project Manager disapproves the document, the Contractor shall modify the document and resubmit it for the Project Manager's approval in accordance with GCC Sub-Clause 16.3.2. If the Project Manager approves the document subject to modification(s), the Contractor shall make the required modification(s), and upon resubmission with the required modifications the document shall be deemed to have been approved.

The procedure for submission of the documents by the Contractor and their approval by the Project Manager shall be discussed and finalized with the Contractor.

16.3.5 If any dispute or difference occurs between the Employer and the Contractor in connection with or arising out of the disapproval by the Project Manager of any document and/or any modification(s) thereto that cannot be settled between the parties within a reasonable period, then for disposal of such dispute or difference, turnkey contractor may appear before the Settlement Committee of various level of Jodhpur Discom according to financial involvement of dispute, after deposition of non-refundable fee prevailing at that time as per norms.



Decision of the Settlement Committee shall be final and binding to both of them. However appeal may be done by discontented in next level committee, as per norms /rules prevailing at that time.

16.3.6 The Project Manager's approval, with or without modification of the document furnished by the Contractor, shall not relieve the Contractor of any responsibility or liability imposed upon it by any provisions of the Contract except to the extent that any subsequent failure results from modifications required by the Project Manager.

16.3.7 The Contractor shall not depart from any approved document unless the Contractor has first submitted to the Project Manager an amended document and obtained the Project Manager's approval thereof, pursuant to the provisions of this GCC Sub-Clause 16.3. If the Project Manager requests any change in any already approved document and/or in any document based thereon, the provisions of GCC Clause 33 shall apply to such request.

17. Plant and Equipment

17.1 Subject to GCC Sub-Clause 10.2, the Contractor shall manufacture or procure and transport all the Plant and Equipment in an expeditious and orderly manner to the Site.

17.2 Employer-Supplied Plant, Equipment, and Materials

If the corresponding Appendix – 6 (Scope of Works and Supply by the Employer) to the Contract Agreement provides that the Employer shall furnish any specific items of machinery, equipment or materials to the Contractor, the following provisions shall apply:

17.2.1 The Employer shall, at its own risk and expense, transport each item to the place on or near the Site as agreed upon by the parties and make such item available to the Contractor at the time specified in the program furnished by the Contractor, pursuant to GCC Sub-Clause 14.2, unless otherwise mutually agreed.

17.2.2 The equipment & materials to be furnished by the Employer shall be supplied to the Contractor at the depots established by the Contractor or the Employer. The Lorry Receipts for the materials will be handed over to the Contractor by the representative of the Employer as and when the same are received. The Contractor shall be responsible for taking delivery of these materials from the railways/road transporter, unloading them from the transporter, carting them to different stores built by him for the purpose, the unloading and cartage being at the cost of the Contractor. All wharf age and demurrage charges incurred due to delay in taking delivery will be to the Contractor's account, except those due to reasons beyond his control in which case the Contractor shall immediately intimate the Project Manager for settling the claims. The Contractor shall be responsible for proper handling and storage of these materials from the time of receipt upto the time of Taking Over of the Facilities by the Employer.

17.2.3 Yards and store provided by the Contractor for stacking and storage of materials shall be open for inspection by the Employer as and when required. The cost of handling and storage shall be to the Contractor's account.

17.2.4 Upon receipt of such item, the Contractor shall inspect the same visually and notify the Project Manager of any detected shortage, defect or default. For the material being arranged by the Employer and supplied to the Contractor for erection, are received short, broken or damaged, an entry shall be made in the delivery register of



the railway authorities/road transporter as far as possible and a report of the same giving full details of shortage and damages along with a copy of report entered in the delivery register of the road transporter/railways shall be submitted by the Contractor to the Project Manager and Employer's consignee immediately. The Employer shall immediately remedy any shortage, defect or default, or the Contractor shall, if practicable and possible, at the request of the Employer, remedy such shortage, defect or default at the Employer's cost and expense. After inspection, such item shall fall under the care, custody and control of the Contractor. The provision of this GCC Sub-Clause 17.2.4 shall apply to any item supplied to remedy any such shortage or default or to substitute for any defective item, or shall apply to defective items that have been repaired.

17.2.5 The foregoing responsibilities of the Contractor and its obligations of care, custody and control shall not relieve the Employer of liability for any undetected shortage, defect or default, nor place the Contractor under any liability for any such shortage, defect or default whether under GCC Clause 22 or under any other provision of Contract.

17.3 Transportation

17.3.1 The Contractor shall at its own risk and expense transport all the Plant and Equipment and the Contractor's Equipment to the Site by the mode of transport that the Contractor judges most suitable under all the circumstances.

17.3.2 Unless otherwise provided in the Contract, the Contractor shall be entitled to select any safe mode of transport operated by any person to carry the Plant and Equipment and the Contractor's Equipment.

17.3.3 Upon dispatch of each shipment of the Plant and Equipment and the Contractor's Equipment, the Contractor shall notify the Employer by e-mail, telex, facsimile or Electronic Data Interchange (EDI) of the description of the Plant and Equipment and of the Contractor's Equipment, the point and means of dispatch, and the estimated time and point of arrival in the country where the Site is located, if applicable, and at the Site. The Contractor shall furnish the Employer with relevant shipping documents to be agreed upon between the parties.

17.3.4 The Contractor shall be responsible for obtaining, if necessary, approvals from the authorities for transportation of the Plant and Equipment and the Contractor's Equipment to the Site. The Employer shall use its best endeavors in a timely and expeditious manner to assist the Contractor in obtaining such approvals, if requested by the Contractor. The Contractor shall indemnify and hold harmless the Employer from and against any claim for damage to roads, bridges or any other traffic facilities that may be caused by the transport of the Plant and Equipment and the Contractor's Equipment to the Site.

17.4 Delivery and Documents

17.4.1 Delivery Documents

Upon shipment, the Contractor shall notify the Employer with full details of the dispatch and shall furnish the documents as specified in the corresponding Appendix - 1 (Terms and Procedures of Payment) to the Contract Agreement

17.4.2 Packing



- 17.4.2.1 The Contractor shall provide such packing of the Goods as it is required to prevent their damage or deterioration during transit to their final destination as indicated in the Contract. The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit and open storage. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the Goods final destination and the absence of heavy handling facilities at all points in transit.
- 17.4.2.2 The packing, marking and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for in the Contract and, subject to any subsequent instruction ordered by the Employer consistent with the requirements of the Contract.
- 17.4.3 **Materials Handling and Storage:**

All the equipment furnished under the Contract and arriving at Site shall be promptly received, unloaded, transported and stored in the storage spaces by the Contractor.

Contractor shall be responsible for examining all the shipment and notify the Project Manager immediately of any damages, storage, discrepancy etc, for the purpose of Project Manager's information only. The Contractor shall submit to the Project Manager every week a report detailing all the receipts during the week. However, the Contractor shall be solely responsible for any shortages or damages in transit, handling and/ or in storage and erection of the equipment at Site. Any demurrage, wharf age and other such charges claimed by the transporters, railways etc, shall be to the account of the Contractor.

The Contractor shall maintain an accurate and exhaustive record detailing out the list of all equipment received by him for the purpose of erection and keep such record open for the inspection of the Project Manager.

All equipment shall be handled very carefully to prevent any damage or loss. No bare wire ropes, slings, etc. shall be used for unloading and/or handling of the equipment without the specific written permission of the Project Manager. The equipment stored shall be properly protected to prevent damage either to the equipment or to the floor where they are stored. The equipment from the store shall be moved to the actual location at the appropriate time so as to avoid damage of such equipment at Site.

All electrical panels, control gears, motors and such other devices shall be properly dried by heating before they are installed and energized. Motor bearings, slip ring, commutators and other exposed parts shall be protected against moisture ingress and corrosion during storage and periodically inspected.

All the electrical equipment such as transformers, cables, insulators, motors, generators, etc. shall be tested for insulation resistance at least once in three months from the date of receipt till the date of commissioning and a record of such measured insulation values maintained by the Contractor. Such records shall be opened for inspection by the Project Manager.

The Contractor shall ensure that all the packing materials and protection devices, used for various equipment during transit and storage, are removed before the equipment are installed.



The consumable and other supplies likely to deteriorate due to storage must be thoroughly protected and stored in a suitable manner to prevent damage or deterioration in quality by storage.

All the materials stored in the open or dusty location must be covered with suitable weatherproof and flame proof covering material wherever applicable.

If the materials belonging to the Contractor are stored in areas other than those earmarked for him, the Project Manager will have the right to get it moved to the area earmarked for the Contractor at the Contractor's cost.

The Contractor shall be responsible for making suitable indoor storage facilities to store all equipment, which require indoor storage. Normally all the electrical equipment such as motors, control gears, generators, exciters and consumables like electrodes, lubricants etc. shall be stored in the closed storage space. The Project Manager, in addition, may direct the Contractor to move certain other materials, which in his opinion will require indoor storage, to indoor storage areas, which the Contractor shall strictly comply with.

18. Installation

18.1 Setting Out/Supervision/Labor

18.1.1 Bench Mark: The Contractor shall be responsible for the true and proper setting-out of the Facilities in relation to bench marks, reference marks and lines provided to it in writing by or on behalf of the Employer.

If, at any time during the progress of installation of the Facilities, any error shall appear in the position, level or alignment of the Facilities, the Contractor shall forthwith notify the Project Manager of such error and, at its own expense, immediately rectify such error to the reasonable satisfaction of the Project Manager. If such error is based on incorrect data provided in writing by or on behalf of the Employer, the expense of rectifying the same shall be borne by the Employer.

18.1.2 Contractor's Supervision: The Contractor shall give or provide all necessary superintendence during the installation of the Facilities, and the Construction Manager or its deputy shall be constantly on the Site to provide full-time superintendence of the installation. The Contractor shall provide and employ only technical personnel who are skilled and experienced in their respective callings and supervisory staff who are competent to adequately supervise the work at hand.

18.1.3 Labour:

(a) The Contractor shall provide and employ on the Site in the installation of the Facilities such skilled, semi-skilled and unskilled labor as is necessary for the proper and timely execution of the Contract. The Contractor is encouraged to use local labour that has the necessary skills.

(b) Unless otherwise provided in the Contract, the Contractor at its own expense shall be responsible for the recruitment, transportation, accommodation and catering of all labour, local or expatriate, required for the execution of the Contract and for all payments in connection therewith.



- (c) The Contractor shall at all times during the progress of the Contract use its best endeavors to prevent any unlawful, riotous or disorderly conduct or behavior by or amongst its employees and the labor of its Subcontractors.
- (d) The Contractor shall, in all dealings with its labor and the labour of its Subcontractors currently employed on or connected with the Contract, pay due regard to all recognized festivals, official holidays, religious or other customs and all local laws and regulations pertaining to the employment of labour.

18.2 Contractor's Equipment

- 18.2.1 All Contractor's Equipment brought by the Contractor onto the Site shall be deemed to be intended to be used exclusively for the execution of the Contract. The Contractor shall not remove the same from the Site without the Project Manager's consent that such Contractor's Equipment is no longer required for the execution of the Contract.
- 18.2.2 Unless otherwise specified in the Contract, upon completion of the Facilities, the Contractor shall remove from the Site all Equipment brought by the Contractor onto the Site and any surplus materials remaining thereon.
- 18.2.3 The Employer will, if requested, use its best endeavors to assist the Contractor in obtaining any local, state or national government permission required by the Contractor for the export of the Contractor's Equipment imported by the Contractor for use in the execution of the Contract that is no longer required for the execution of the Contract.

18.3 Site Regulations and Safety

The Employer and the Contractor shall establish Site regulations setting out the rules to be observed in the execution of the Contract at the Site and shall comply therewith. The Contractor shall prepare and submit to the Employer, with a copy to the Project Manager, proposed Site regulations for the Employer's approval, which approval shall not be unreasonably withheld.

Such Site regulations shall include, but shall not be limited to, rules in respect of security, safety of the Facilities, gate control, sanitation, medical care, and fire prevention.

18.3.1 Compliance with Labour Regulations

- 18.3.1.1 During continuance of the contract, the Contractor and his sub-contractors shall abide at all times by all applicable existing labour enactments and rules made thereunder, regulations notifications and byelaws of the State or Central Government or local authority and any other labour law (including rules), regulations bye laws that may be passed or notification that may be issued under any labour law in future either by the State or the Central Government or the local authority. The employees of the Contractor and the Sub-contractor in no case shall be treated as the employees of the Employer at any point of time.
- 18.3.1.2 The Contractor shall keep the Project Manager indemnified in case any action is taken against the Contractor by the competent authority on account of contravention of any of the provisions of any Act or rules made thereunder, regulations or notifications including amendments.



18.3.1.3 If the Project Manager/Employer is caused to pay under any law as principal employer such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications/ byelaws/Acts/ Rules/regulations including amendments, if any, on the part of the Contractor, the Project Manager shall have the right to deduct any money due to the Contractor under this contract or any other contract with the Project Manager/Employer including his amount of performance security for adjusting the aforesaid payment. The Project Manager shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Project Manager/Employer.

Notwithstanding the above, the Contractor shall furnish to the Project Manager the details/documents evidencing the Contractor's compliance to the laws applicable to establishments engaged in building and other construction works, as may be sought by the Project Manager. In particular the Contractor shall submit quarterly certificate regarding compliance in respect of provisions of Employees' Provident Fund and Misc. Provisions Act 1952 or latest to the Project Manager.

18.3.1.4 Salient features of some major laws applicable to establishments engaged in building and other construction works:

- (a) Workmen Compensation Act 1923 or latest: The Act provides for compensation in case of injury by accident arising out of and during the course of employment.
- (b) Payment of Gratuity Act 1972 or latest: Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years' service or more or on death at the rate of 15 days wages for every completed year of service. The Act is applicable to all establishments employing 10 or more employees.
- (c) Employee P.F. and Miscellaneous Provision Act 1952 or latest: The Act provides for monthly contribution by the turnkey Contractor plus his workers as per the latest prevalent applicable rate. The benefits under the Act are:
 - (i) Pension or family pension on retirement or death, as the case may be.
 - (ii) Deposit linked insurance on death in harness of the worker.
 - (iii) Payment of P.F. accumulation on retirement/death etc.
- (d) Maternity Benefit Act 1951 or latest: The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.
- (e) Contract Labour (Regulation & Abolition) Act 1970 or latest: The Act provides for certain welfare measures to be provided by the Contractor to contract labour and in case the Contractor fails to provide, the same are required to be provided, by the Principal Employer by law. The Principal Employer is required to take Certification of Registration and the Contractor is required to take license from the designated Officer. The Act is applicable to the establishments or Contractor of Principal Employer if they employ 20 or more contract labour.
- (f) Minimum Wages Act 1948 or latest: The Contractor is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provision of the Act if the employment is a scheduled employment. Construction of Buildings, Roads, Runways are scheduled employments.



- (g) Payment of Wages Act 1936 or latest: It lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.
- (h) Equal Remuneration Act 1979 or latest: The Act provides for payment of equal wages for work of equal nature to Male and Female workers and for not making discrimination against Female employees in the matters of transfers, training and promotions etc.
- (i) Payment of Bonus Act 1965 or latest: The Act is applicable to all establishments employing 20 or more employees. The Act provides for payments of annual bonus subject to a minimum and maximum % of wages to employees drawing certain amount per month or less. The bonus is to be paid to employees getting specified amount as per the latest prevalent applicable provisions of the The Act. The Act does not apply to certain establishments. The newly set-up establishments are exempted for five years in certain circumstances. Some of the State Governments have reduced the employment size from 20 to 10 for the purpose of applicability of this Act. The above guidelines shall be liable to change with the change in act/notification by relevant statutory authority.
- (j) Industrial Dispute Act 1947 or latest: the Act lays down the machinery the procedure for resolution of Industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.
- (k) Industrial Employment (Standing Orders) Act 1946 or latest: It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the States and Central Government to 50). The Act provides for laying down rules governing the conditions of employment by the employer (i.e. turnkey contractor) on matters provided in the Act and get the same certified by the designated Authority.
- (l) Trade Unions Act 1926 or latest: The Act lays down the procedure for registration of trade unions of workmen and contractors. The Trade Unions registered under the Act have been given certain immunities from civil and criminal liabilities.
- (m) Child Labour (Prohibition & Regulation) Act 1986 or latest: The Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of Child Labour is prohibited in Building and Construction Industry.
- (n) Inter-State Migrant workmen's (Regulation of Employment & Conditions of Service Act 1979 or latest: The Act is applicable to an establishment which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The Inter-State migrant workmen, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, traveling expenses from home upto the establishment and back, etc.
- (o) The Building and Other Construction workers (Regulation of Employment and Conditions of Service) Act 1996 or latest and the Cess Act of 1996 or latest: All the establishments who carry on any building or other construction work and employ 10 or more workers are covered under this Act. All such establishments are required to pay cess at the prevalent applicable rate of the cost of



construction as may be modified by the Government. The turnkey contractor of the establishment is required to provide safety measures at the electrical construction site, substations, building or construction work and other welfare measures, such as Canteens, First-Aid facilities, Ambulance, Housing accommodations for workers near the work place etc. The turnkey contractor to whom the Act applies has to obtain a registration certificate from the Registering Officer appointed by the government.

- (p) Factories Act 1948 or latest: The Act lays down the procedure for approval at plans before setting up a factory, health and safety provisions, welfare provisions, working hours, annual earned leave and rendering information regarding accidents or dangerous occurrences to designated authorities. It is applicable to premises employing 10 persons or more with aid of power or 20 or more persons without the aid of power engaged in manufacturing process.

18.3.2 Protection of Environment

The Contractor shall take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as consequence of his methods of operation.

During continuance of the Contract, the Contractor and his Sub-contractors shall abide at all times by all existing enactments on environmental protection and rules made thereunder, regulations, notifications and bye-laws of the State or Central Government, or local authorities and any other law, bye-law, regulations that may be passed or notification that may be issued in this respect in future by the State or Central Government or the local authority.

Salient features of some of the major laws that are applicable are given below:

The Water (Prevention and Control of Pollution) Act, 1974 or latest, This provides for the prevention and control of water pollution and the maintaining and restoring of wholesomeness of water. 'Pollution' means such contamination of water or such alteration of the physical, chemical or biological properties of water or such discharge of any sewage or trade effluent or of any other liquid, gaseous or solid substance into water (whether directly or indirectly) as may, or is likely to, create a nuisance or render such water harmful or injurious to public health or safety, or to domestic, commercial, industrial, agricultural or other legitimate uses, or to the life and health of animals or plants or of aquatic organisms.

The Air (Prevention and Control of Pollution) Act, 1981 or latest, This provides for prevention, control and abatement of air pollution. 'Air Pollution' means the presence in the atmosphere of any 'air pollutant', which means any solid, liquid or gaseous substance (including noise) present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment.

The Environment (Protection) Act, 1986 or latest, This provides for the protection and improvement of environment and for matters connected therewith, and the prevention of hazards to human beings, other living creatures, plants and property. 'Environment' includes water, air and land and the inter-relationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro-organism and property.



The Public Liability Insurance Act, 1991 or latest, This provides for public liability insurance for the purpose of providing immediate relief to the persons affected by accident occurring while handling hazardous substances and for matters connected herewith or incidental thereto. Hazardous substance means any substance or preparation which is defined as hazardous substance under Environment (Protection) Act, 1986 or latest, and exceeding such quantity as may be specified by notification by the Central Government.

18.3.3 Safety Precautions

18.3.3.1 The Contractor shall observe all applicable regulations regarding safety on the Site.

Unless otherwise agreed, the Contractor shall, from the commencement of work on Site until Taking Over, provide:

- a) Fencing, lighting, guarding and watching of the Works, and
- b) Temporary roadways, footways, guards and fences which may be necessary for the accommodation and protection of Employer / his representatives and occupiers of adjacent property, the public and others.

18.3.3.2 The Contractor shall ensure proper safety of all the workmen, materials, plant and equipment belonging to him or to Employer or to others, working at the Site. The Contractor shall also be responsible for provision of all safety notices and safety equipment required both by the relevant legislations and the Project Manager, as he may deem necessary.

18.3.3.3 The Contractor will notify well in advance to the Project Manager of his intention to bring to the Site any container filled with liquid or gaseous fuel or explosive or petroleum substance or such chemicals which may involve hazards. The Project Manager shall have the right to prescribe the conditions, under which such container is to be stored, handled and used during the performance of the works and the Contractor shall strictly adhere to and comply with such instructions. The Project Manager shall have the right at his sole discretion to inspect any such container or such construction plant/equipment for which material in the container is required to be used and if in his opinion, its use is not safe, he may forbid its use. No claim due to such prohibition shall be entertained by the Employer and the Employer shall not entertain any claim of the Contractor towards additional safety provisions/conditions to be provided for/constructed as per the Project Manager's instructions.

Further, any such decision of the Project Manager shall not, in any way, absolve the Contractor of his responsibilities and in case, use of such a container or entry thereof into the Site area is forbidden by the Project Manager, the Contractor shall use alternative methods with the approval of the Project Manager without any cost implication to the Employer or extension of work schedule.

18.3.3.4 Where it is necessary to provide and/or store petroleum products or petroleum mixtures and explosives, the Contractor shall be responsible for carrying-out such provision and/or storage in accordance with the rules and regulations laid down in Petroleum Act 1934 or latest, Explosives Act, 1948 or latest and Petroleum and Carbide of Calcium Manual published by the Chief Inspector of Explosives of India. All such storage shall have prior approval of the Project Manager. In case, any approvals are necessary from the Chief Inspector (Explosives) or any statutory authorities, the Contractor shall be responsible for obtaining the same.



- 18.3.3.5 All equipment used in construction and erection by Contractor shall meet Indian/International Standards and where such standards do not exist, the Contractor shall ensure these to be absolutely safe. All equipment shall be strictly operated and maintained by the Contractor in accordance with manufacturer's Operation Manual and safety instructions and as per Guidelines/rules of Employer in this regard.
- 18.3.3.6 Periodical examinations and all tests for all lifting/hoisting equipment & tackles shall be carried-out in accordance with the relevant provisions of Factories Act 1948 or latest or latest, Indian Electricity Act 2003 and associated Laws/Rules in force from time to time. A register of such examinations and tests shall be properly maintained by the Contractor and will be promptly produced as and when desired by the Project Manager or by the person authorised by him.
- 18.3.3.7 The Contractor shall be fully responsible for the safe storage of his and his Sub-Contractor's radioactive sources in accordance with BARC/DAE Rules and other applicable provisions. All precautionary measures stipulated by BARC/DAE in connection with use, storage and handling of such material will be taken by the Contractor.
- 18.3.3.8 The Contractor shall provide suitable safety equipment of prescribed standard to all employees and workmen according to the need, as may be directed by the Project Manager who will also have right to examine these safety equipment to determine their suitability, reliability, acceptability and adaptability.
- 18.3.3.9 Where explosives are to be used, the same shall be used under the direct control and supervision of an expert, experienced, qualified and competent person strictly in accordance with the Code of Practice/Rules framed under Indian Explosives Act pertaining to handling, storage and use of explosives.
- 18.3.3.10 The Contractor shall provide safe working conditions to all workmen and employees at the Site including safe means of access, railings, stairs, ladders, scaffoldings etc. The scaffoldings shall be erected under the control and supervision of an experienced and competent person. For erection, good and standard quality of material only shall be used by the Contractor.
- 18.3.3.11 The Contractor shall not interfere or disturb electric fuses, wiring and other electrical equipment belonging to the Employer or other Contractors under any circumstances, whatsoever, unless expressly permitted in writing by Employer to handle such fuses, wiring or electrical equipment
- 18.3.3.12 Before the Contractor connects any electrical appliances to any plug or socket belonging to the other Contractor or Employer, he shall:
- a. Satisfy the Project Manager that the appliance is in good working condition;
 - b. Inform the Project Manager of the maximum current rating, voltage and phases of the appliances;
 - c. Obtain permission of the Project Manager detailing the sockets to which the appliances may be connected.
- 18.3.3.13 The Project Manager will not grant permission to connect until he is satisfied that;
- a. The appliance is in good condition and is fitted with suitable plug;



- b. The appliance is fitted with a suitable cable having two earth conductors, one of which shall be an earthed metal sheath surrounding the cores.
- 18.3.3.14 No electric cable in use by the Contractor/Employer will be disturbed without prior permission. No weight of any description will be imposed on any cable and no ladder or similar equipment will rest against or attached to it.
- 18.3.3.15 No repair work shall be carried out on any live equipment. The equipment must be declared safe by the Project Manager and a permit to work shall be issued by the Project Manager before any repair work is carried out by the Contractor. While working on electric lines/equipment, whether live or dead, suitable type and sufficient quantity of tools will have to be provided by the Contractor to electricians/workmen/officers.
- 18.3.3.16 The Contractors shall employ necessary number of qualified, full time electricians/electrical supervisors to maintain his temporary electrical installation.
- 18.3.3.17 The Contractor employing more than 250 workmen whether temporary, casual, probationer, regular or permanent or on contract, shall employ at least one full time officer exclusively as safety officer to supervise safety aspects of the equipment and workmen, who will coordinate with the Project Safety Officer. In case of work being carried out through Sub-Contractors, the Sub-Contractor's workmen/employees will also be considered as the Contractor's employees/workmen for the above purpose.
- The name and address of such Safety Officers of the Contractor will be promptly informed in writing to Project Manager with a copy to Safety Officer-In charge before he starts work or immediately after any change of the incumbent is made during currency of the Contract.
- 18.3.3.18 In case any accident occurs during the construction/ erection or other associated activities undertaken by the Contractor thereby causing any minor or major or fatal injury to his employees due to any reason, whatsoever, it shall be the responsibility of the Contractor to promptly inform the same to the Project Manager in prescribed form and also to all the authorities envisaged under the applicable laws.
- 18.3.3.19 The Project Manager shall have the right at his sole discretion to stop the work, if in his opinion the work is being carried out in such a way that it may cause accidents and endanger the safety of the persons and/or property, and/or equipment. In such cases, the Contractor shall be informed in writing about the nature of hazards and possible injury/accident and he shall comply to remove shortcomings promptly. The Contractor after stopping the specific work can, if felt necessary, appeal against the order of stoppage of work to the Project Manager within 3 days of such stoppage of work and decision of the Project Manager in this respect shall be conclusive and binding on the Contractor.
- 18.3.3.20 The Contractor shall not be entitled for any damages/compensation for stoppage of work due to safety reasons as provided in GCC Sub-Clause 18.3.3.19 above and the period of such stoppage of work will not be taken as an extension of time for completion of work and will not be the ground for waiver of levy of liquidated damages.
- 18.3.3.21 It is mandatory for the Contractor to observe during the execution of the works, requirements of Safety Rules which would generally include but not limited to following:



Safety Rules

- a) Each employee shall be provided with initial indoctrination regarding safety by the Contractor, so as to enable him to conduct his work in a safe manner.
 - b) No employee shall be given a new assignment of work unfamiliar to him without proper introduction as to the hazards incident thereto, both to himself and his fellow employees.
 - c) Under no circumstances shall an employee hurry or take unnecessary chance when working under hazardous conditions.
 - d) Employees must not leave naked fires unattended. Smoking shall not be permitted around fire prone areas and adequate firefighting equipment shall be provided at crucial location.
 - e) Employees under the influence of any intoxicating beverage, even to the slightest degree shall not be permitted to remain at work.
 - f) There shall be a suitable arrangement at every work site for rendering prompt and sufficient first aid to the injured.
 - g) The staircases and passageways shall be adequately lighted.
 - h) The employees when working around moving machinery, must not be permitted to wear loose garments. Safety shoes are recommended when working in shops or places where materials or tools are likely to fall. Only experienced workers shall be permitted to go behind guard rails or to clean around energized or moving equipment.
 - i) The employees must use the standard protection equipment intended for each job. Each piece of equipment shall be inspected before and after it is used.
 - j) Requirements of ventilation in underwater working to licensed and experienced divers, use of gum boots for working in slushy or in inundated conditions are essential requirements to be fulfilled.
 - k) In case of rock excavation, blasting shall invariably be done through licensed blasters and other precautions during blasting and storage/transport of charge material shall be observed strictly.
- 18.3.3.22 The Contractor shall follow and comply with all Employer Safety Rules, relevant provisions of applicable laws pertaining to the safety of workmen, employees, plant and equipment as may be prescribed from time to time without any demur, protest or contest or reservations. In case of any discrepancy between statutory requirement and Employer Safety Rules referred above, the latter shall be binding on the Contractor unless the statutory provisions are more stringent.
- 18.3.3.23 If the Contractor fails in providing safe working environment as per Employer Safety Rules or continues the work even after being instructed to stop work by the Project Manager as provided in GCC Sub-Clause 18.3.3.19 above, the Contractor shall promptly pay to Employer, on demand by the Employer, compensation at the rate of Rs. 5,000/- per day of part thereof till the instructions are complied with and so certified by the Project Manager. However, in case of accident taking place causing



injury to any individual, the provisions contained in GCC Sub-Clause 18.3.3.24 shall also apply in addition to compensation mentioned in this Clause.

- 18.3.3.24 If the Contractor does not take adequate safety precautions and/or fails to comply with the Safety Rules as prescribed by the Employer or under the applicable law for the safety of the equipment and plant or for the safety of personnel or the Contractor does not prevent hazardous conditions which cause injury to his own employees or employees of other Contractors or Employer's employees or any other person who are at Site or adjacent thereto, then the Contractor shall be responsible for payment of a sum as indicated below to be deposited with the Employer, which will be passed on by the Employer to such person or next to kith and kin of the deceased:

a.	Fatal injury or accident causing death	Rs. 1,000,000/- per person
b.	Major injuries or accident causing 25% or more permanent disablement	Rs. 100,000/- per person

Permanent disablement shall have same meaning as indicated in Workmen's Compensation Act. The amount to be deposited with Employer and passed on to the person mentioned above shall be in addition to the compensation payable under the relevant provisions of the Workmen's Compensation Act and rules framed there under or any other applicable laws as applicable from time to time. In case the Contractor does not deposit the above mentioned amount with Employer, such amount shall be recovered by Employer from any monies due or becoming due to the Contractor under the contract or any other on-going contract.

- 18.3.3.25 If the Contractor observes all the Safety Rules and Codes, Statutory Laws and Rules during the currency of Contract awarded by the Employer and no accident occurs then Employer may consider the performance of the Contractor and award suitable 'ACCIDENT FREE SAFETY MERITORIOUS AWARD' as per scheme as may be announced separately from time to time.

- 18.3.3.26 The Contractor shall also submit 'Safety Plan' as per proforma specified in Section – Sample Forms and Procedures of the Bidding Documents alongwith all the requisite documents mentioned therein and as per check-list contained therein to the Project Manager for its approval within 60 days of award of Contract.

Further, one of the conditions for release of first progressive payment / subsequent payment towards Services Contract shall be submission of 'Safety Plan' alongwith all requisite documents and approval of the same by the Project Manager.

18.4 Opportunities for Other Contractors

- 18.4.1 The Contractor shall, upon written request from the Employer or the Project Manager, give all reasonable opportunities for carrying out the work to any other contractors employed by the Employer on or near the Site.

- 18.4.2 If the Contractor, upon written request from the Employer or the Project Manager, makes available to other contractors any roads or ways the maintenance for which the Contractor is responsible, permits the use by such other contractors of the Contractor's Equipment, or provides any other service of whatsoever nature for such other contractors, the Employer shall fully compensate the Contractor for any loss or damage caused or occasioned by such other contractors in respect of any such use or service, and shall pay to the Contractor reasonable remuneration for the use of such equipment or the provision of such services.



18.4.3 The Contractor shall also so arrange to perform its work as to minimize, to the extent possible, interference with the work of other contractors. The Project Manager shall determine the resolution of any difference or conflict that may arise between the Contractor and other contractors and the workers of the Employer in regard to their work.

18.4.4 The Contractor shall notify the Project Manager promptly of any defects in the other contractors' work that come to its notice, and that could affect the Contractor's work. The Project Manager shall determine the corrective measures, if any, required to rectify the situation after inspection of the Facilities. Decisions made by the Project Manager shall be binding on the Contractor.

18.5 Emergency Work

If, by reason of an emergency arising in connection with and during the execution of the Contract, any protective or remedial work is necessary as a matter of urgency to prevent damage to the Facilities, the Contractor shall immediately carry out such work.

If the Contractor is unable or unwilling to do such work immediately, the Employer may do or cause such work to be done as the Employer may determine is necessary in order to prevent damage to the Facilities. In such event the Employer shall, as soon as practicable after the occurrence of any such emergency, notify the Contractor in writing of such emergency, the work done and the reasons therefor. If the work done or caused to be done by the Employer is work that the Contractor was liable to do at its own expense under the Contract, the reasonable costs incurred by the Employer in connection therewith shall be paid by the Contractor to the Employer. In case such work is not in the scope of the Contractor, the cost of such remedial work shall be borne by the Employer.

18.6 Site Clearance

18.6.1 Site Clearance in Course of Performance: In the course of carrying out the Contract, the Contractor shall keep the Site reasonably free from all unnecessary obstruction, store or remove any surplus materials, clear away any wreckage, rubbish or temporary works from the Site, and remove any Contractor's Equipment no longer required for execution of the Contract.

18.6.2 Clearance of Site after Completion: After Completion of all parts of the Facilities, the Contractor shall clear away and remove all wreckage, rubbish and debris of any kind from the Site, and shall leave the Site and Facilities clean and safe.

18.7 Watching and Lighting

The Contractor shall provide and maintain at its own expense all lighting, fencing, and watching when and where necessary for the proper execution and the protection of the Facilities, or for the safety of the owners and occupiers of adjacent property and for the safety of the public.

18.8 Work at Night and on Holidays

18.8.1 Unless otherwise provided in the Contract, no work shall be carried out during the night and on public holidays of the country where the Site is located without prior written consent of the Employer, except where work is necessary or required to ensure safety of the Facilities or for the protection of life, or to prevent loss or damage to property, when the Contractor shall immediately advise the Project Manager,



provided that provisions of this GCC Sub-Clause 18.8.1 shall not apply to any work which is customarily carried out by rotary or double-shifts.

18.8.2 Notwithstanding GCC Sub-Clauses 18.8.1 or 18.1.3, if and when the Contractor considers it necessary to carry out work at night or on public holidays so as to meet the Time for Completion and requests the Employer's consent thereto, the Employer shall not unreasonably withhold such consent.

19. Test and Inspection

19.1 The Contractor shall at its own expense carry out at the place of manufacture and/or on the Site all such tests and/or inspections of the Plant and Equipment and any part of the Facilities as are specified in the Contract.

19.2 The Employer and the Project Manager or their designated representatives shall be entitled to attend the aforesaid test and/or inspection, provided that the Employer shall bear all costs and expenses incurred in connection with such attendance including, but not limited to, all traveling and board and lodging expenses.

19.3 Whenever the Contractor is ready to carry out any such test and/or inspection, the Contractor shall give four weeks advance notice of such test and/or inspection and of the place and time thereof to the Project Manager. The Contractor shall obtain from any relevant third party or manufacturer any necessary permission or consent to enable the Employer and the Project Manager (or their designated representatives) to attend the test and/or inspection.

19.4 The Contractor shall provide the Project Manager with a certified report of the results of any such test and/or inspection.

If the Employer or Project Manager (or their designated representatives) fails to attend the test and/or inspection, or if it is agreed between the parties that such persons shall not do so, then the Contractor may proceed with the test and/or inspection in the absence of such persons, and may provide the Project Manager with a certified report of the results thereof.

19.5 The Project Manager may require the Contractor to carry out any test and/or inspection not required by the Contract, provided that the Contractor's reasonable costs and expenses incurred in the carrying out of such test and/or inspection shall be added to the Contract Price. Further, if such test and/or inspection impedes the progress of work on the Facilities and/or the Contractor's performance of its other obligations under the Contract, due allowance will be made in respect of the Time for Completion and the other obligations so affected.

19.6 If any Plant and Equipment or any part of the Facilities fails to pass any test and/or inspection, the Contractor shall either rectify or replace such Plant and Equipment or part of the Facilities and shall repeat the test and/or inspection upon giving a notice under GCC Sub-Clause 19.3.

19.7 If any dispute or difference of opinion shall arise between the parties in connection with or arising out of the test and/or inspection of the Plant and Equipment or part of the Facilities that cannot be settled between the parties within a reasonable period of time, it may be referred to the Settlement Committee for determination in accordance with GCC Sub-Clause 38.1.

19.8 The Contractor shall afford the Employer and the Project Manager, at the Employer's expense, access at any reasonable time to any place where the Plant and Equipment



are being manufactured or the Facilities are being installed, in order to inspect the progress and the manner of manufacture or installation, provided that the Project Manager shall give the Contractor a reasonable prior notice.

- 19.9 The Contractor agrees that neither the execution of a test and/or inspection of Plant and Equipment or any part of the Facilities, nor the attendance by the Employer or the Project Manager, nor the issue of any test certificate pursuant to GCC Sub-Clause 19.4, shall release the Contractor from any other responsibilities under the Contract.
- 19.10 No part of the Facilities or foundations shall be covered up on the Site without the Contractor carrying out any test and/or inspection required under the Contract. The Contractor shall give a reasonable notice to the Project Manager whenever any such part of the Facilities or foundations are ready or about to be ready for test and/or inspection; such test and/or inspection and notice thereof shall be subject to the requirements of the Contract.
- 19.11 The Contractor shall uncover any part of the Facilities or foundations, or shall make openings in or through the same as the Project Manager may from time to time require at the Site, and shall reinstate and make good such part or parts.

If any parts of the Facilities or foundations have been covered up at the Site after compliance with the requirement of GCC Sub-Clause 19.10 and are found to be executed in accordance with the Contract, the expenses of uncovering, making openings in or through, reinstating, and making good the same shall be borne by the Employer, and the Time for Completion shall be reasonably adjusted to the extent that the Contractor has thereby been delayed or impeded in the performance of any of its obligations under the Contract.

20. Completion of the Facilities and Operational Acceptance

20.1 Completion of the Facilities

20.1.1 Physical Completion

20.1.1.1 As soon as the Facilities or any part thereof has, in the opinion of the Contractor, been completed operationally and structurally and put in a tight and clean condition as specified in the Technical Specifications, excluding minor items not materially affecting the operation or safety of the Facilities, the Contractor shall so notify the Employer in writing.

20.1.2 Pre-Commissioning

20.1.2.1 Within seven (7) days after receipt of the notice from the Contractor under GCC Sub-Clause 20.1.1.1, the Project Manager shall deploy the operating and maintenance personnel and other material if so specified in the corresponding Appendix – 6 (Scope of Works and Supply by the Employer) to the Contract Agreement for Pre-commissioning of the Facilities or any part thereof.

20.1.2.2 As soon as reasonably practicable after the operation and maintenance personnel have been deployed by the Employer and other materials have been provided by the Employer in accordance with GCC Sub-Clause 20.1.2.1, the Contractor shall commence Pre-commissioning of the Facilities or the relevant part thereof, in presence of the Employer's representatives, as per procedures detailed in Technical Specifications in preparation for Commissioning.



- 20.1.2.3 As soon as all works in respect of Pre-commissioning are successfully completed and, in the opinion of the Contractor, the Facilities or any part thereof is ready for Commissioning, the Contractor shall notify the Project Manager in writing.
- 20.1.2.4 The Project Manager shall, within fourteen (14) days after receipt of the Contractor's notice under GCC Sub-Clause 20.1.2.3, notify the Contractor in writing of any defects and/or deficiencies.
- 20.1.2.5 If the Project Manager notifies the Contractor of any defects and/or deficiencies, the Contractor shall then correct such defects and/or deficiencies, and shall repeat the procedure described in GCC Sub-Clause 20.1.2.2. If in the opinion of the Contractor, the Facilities or any part thereof is now ready for Commissioning, the Contractor shall again notify the Project Manager in writing. If further defects and/or deficiencies are not notified by the Project Manager and if the Project Manager is satisfied that the Pre-commissioning of Facilities or that part thereof have been successfully completed, the Project Manager shall, within seven (7) days after receipt of the Contractor's such notice, advise the Contractor to proceed with the Commissioning of the Facilities or part thereof.
- 20.1.2.6 If the Project Manager fails to inform the Contractor of any defects and/or deficiencies within fourteen (14) days after receipt of the Contractor's notice under GCC Sub-Clause 20.1.2.4 or within seven (7) days after receipt of the Contractor's notice on completion of repeat procedure under GCC Sub-Clause 20.1.2.5, then the Pre-commissioning of the Facilities or that part thereof shall be considered to have been successfully completed as of the date of the Contractor's notice.
- 20.1.2.7 As soon as possible after Pre-commissioning, the Contractor shall complete all outstanding minor items so that the Facilities are fully in accordance with the requirements of the Contract, failing which the Employer will undertake such completion and deduct the costs thereof from any monies owing to the Contractor.
- 20.1.2.8 In the event that the Contractor is unable to proceed with the Pre-commissioning of the Facilities pursuant to Sub-Clause 20.1.2 for reasons attributable to the Employer either on account of non-availability of other facilities under the responsibilities of other contractor(s), or for reasons beyond the Employer's control, the following provisions shall apply:

When the Contractor is notified by the Project Manager that he will be unable to proceed with the activities and obligations pursuant to above GCC Sub-Clause 20.1.2.8, the Contractor shall be entitled to the following:

- a) the Time of Completion shall be extended for the period of suspension without imposition of liquidated damages pursuant to GCC Sub-Clause 21.2.
- b) payments due to the Contractor in accordance with the provisions specified in Appendix I (Terms and Procedures of Payment) to the Contract Agreement, which would have not been payable in normal circumstances due to non-completion of the said activities and obligations, shall be released to the Contractor against submission of a security in the form of a bank guarantee of equivalent amount acceptable to the Employer, and which shall become null and void when the Contractor will have complied with its obligations regarding these payments, subject to the provisions of GCC Sub-Clause 21.2.9 below.
- c) the expenses payable by the Contractor to the Bankers toward the extension of above security and extension of other securities under the Contract, of which



validity need to be extended, shall be reimbursed to the Contractor by the Employer against documentary evidence.

- d) the additional charges toward the care of the Facilities pursuant to GCC Sub-Clause 28.1 shall be reimbursed to the Contractor by the Employer for the period between the notification mentioned above and the notification mentioned in GCC Sub-Clause 20.1.2.10 below. The provisions of GCC Sub-Clause 29.2 shall apply to the Facilities during the same period.

20.1.2.9 In the event that the period of suspension under GCC Sub-Clause 20.1.2.8 actually exceeds one hundred eighty (180) days, the Employer and the Contractor shall mutually agree to any additional compensation payable to the Contractor.

20.1.2.10 As and when, after the period of suspension under GCC Sub-Clause 20.1.2.8, the Contractor is notified by the Project Manager that the Facilities are ready for Pre-commissioning, the Contractor shall proceed without delay in performing all activities and obligations under the Contract.

20.1.3 Commissioning

20.1.3.1 Commissioning of the Facilities or any part thereof shall be commenced by the Contractor immediately after being advised by the Project Manager, pursuant to GCC Sub-Clause 20.1.2.5 or immediately after the Pre-commissioning is considered to be completed under GCC Sub-Clause 20.1.2.6.

20.1.3.1.1 Commissioning of the Facilities or any part thereof shall be completed by the Contractor as per procedures detailed in bid documents.

20.1.3.2 The Employer shall, to the extent specified in Appendix – 6 (Scope of works and supply by the Employer), deploy the operating and maintenance personnel and supply all raw materials, utilities, lubricants, chemicals, catalysts, facilities, services and other materials required for commissioning.

20.1.3.3 In the event that the Contractor is unable to proceed with the Commissioning of the Facilities pursuant to Sub-Clause 20.1.3 for reasons attributable to the Employer either on account of non-availability of other facilities under the responsibilities of other contractor(s), or for reasons beyond the Employer's control, the provisions of GCC Sub-Clause 20.1.2.8 to 20.1.2.9 shall apply.

20.1.3.4 As and when, after the period of suspension under GCC Sub-Clause 20.1.2.8, the Contractor is notified by the Project Manager that the Facilities are ready for Commissioning, the Contractor shall proceed without delay in performing all activities and obligations under the Contract.

20.1.4 Trial - Operation

20.1.4.1 Trial – Operation of the Facilities or any part thereof shall be commenced by the Contractor immediately after the Commissioning is completed pursuant to GCC Sub-Clause 20.1.3.1.1.

20.1.4.2 Trial – Operation of the Facilities or any part thereof shall be completed by the Contractor for the period specified in Technical Specification (or for a continuous period of 24 hours where such period is not specified in Technical Specification) and as per procedures detailed in Technical Specifications.



- 20.1.4.3 At any time after the events set out in GCC Sub-Clause 20.1.4.2 have occurred, the Contractor may give a notice to the Project Manager requesting the issue of an Taking Over Certificate in the form provided in the Bidding Documents or in another form acceptable to the Employer in respect of the Facilities or the part thereof specified in such notice as of the date of such notice.
- 20.1.4.4 The Project Manager shall within twenty-one (21) days after receipt of the Contractor's notice, issue a Taking Over Certificate.
- 20.1.5 Taking Over
- 20.1.5.1 Upon successful Trial – Operation of the Facilities or any part thereof, pursuant to GCC Sub-Clause 20.1.4, the Project Manager shall issue to the Contractor a Taking Over Certificate as a proof of the acceptance of the Facilities or any part thereof. Such certificate shall not relieve the Contractor of any of his obligations which otherwise survive, by the terms and conditions of Contract after issue of such certificate.
- 20.1.5.2 If within twenty one (21) days after receipt of the Contractor's notice, the Project Manager fails to issue the Taking Over Certificate or fails to inform the Contractor in writing of the justifiable reasons why the Project Manager has not issued the Taking Over Certificate, the Facilities or the relevant part thereof shall be deemed to have been Taken Over as at the date of the Contractor's said notice.
- 20.1.5.3 Upon Taking Over of the Facilities or any part thereof, the Employer shall be responsible for the care and custody of the Facilities or the relevant part thereof, together with the risk of loss or damage thereto, and shall thereafter take over the Facilities or the relevant part thereof.
- 20.2 Operational Acceptance
- 20.2.1 Guarantee Test
- 20.2.1.1 The Guarantee Test (and repeats thereof), if any specified in the SCC and/or the Technical Specification, shall be conducted by the Contractor after successful Trial – Operation of the Facilities or the relevant part thereof to ascertain whether the Facilities or the relevant part can attain the Functional Guarantees specified in the Contract Documents or if otherwise required as per the Technical Specifications. The Contractor's and Project Manager's advisory personnel may witness the Guarantee Test. The Contractor shall promptly provide the Employer with such information as the Employer may reasonably require in relation to the conduct and results of the Guarantee Test (and any repeats thereof).
- 20.2.1.2 If for reasons not attributable to the Contractor, the Guarantee Test of the Facilities or the relevant part thereof cannot be successfully completed within the time stipulated in the Technical Specifications the period for completing the same shall be as agreed upon by the Employer and the Contractor.
- 20.2.2 Operational Acceptance
- 20.2.2.1 Operational Acceptance shall occur in respect of the Facilities or any part thereof as mentioned below:



- (I) In case no Functional Guarantees are applicable, Operational Acceptance shall occur when the Facilities or part thereof have been successfully Commissioned and Trial – Operation for the specified period have been successfully completed
- (II) In case Functional Guarantees are applicable, Operational Acceptance shall occur when the Functional Guarantees are met or the Contractor has paid liquidated damages specified in GCC Sub-Clause 23.3 hereof; or

20.2.2.2 At any time after any of the events set out in GCC Sub-Clause 20.2.2.1 have occurred, the Contractor may give a notice to the Project Manager requesting the issue of an Operational Acceptance Certificate in the form provided in the Bidding Documents or in another form acceptable to the Employer in respect of the Facilities or the part thereof specified in such notice as of the date of such notice.

20.2.2.3 The Project Manager shall within seven (7) days after receipt of the Contractor's notice, issue an Operational Acceptance Certificate.

20.2.2.4 Upon Operational Acceptance, pursuant to GCC Sub-Clause 20.2.2.2, the Project Manager shall issue to the Contractor an Operational Acceptance Certificate as a proof of the final acceptance of the Plant and Equipment. Such certificate shall not relieve the Contractor of any of his obligations which otherwise survive, by the terms and conditions of Contract after issue of such certificate.

20.2.2.5 If within fourteen (14) days after receipt of the Contractor's notice, the Project Manager fails to issue the Operational Acceptance Certificate or fails to inform the Contractor in writing of the justifiable reasons why the Project Manager has not issued the Operational Acceptance Certificate, the Facilities or the relevant part thereof shall be deemed to have been accepted as at the date of the Contractor's said notice.

20.3 Partial Acceptance

20.3.1 If the Contract specifies that Commissioning shall be carried out in respect of parts of the Facilities, the provisions relating to Commissioning including the Trial – Operation and Guarantee Test shall apply to each such part of the Facilities individually, and the Operational Acceptance Certificate shall be issued accordingly for each such part of the Facilities.

20A. Quantity Variation

The variation in awarded quantity/ price shall be allowed subject to provisions mentioned under RTPP Act -2012 and rule -2013 mentioned thereof which shall be based on the joint survey with Nigam Officers during commencement period and submitted with inception report.

20B. Electrical Inspector inspection:

After successful completion of the work permission from State Electrical Inspectorate is required. Necessary fee etc. shall be paid by the Employer. However if Contractor pays such fee it shall be reimbursed on actual basis on documentary evidence.

Defects / in-complete works notified by Electrical Inspectorate shall be completed by the agency at no extra cost implication to Employer.

F. Guarantees and Liabilities



21. Completion Time Guarantee

21.1 The Contractor guarantees that it shall attain Completion of the Facilities (or a part for which a separate time for completion is specified in the **GCC Clause 1.1 (ee)**) within the Time for Completion specified in the **GCC Clause 1.1 (ee)** pursuant to GCC Sub-Clause 4.2, or within such extended time to which the Contractor shall be entitled under GCC Clause 34 hereof.

21.2 If the Contractor fails to comply with the Time for Completion in accordance with Clause GCC 21 for the whole of the facilities, (or a part for which a separate time for completion is agreed) then the Contractor shall pay to the Employer a sum equivalent to a **quarter of a percent (0.25%) of the Contract Price** for the whole of the facilities, (or a part for which a separate time for completion is agreed) as liquidated damages for such default and not as a penalty, without prejudice to the Employer's other remedies under the Contract, for each week or part thereof which shall elapse between the relevant Time for Completion and the date stated in Taking Over Certificate of the whole of the Works (or a part for which a separate time for completion is agreed) subject to the limit of **ten percent (10%)** of Contract Price for the whole of the facilities, (or a part for which a separate time for completion is agreed).

However, if the Contractor completes the work for whole of the facilities within the contracted time period, the Employer may then refund back the LD which was deducted on account of delay in completion of a part of a work for which a separate time for completion is agreed.

The Employer may, without prejudice to any other method of recovery, deduct the amount of such damages from any monies due or to become due to the Contractor. The payment or deduction of such damages shall not relieve the Contractor from his obligation to complete the Works, or from any other of his obligations and liabilities under the Contract.

21.3 No bonus will be given for earlier Completion of the Facilities or part thereof.

21A. Pre-dispatch Inspection:

- i. Pre-dispatch inspection shall be performed on various materials at manufacturer's work place for which contractor shall be required to raise requisition giving at least 10-day time. Depending on requirement, inspection shall be witnessed by representatives of Employer, PMA/TPIA and/or REC/MoP or any appointed agency.
- ii. The contractor shall ensure receipt of material at site within 21 days from date of receipt of dispatch instructions. In case materials are not received within 21 days from date of issue of dispatch instruction, the dispatch instruction shall stand cancelled. All expenditure incurred by Employer in performance of dispatch instruction shall be recovered from turnkey contractor.
- iii. The turnkey contractor shall ensure that pre-dispatch inspection for materials are intimated only when the material is completely ready for inspection. On due date of inspection, if it is found that materials are not ready in required quantities or the inspection could not be carried out due to non-availability of requisite calibrated certificate of instruments with manufacturer, closing of works on scheduled date of inspection, non-availability of sufficient testing/material handling staff at manufacturer works etc, all expenditures incurred on deployment of various inspecting officials along with a fine of Rs 50,000/- shall be recovered from the bills of the agency and re-



inspection shall be carried out on expense of contractor. 2nd such situation at same manufacturer/supplier shall result in rejection of name of manufacturer from list of approved vendors/sub-vendors. In case sub-standard materials (old component, recycled materials, re-used core material, re-used transformer coil material etc) offered for inspection and are noticed during the inspection, materials shall be rejected and approval of sub-vendor shall also be cancelled for all IPDS projects.

- iv. It is clarified that the Samples from the material received in stores shall be selected by the Nodal/Nominated officer within a period of 3 days and the same shall be tested within a weeks' time in the CTL thereafter.
- v. In case of re-inspection of the material on account of failure of CTL testing, the re-inspection charges of Rs 7,500 from the local supplier and Rs 15,000 from the outside supplier would be recovered at every occasion.
- vi. **Packing:-** The material/equipment shall be offered duly packed so as to enable the inspecting Officer to seal the inspected / cleared material for identification. The supplier / contractor shall provide such packing of the goods as is required to prevent their damages or deterioration during transit to their final destination as indicated in the contract. The packing shall be sufficient to withstand without limitation rough handling during transit to their final destination as indicated in the contract. The packing shall be sufficient to withstand without limitation rough handling during transit and exposure to extreme temperature, salt and precipitation during transport and open storage. Packing case size and weights shall be taken into consideration where appropriate keeping in view, remoteness of the good's final destination and absence of heavy mechanized handling facilities at all points in transit as well as at the destination. The packing, marking and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for in the contract or in any subsequent instructions imparted by the owner.
- vii. When the tests have been satisfactorily completed at the Contractor's or sub-contractors works the Engineer shall issue a certificate to that effect but if the tests were not witnessed by the Engineer or his representative, the certificate would be issued after the receipt of test certificate by the Engineer, No equipment shall be shipped / dispatched before such a certificate has been issued.
- viii. Unless the inspection is specifically waived, no material shall be dispatched without inspection and clearance for dispatch by the owner's representative.
- ix. The owner reserves the right to reject all or any part of the material being manufactured or awaiting dispatch, due to any defect or deviations from the standard specifications prescribed, as observed during the inspection. In case of any dispute / difference in this regard the decision of the Superintending Engineer (TW) shall be final and binding.
- x. The owner also reserves the right to get the material / equipment tested in any recognized Government Laboratory & claiming any compensation or rejecting the material/ equipment, if not found in accordance with the specification. All charges whatsoever consequent to such rejection and replacement / rectification shall be borne by the contractor.

21B. TYPE TEST CERTIFICATES:-

- i. Original/attested photocopies of the latest Type test certificate(s) not older than three years from any recognized Government Laboratory, for all type tests wherever prescribed in the relevant latest edition of ISS (as applicable) as mentioned in technical specification shall be furnished by the successful bidder of



the placement of award only. However the bidder shall have to furnish declaration to this effect that in the event of order they shall submit type test reports with the proposal for approval of sub-vendors. However, the owner reserves the right to get type tests conducted afresh by the contractor.

- ii. In case of any specific alternative requirement of type tests, the same shall be furnished as per Technical specification.
- iii. The contractor shall be required to furnish the routine/manufacturer(s) factory test certificate(s) for the tests carried out during manufacture in accordance with the relevant standard specifications.

21C. Random checking of material at site:

- i. In addition of material testing in CTL and after issuing the material from ACOS for further use at site. The owner or his representative may take random sample of material from site in presence of contractor representative available at site and to get it tested in CTL, failure of material in testing shall lead to rejection of balance material with contractor and same should not be allowed for further used and have to be replaced by fresh material after successful testing in CTL.

21D. Random checking of workmanship of work going on:-

The owner or his representative shall on giving seven days' notice in writing to the agency setting out any grounds of objections which he may have in respect of the work, be at liberty to reject all or any part of the remaining work and all or any workmanship connected with such work which in his opinion are not in accordance with the contract or are in his opinion defective with reasons. In case of any dispute / difference in this regard the decision of the concerned Engineer In Charge i.e. Circle Superintending Engineer & Superintending Engineer (CSS),JDVVNL shall be final and binding.

22. Defect Liability/Performance Period

22.1 The Contractor warrants that the Facilities or any part thereof shall be free from defects in the design, engineering, materials and workmanship of the Plant and Equipment supplied and of the work executed.

22.1.1 Volume of concreting: If it was observed by employer, quality monitoring agencies and/or REC/MoP that volume and quality of concreting used in foundation of support, equipment foundation, gantry structure foundation, stay set etc. are not as per requirement specified in the scope of work/technical specifications, the contractor has to dismantle the supports, foundation and redo the concreting of all the supports in that particular section of line/redo all the foundations in that particular substation at his own cost. To ensure this, the employer reserves the right to withhold the payment of contractor for such defective works till such time the contractor conforms to scope of works, technical specification and tender drawings.

22.1.2 Galvanization of metallic structure: All Metallic structures & fabricated items excluding metallic supports (Steel tubular poles/H-Beam) must be galvanized. In case any metallic item found rusted during execution of works, the contractor has to replace the item used at all places. To ensure this, the employer reserves the right to withhold the payment of contractor for such works till such time the contractor conforms to scope of works, technical specification and tender drawings.



- 22.1.3 Painting of metallic supports (Steel tubular poles/H-Beam): Painting of metallic supports in overhead lines, distribution transformer substation and Power substation shall be ensured as per specifications. In case metallic supports found rusted during execution of works, the contractor has to remove inferior painting, clean the surface and re-paint it as per given specifications. To ensure this, the employer reserves the right to withhold the payment of contractor for such works till such time the contractor conforms to scope of works, technical specification and tender drawings.
- 22.2 **The Defect Liability Period/Performance** Period shall be **Twenty Four (24) months** from the date of Taking Over of the project completed in all respect.
- If during the Defect Liability Period any defect should be found in the design, engineering, materials and workmanship of the Plant and Equipment supplied or of the work executed by the Contractor, the Contractor shall promptly, in consultation and agreement with the Employer regarding appropriate remedying of the defects, and at its cost, repair, replace or otherwise make good (as the Contractor shall, at its discretion, determine) such defect as well as any damage to the Facilities caused by such defect. The Contractor shall not be responsible for the repair, replacement or making good of any defects or of any damage to the Facilities arising out of or resulting from any of the following causes:
- (a) improper operation or maintenance of the Facilities by the Employer
 - (b) operation of the Facilities outside specifications provided in the Contract
 - (c) Normal wear and tear.
- 22.3 The Contractor's obligations under this GCC Clause 22 shall not apply to
- (a) Any materials that are supplied by the Employer under GCC Sub-Clause 17.2, are normally consumed in operation, or have a normal life shorter than the Defect Liability Period stated herein
 - (b) Any designs, specifications or other data designed, supplied or specified by or on behalf of the Employer or any matters for which the Contractor has disclaimed responsibility herein
 - (c) Any other materials supplied or any other work executed by or on behalf of the Employer, except for the work executed by the Employer under GCC Sub-Clause 22.7.
- 22.4 The Employer/Owner shall give the Contractor a notice stating the nature of any such defect together with all available evidence thereof, promptly following the discovery thereof. The Employer/Owner shall afford all reasonable opportunity for the Contractor to inspect any such defect.
- 22.5 The Employer/Ownershall afford the Contractor all necessary access to the Facilities and the Site to enable the Contractor to perform its obligations under this GCC Clause 22. The Contractor may, with the consent of the Employer/Owner, remove from the Site any Plant and Equipment or any part of the Facilities that are defective if the nature of the defect, and/or any damage to the Facilities caused by the defect, is such that repairs cannot be expeditiously carried out at the Site.
- 22.6 If the repair, replacement or making good is of such a character that it may affect the efficiency of the Facilities or any part thereof, the Employer/Ownermay give to the



Contractor a notice requiring that tests of the defective part of the Facilities shall be made by the Contractor immediately upon completion of such remedial work, whereupon the Contractor shall carry out such tests.

If such part fails the tests, the Contractor shall carry out further repair, replacement or making good (as the case may be) until that part of the Facilities passes such tests.

22.7 If the Contractor fails to commence the work necessary to remedy such defect or any damage to the Facilities caused by such defect within a reasonable time (which shall in no event be considered to be less than fifteen (15) days), the Employer/Owner may, following notice to the Contractor, proceed to do such work, and the reasonable costs incurred by the Employer/Owner in connection therewith shall be paid to the Employer/Owner by the Contractor or may be deducted by the Employer/Owner from any monies due the Contractor or claimed under the Performance Security.

22.8 If the Facilities or any part thereof cannot be used by reason of such defect and/or making good of such defect, the Defect Liability Period of the Facilities or such part, as the case may be, shall be extended by a period equal to the period during which the Facilities or such part cannot be used by the Employer because of any of the aforesaid reasons.

Upon correction of the defects in the Facilities or any part thereof by repair/replacement, such repair/replacement shall have the Defect Liability Period extended by a period mentioned in GCC Sub-Clause 22.2 from the time of such replacement/repair of the facilities or any part thereof.

22.8.1 At the end of the Defect Liability Period, the Contractor's Liability ceases except for latent defects. The Contractor's liability for latent defects warranty shall be limited to period of ten (10) years from the end of Defect Liability Period. For the purpose of this clause, the latent defects shall be the defects inherently lying within the material or arising out of design deficiency, which do not manifest themselves during the Defect Liability Period defined in this GCC Clause 22, but later.

22.9 Except as provided in GCC Clauses 22 and 29, the Contractor shall be under no liability whatsoever and howsoever arising, and whether under the Contract or at law, in respect of defects in the Facilities or any part thereof, the Plant and Equipment, design or engineering or work executed that appear after Defect Liability Period except for the liability towards obligations that may survive in terms of the Contract after Defect Liability Period, except where such defects are the result of the gross negligence, fraud, criminal or willful action of the Contractor.

23. Deleted -Functional Guarantees

- 23.1 Deleted
- 23.2 Deleted
- 23.3 Deleted
 - (a) Deleted
 - (b) Deleted
- 23.4 Deleted

24. Equipment Performance Guarantees

24.1 The Contractor guarantees that the 16/10/5 KVA, 11/0.250kV, 1-phase Distribution Transformers, shall attain the rating and performance requirements specified in Appendix - 8 (Guarantees, Liquidated Damages for Non - Performance) to the Contract Agreement, subject to and upon the conditions therein specified.



- 24.2 If the guarantees specified in Appendix – 8 (Guarantees, Liquidated Damages for Non – Performance) to the Contract Agreement are not established, then the Employer shall reject the equipment.
- 24.3 In case the Employer rejects the equipment, the Contractor shall at its cost and expense make such changes, modifications and/or additions to the equipment or any part thereof as may be necessary to meet the specified guarantees. The Contractor shall notify the Employer upon completion of the necessary changes, modifications and/or additions, and shall request the Employer to repeat the Test until the level of the specified guarantee has been met.
- 24.4 Whenever the Employer exercises its option to accept the equipment after levy of liquidated damages, the payment of liquidated damages under GCC Sub-Clause 24.2, upto the limitation of liability specified below, shall completely satisfy the Contractor's guarantees under GCC Sub-Clause 24.2, and the Contractor shall have no further liability whatsoever to the Employer in respect thereof.

25. Patent Indemnity

- 25.1 The Contractor shall, subject to the Employer's compliance with GCC Sub-Clause 25.2, indemnify and hold harmless the Employer and its employees and officers from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of whatsoever nature, including attorney's fees and expenses, which the Employer may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright or other intellectual property right registered or otherwise existing at the date of the Contract by reason of: (a) the installation of the Facilities by the Contractor or the use of the Facilities in the country where the Site is located; and (b) the sale of the products produced by the Facilities in any country.

Such indemnity shall not cover any use of the Facilities or any part thereof other than for the purpose indicated by or to be reasonably inferred from the Contract, any infringement resulting from the use of the Facilities or any part thereof, or any products produced thereby in association or combination with any other equipment, plant or materials not supplied by the Contractor, pursuant to the Contract Agreement.

- 25.2 If any proceedings are brought or any claim is made against the Employer arising out of the matters referred to in GCC Sub-Clause 25.1, the Employer shall promptly give the Contractor a notice thereof, and the Contractor may at its own expense and in the Employer's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim. If the Contractor fails to notify the Employer within twenty-eight (28) days after receipt of such notice that it intends to conduct any such proceedings or claim, then the Employer shall be free to conduct the same on its own behalf. Unless the Contractor has so failed to notify the Employer within the twenty-eight (28) day period, the Employer shall make no admission that may be prejudicial to the defense of any such proceedings or claim.

The Employer shall, at the Contractor's request, afford all available assistance to the Contractor in conducting such proceedings or claim, and shall be reimbursed by the Contractor for all reasonable expenses incurred in so doing.

- 25.3 The Employer shall indemnify and hold harmless the Contractor and its employees, officers and Subcontractors from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of whatsoever nature, including attorney's fees and expenses, which the Contractor may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright or other intellectual property right registered or



otherwise existing at the date of the Contract arising out of or in connection with any design, data, drawing, specification, or other documents or materials provided or designed by or on behalf of the Employer.

26. Limitation of Liability

26.1 Except in cases of gross negligence or willful misconduct,

(a) the Contractor and the Employer shall not be liable to the other party for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits or interest costs, provided that this exclusion shall not apply to any obligation of the Contractor to pay liquidated damages to the Employer and

(b) the aggregate liability of the Contractor to the Employer, whether under the Contract, in tort or otherwise, shall not exceed the total Contract Price, provided that this limitation shall not apply to the cost of repairing or replacing defective equipment, or to any obligation of the Contractor to indemnify the Employer with respect to patent infringement.

26.2 All payments to subcontractor shall be made by contractor. Contractor shall indemnify Employer from any legal issues related to delay in payment or not making any payment to sub-vendor/sub-contractor.

G. Risk Distribution

27. Transfer of Ownership

27.1 Imported finished items are not covered under the contract. Only indigenous finished items are covered under the contract.

27.2 Ownership of the Plant and Equipment (including spare parts) procured in India, shall be transferred to the Employer upon loading on to the mode of transport to be used to carry the Plant and Equipment from the works to the site and upon endorsement of the dispatch documents in favour of the Employer.

27.3 Ownership of the Contractor's Equipment used by the Contractor and its Subcontractors in connection with the Contract shall remain with the Contractor or its Subcontractors.

27.4 Ownership of any Plant and Equipment in excess of the requirements for the Facilities shall revert to the Contractor upon Completion of the Facilities or at such earlier time when the Employer and the Contractor agree that the Plant and Equipment in question are no longer required for the Facilities provided quantity of any Plant and Equipment specifically stipulated in the Contract shall be the property of the Employer whether or not incorporated in the Facilities.

27.5 Notwithstanding the transfer of ownership of the Plant and Equipment, the responsibility for care and custody thereof together with the risk of loss or damage thereto shall remain with the Contractor pursuant to GCC Clause 28 (Care of Facilities) hereof until Completion of the Facilities and Taking Over pursuant to GCC Clause 20 or the part thereof, if any, as per GCC Sub-Clause 1.1(e) in which such Plant and Equipment are incorporated.

28. Care of Facilities



28.1 The Contractor shall be responsible for the care and custody of the Facilities or any part thereof until the date of Taking Over Certificate pursuant to GCC Clause 20 or, where the Contract provides for Completion of the Facilities in parts, until the date of Completion of the relevant part, and shall make good at its own cost any loss or damage that may occur to the Facilities or the relevant part thereof from any cause whatsoever during such period. The Contractor shall also be responsible for any loss or damage to the Facilities caused by the Contractor or its Subcontractors in the course of any work carried out, pursuant to GCC Clause 22. Notwithstanding the foregoing, the Contractor shall not be liable for any loss or damage to the Facilities or that part thereof caused by any use or occupation by the Employer or any third party (other than a Subcontractor) authorized by the Employer of any part of the Facilities.

29. Loss of or Damage to Property; Accident or Injury to Workers; Indemnification

29.1 The Contractor shall indemnify and hold harmless the Employer and its employees and officers from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of whatsoever nature, including attorney's fees and expenses, in respect of the death or injury of any person or loss of or damage to any property (other than the Facilities whether accepted or not), arising in connection with the supply and installation of the Facilities and by reason of the negligence of the Contractor or its Subcontractors, or their employees, officers or agents, except any injury, death or property damage caused by the negligence of the Employer, its contractors, employees, officers or agents.

29.2 If any proceedings are brought or any claim is made against the Employer that might subject the Contractor to liability under GCC Sub-Clause 29.1, the Employer shall promptly give the Contractor a notice thereof and the Contractor may at its own expense and in the Employer's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim.

If the Contractor fails to notify the Employer within twenty-eight (28) days after receipt of such notice that it intends to conduct any such proceedings or claim, then the Employer shall be free to conduct the same on its own behalf. Unless the Contractor has so failed to notify the Employer within the twenty-eight (28) day period, the Employer shall make no admission that may be prejudicial to the defense of any such proceedings or claim.

The Employer shall, at the Contractor's request, afford all available assistance to the Contractor in conducting such proceedings or claim, and shall be reimbursed by the Contractor for all reasonable expenses incurred in so doing.

29.3 Notwithstanding anything in this Contract to the contrary, it is agreed that neither the Contractor nor the Employer shall be liable to the other party for loss of production, loss of profit, loss of use or any other indirect or consequential damages.

30. Insurance

30.1 To the extent specified in the corresponding Appendix-3 (Insurance Requirements) to the Contract Agreement, the Contractor shall at its expense take out and maintain in effect, or cause to be taken out and maintained in effect, during the performance of the Contract, the insurances set forth below in the sums and with the deductibles and other conditions specified in the said Appendix. The identity of the insurers and the form of the policies shall be subject to the approval of the Employer, who should not unreasonably withhold such approval.

(a) Marine Cargo Policy/Transit Insurance Policy:



(I)(i) Marine Cargo policy for imported equipment

Since imported finished materials are not permitted under the contract, this policy shall not be applicable,

(I)(ii) Transit Insurance Policy for indigenous equipment

Transit Insurance Policy shall be taken wherein only inland transit is involved for the movement of Plant and Equipment supplied from within India. The policy shall cover movement of Plant and Equipment from the manufacturer's works to the project's warehouse at final destination site. Inland Transit Clause(ITC) 'A' along with war & Strike Riots & Civil Commotion (SRCC) extension cover shall be taken. The policy shall cover movement of Plant and Equipment from the manufacturer's works to the project's warehouse at final destination site. The policy shall cover all risk for loss or damage that may occur during transit of Plant and Equipment from the Contractor/sub-Contractor's works or stores until arrival at project's warehouse/ store at final destination. Institute Cargo Clause (ICC) 'A' along with war & Strike Riots & Civil Commotion (SRCC) cover shall be taken.

(II) If during the execution of Contract, the Employer requests the Contractor to take any other add-on cover(s)/ supplementary cover(s) in aforesaid insurance, in such a case, the Contractor shall promptly take such add-on cover(s)/ supplementary cover(s) and the charges towards such premium for such add-on cover(s)/ supplementary cover(s) shall be reimbursed to the Contractor on submission documentary evidence of payment to the Insurance company. Therefore, charges towards premium for such add-on cover(s)/ supplementary cover(s) are not included in the Contract Price.

(III) The Contractor shall take the policy in the joint names of Employer and the Contractor. The policy shall indicate the Employer as the beneficiary. However, if the Contractor is having an open policy for its line of business, it should obtain an endorsement of the open cover policy from the insurance company indicating that the dispatches against this Contract are duly covered under its open policy and include the name of the Employer as jointly Insured in the endorsements to the open policy.

(b) Erection All Risk Policy/Contractor All Risk Policy:

(I) The policy should cover all physical loss or damage to the facility at site during storage, erection and commissioning covering all the perils as provided in the policy as a basic cover and the add on covers as mentioned at Sl. No. (III) below.

(II) The Contractor shall take the policy in the joint name of Employer and the Contractor. All these policies shall indicate Employer as the beneficiary. The policy shall be kept valid till the date of the Operational Acceptance of the project and the period of the coverage shall be determined with the approval of the Employer.



If the work is completed earlier than the period of policy considered, the Contractor shall obtain the refund as per provisions of the policy and pass on the benefit to Employer. In case no refund is payable by the insurance company then the certificate to that effect shall be submitted to Employer at the completion of the project.

(III) The following add-on covers shall also be taken by the Contractor:

- i) Earthquake
- ii) Terrorism
- iii) Escalation cost (approximately @10% of sum insured on annual basis)
- iv) Extended Maintenance cover for Defect Liability Period
- v) Design Defect
- vi) Other add-on covers viz., 50-50 clause, 72 hours clause, loss minimization clause, waiver of subrogation clause (for projects of more than 100 crores, cover for offsite storage/fabrication (over 100 crores).

(IV) Third Party Liability cover with cross Liability within Geographical limits of India as on ADD-on cover to the basic EAR cover:

The third party liability add-on cover shall cover bodily injury or death suffered by third parties (including the Employer's personnel) and loss of or damage to property (including the Employer's property and any parts of the Facilities which have been accepted by the Employer) occurring in connection with supply and installation of the Facilities.

(V) As per para 30.8 below, the cost of insurance premium is to be reimbursed to the Contractor for Employer Supplied Materials (OSM) for which the insurer is to be finalized by the Contractor as detailed therein. Alternatively, the Contractor may take a single policy covering the entire cost of the project including the cost of OSM. For this purpose, the Contractor shall submit documentary evidence for the premium paid for the entire project to the Employer and Employer shall reimburse to the Contractor the proportion of premium equal to value of OSM to total sum insured.

(VI) If during the execution of Contract, the Employer requests the Contractor to take any other add-on cover(s)/ supplementary cover(s) in aforesaid insurance, in such a case, the Contractor shall promptly take such add-on cover(s)/ supplementary cover(s) and the charges towards such premium for such add-on cover(s)/ supplementary cover(s) shall be reimbursed to the Contractor on submission documentary evidence of payment to the Insurance company. Therefore, charges towards premium for such add-on cover(s)/ supplementary cover(s) are not included in the Contract Price.

(c) Automobile Liability Insurance

The Contractor shall ensure that all the vehicles deployed by the Contractor or its Subcontractors (whether or not owned by them) in connection with the supply and installation of the Facilities in the project are duly insured as per RTA act.



Further the Contractor or its Subcontractors may also take comprehensive policy (own damage plus third party liability) of each individual vehicles deployed in the project on their own discretion in their own name to protect their own interest.

(d) Workmen Compensation Policy:

- (I) Workmen Compensation Policy shall be taken by the Contractor in accordance with the statutory requirement applicable in India. The Contractor shall ensure that all the workmen employed by the Contractor or its Subcontractors for the project are adequately covered under the policy.
- (II) The policy may either be project specific covering all men of the Contractor and its Subcontractors. The policy shall be kept valid till the date of Operational Acceptance of the project.

Alternatively, if the Contractor has an existing 'Workmen Compensation Policy' for all its employees including that of the Subcontractor(s), the Contractor must include the interest of the Employer for this specific Project in its existing 'Workmen Compensation Policy'.

- (III) Without relieving the Contractor of its obligations and responsibilities under this Contract, before commencing work the Contractor shall insure against liability for death of or injury to persons employed by the Contractor including liability by statute and at common law. The insurance cover shall be maintained until all work including remedial work is completed including the Defect Liability Period. The insurance shall be extended to indemnify the Principal for the Principal's statutory liability to persons employed by the Contractor.

The Contractor shall also ensure that each of its Subcontractors shall effect and maintain insurance on the same basis as the 'Workmen Compensation Policy' effected by the Contractor.

(e) Contractor's Plant and Machinery (CPM) Insurance

The Employer (including without limitation any consultant, servant, agent or employee of the Employer) shall not in any circumstances be liable to the Contractor for any loss of or damage to any of the Contractor's Equipment or for any losses, liabilities, costs, claims, actions or demands which the Contractor may incur or which may be made against it as a result of or in connection with any such loss or damage.

30.2 The Employer shall be named as co-insured under all insurance policies taken out by the Contractor pursuant to GCC Sub-Clause 30.1, except for the Third Party Liability, Workmen Compensation Policy Insurances, and the Contractor's Subcontractors shall be named as co-insured's under all insurance policies taken out by the Contractor pursuant to GCC Sub-Clause 30.1 except for the Cargo Insurance During Transport, Workmen Compensation Policy Insurances. All insurer's rights of subrogation against such co-insured's for losses or claims arising out of the performance of the Contract shall be waived under such policies.

30.3 The Contractor shall, in accordance with the provisions of the corresponding Appendix – 3 (Insurance Requirements) to the Contract Agreement, deliver to the Employer certificates of insurance (or copies of the insurance policies) as evidence that the



- required policies are in full force and effect. The certificates shall provide that no less than twenty-one (21) days' notice shall be given to the Employer by insurers prior to cancellation or material modification of a policy.
- 30.4 The Contractor shall ensure that, where applicable, its Subcontractor(s) shall take out and maintain in effect adequate insurance policies for their personnel and vehicles and for work executed by them under the Contract, unless such Subcontractors are covered by the policies taken out by the Contractor.
- 30.5 The Employer shall at its expense take out and maintain in effect during the performance of the Contract those insurances specified in the corresponding Appendix – 3 (Insurance Requirements) to the Contract Agreement, in the sums and with the deductibles and other conditions specified in the said Appendix. The Contractor and the Contractor's Subcontractors shall be named as co-insureds under all such policies. All insurers' rights of subrogation against such co-insureds for losses or claims arising out of the performance of the Contract shall be waived under such policies. The Employer shall deliver to the Contractor satisfactory evidence that the required insurances are in full force and effect. The policies shall provide that not less than twenty-one (21) days' notice shall be given to the Contractor by all insurers prior to any cancellation or material modification of the policies. If so requested by the Contractor, the Employer shall provide copies of the policies taken out by the Employer under this GCC Sub-Clause 30.5.
- 30.6 If the Contractor fails to take out and/or maintain in effect the insurances referred to in GCC Sub-Clause 30.1, the Employer may take out and maintain in effect any such insurances and may from time to time deduct from any amount due the Contractor under the Contract any premium that the Employer shall have paid to the insurer, or may otherwise recover such amount as a debt due from the Contractor. If the Employer fails to take out and/or maintain in effect the insurances referred to in GCC 30.5, the Contractor may take out and maintain in effect any such insurances and may from time to time deduct from any amount due the Employer under the Contract any premium that the Contractor shall have paid to the insurer, or may otherwise recover such amount as a debt due from the Employer.
- 30.7 Unless otherwise provided in the Contract, the Contractor shall prepare and conduct all and any claims made under the policies effected by it pursuant to this GCC Clause 30, and the monies payable by any insurers under all the insurance except Third Party Liability Insurance and Workmen Compensation Policy, shall be paid to the joint account of the Employer and the Contractor as mutually agreed and such amounts paid shall be apportioned between the Employer and the Contractor in accordance with the respective responsibilities under the Contract. The Employer shall give to the Contractor all such reasonable assistance as may be required by the Contractor. With respect to insurance claims in which the Employer's interest is involved, the Contractor shall not give any release or make any compromise with the insurer without the prior written consent of the Employer. With respect to insurance claims in which the Contractor's interest is involved, the Employer shall not give any release or make any compromise with the insurer without the prior written consent of the Contractor.
- 30.8 Further all equipment and materials being supplied by Employer for the erection (as per Technical Specification) shall be kept insured by the Contractor against any loss, damage, pilferage, theft, fire, etc. from the point of unloading up to the time of taking over by Employer including handling, transportation, storage, erection, testing and commissioning etc. The premium paid to the Insurance company by the Contractor for such insurance shall be reimbursed by Employer to the Contractor. The Contractor shall obtain competitive quotation for such insurance and shall take prior approval from



Employer before taking the insurance. The insurable value of the equipment being supplied by Employer shall be intimated to the Contractor for arranging the insurance.

- 30.9 It will be the responsibility of the Contractor to lodge, pursue and settle all claims with the insurance company in case of any damage, loss, theft, pilferage or fire during execution of Contract and Employer shall be kept informed about it. The Contractor shall replace the lost/damaged materials promptly irrespective of the settlement of the claims by the underwriters and ensure that the work progress is as per agreed schedules. The losses, if any, in such replacement will have to be borne by the Contractor.

31. Change in Laws and Regulations

- 31.1 If, after the date seven (7) days prior to the date of Bid Opening, any law, regulation, ordinance, order or by-law having the force of law is enacted, promulgated, abrogated or changed in India (which shall be deemed to include any change in interpretation or application by the competent authorities) that subsequently affects the costs and expenses of the Contractor and/or the Time for Completion, the Contract Price shall be correspondingly increased or decreased, and/or the Time for Completion shall be reasonably adjusted to the extent that the Contractor has thereby been affected in the performance of any of its obligations under the Contract. However, these adjustments would be restricted to direct transactions between the Employer and the Contractor and not on procurement of raw materials, intermediary components etc. by the Contractor for which the Employer shall be the sole judge. Notwithstanding the foregoing, such additional or reduced costs shall not be separately paid or credited if the same has already been accounted for in the price adjustment provisions where applicable, in accordance with the Appendix-2 to the Contract Agreement.

32. Force Majeure

- 32.1 "Force Majeure" shall mean any event beyond the reasonable control of the Employer or of the Contractor, as the case may be, and which is unavoidable notwithstanding the reasonable care of the party affected, and shall include, without limitation, the following:
- (a) war, hostilities or warlike operations (whether war be declared or not), invasion, act of foreign enemy and civil war,
 - (b) rebellion, revolution, insurrection, mutiny, usurpation of government, conspiracy, riot and civil commotion,
 - (c) earthquake, landslide, volcanic activity, flood or cyclone, or other inclement weather condition, nuclear and pressure waves or other natural or physical disaster,
- 32.2 Neither party shall be considered to be in default or in breach of his obligations under the Contract to the extent that performance of such obligation is prevented by any circumstances of Force majeure, which arises after date of Notification of Award.
- 32.3 If either party is prevented, hindered or delayed from or in performing any of its obligations under the Contract by an event of Force Majeure, then it shall notify the other in writing of the occurrence of such event and the circumstances thereof within fourteen (14) days after the occurrence of such event.
- 32.4 The party who has given such notice shall be excused from the performance or punctual performance of its obligations under the Contract for so long as the relevant event of



Force Majeure continues and to the extent that such party's performance is prevented, hindered or delayed. The Time for Completion shall be extended in accordance with GCC Clause 34.

H. Change in Contract Elements

33. Change in the Facilities

33.1 Introducing a Change

33.1.1 Subject to GCC Sub-Clause 33.2.5, the Employer shall have the right to propose, and subsequently require, that the Project Manager order the Contractor from time to time during the performance of the Contract to make any change, modification, addition or deletion to, in or from the Facilities (hereinafter called "Change"), provided that such Change falls within the general scope of the Facilities and does not constitute unrelated work and that it is technically practicable, taking into account both the state of advancement of the Facilities and the technical compatibility of the Change envisaged with the nature of the Facilities as specified in the Contract.

33.1.2 The Contractor may from time to time during its performance of the Contract propose to the Employer (with a copy to the Project Manager) any Change that the Contractor considers necessary or desirable to improve the quality, efficiency or safety of the Facilities. The Employer may at its discretion approve or reject any Change proposed by the Contractor, provided that the Employer shall approve any Change proposed by the Contractor to ensure the safety of the Facilities.

33.1.3 Changes made necessary because of any default of the Contractor in the performance of its obligations under the Contract shall not be deemed to be a Change, and such change shall not result in any adjustment of the Contract Price or the Time for Completion.

33.1.4 The procedure on how to proceed with and execute Changes is specified in GCC Sub-Clauses 33.2 and 33.3.

33.2 Changes Originating from Employer

33.2.1 The pricing of any Change shall, as far as practicable, be calculated in accordance with the rates and prices included in the Contract. If such rates and prices are inequitable, the parties thereto shall agree on specific rates for the valuation of the Change.

33.2.2 The Contract Price for (i) the items for which quantities have been indicated as lumpsum or lot or set and/or (ii) where the quantities are to be estimated by the Contractor shall remain constant unless there is change made in the Scope of Work by Employer. The quantities and unit prices (i) subsequently arrived while approving the Bill of Quantities (BOQ)/Billing breakup of lumpsum quantities/lot/Set and/or (ii) estimated by the Contractor shall be for on account payment purpose only. In case additional quantities, over and above the quantities in BOQ/billing breakup and /or estimated by the Contractor, are required for successful completion of the scope of work as per Technical Specification, the Contractor shall execute additional quantities of these items for which no additional payment shall be made over and above the lumpsum Contract Price. In case quantities of these items supplied at site are in excess of that required for successful completion of scope of work, such additional quantities shall be the property of the Contractor and they shall be allowed to take back the same from the site for which no deduction from the lumpsum Contract Price shall be made.



Further, in case actual requirement of quantities for successful completion of scope of work is less than the quantities identified in the approved BOQ /billing breakup and/or estimated by the Contractor, the lumpsum contract price shall remain unchanged and no deduction shall be made from the lumpsum price due to such reduction of quantities.

It shall be the responsibility of the Contractor to pay all statutory taxes, duties and levies to the concerned authorities for such surplus material which would otherwise have been, lawfully payable in case of non-deemed export contracts. The Contractor shall submit an indemnity bond to keep Employer harmless from any liability, before release of such material to the Contractor by Employer.

Set/Lot/Lumpsum shall be governed as per the requirement of the corresponding item description read in conjunction with relevant provisions of Technical Specifications and the Billing breakup referred to above shall be issued by the Employer based on Contractor's request, if and as may be required during the currency of the Contract.

- 33.2.3 If before or during the preparation of the Change Proposal it becomes apparent that the aggregate effect of compliance therewith and with all other Change Orders that have already become binding upon the Contractor under this GCC Clause 33 would be to increase or decrease the Contract Price as originally set forth in Article 2 (Contract Price and Terms of Payment) of the Contract Agreement by more than the percentage specified in below, the Employer and the Contractor shall mutually agree on specific rates for valuation of the Change beyond the specified percentage.

Percentage for the Change Proposal under this Clause shall be limited to Ten (10) percent.

For the said purpose, the Contract Price means the Contract Price of the Facilities notwithstanding the Construction of the Contract.

- 33.2.4 If rates and prices of any change are not available in the Contract, the parties thereto shall agree on specific rates for the valuation of the change and all matters therein related to the change. Based on the same, the Employer shall, if it intends to proceed with the Change, issue the Contractor with a Change Order.

- 33.2.5 The Employer shall issue the Contractor with a Change Order pursuant to GCC Sub-Clause 33.2 by way of amendment to the Contract or in any other manner deemed appropriate. Even if the Employer and the Contractor cannot reach agreement on the price for the Change, an equitable adjustment to the Time for Completion, or any other matters related to the Change Proposal, the Employer may nevertheless instruct the Contractor to proceed with the Change by issue of a "Pending Agreement Change Order" ("Pending Agreement Amendment").

Upon receipt of a Pending Agreement Change Order, the Contractor shall immediately proceed with effecting the Changes covered by such Order. The parties shall thereafter attempt to reach agreement on the outstanding issues under the Change Proposal.

If the parties cannot reach agreement within sixty (60) days from the date of issue of the Pending Agreement Change Order, then the matter may be referred to the Settlement Committee in accordance with the provisions of GCC Clause 38.

- 33.3 Changes Originating from Contractor

- 33.3.1 If the Contractor proposes a Change pursuant to GCC Sub-Clause 33.1.2, the Contractor shall submit to the Project Manager a written "Request for Change Proposal", giving reasons for the proposed Change and which shall include the following:



- (a) brief description of the Change
- (b) effect on the Time for Completion
- (c) estimated cost of the Change
- (d) effect on Functional Guarantees (if any)
- (e) effect on any other provisions of the Contract.

Upon receipt of the Request for Change Proposal, the parties shall follow the procedures outlined in GCC Sub-Clauses 33.2.1 and 33.2.5. However, should the Employer choose not to proceed, the Contractor shall not be entitled to recover the costs of preparing the Request for Change Proposal.

33A.Surplus Materials

- a. On completion of the works all such materials supplied by contractor for erection that remain unutilized, if any, shall be taken back by Contractor after detailed materials and payment reconciliations.
- b. The Contractor, within two (2) months from the taking over of the equipment/ materials under the package, shall submit payment and materials account for the reconciliations, failing which necessary recoveries will be made from the outstanding bills of the Contractor for the cost of the materials left unaccounted as decided by the Project Manager.



34. Extension of Time for Completion

34.1 The Time(s) for Completion specified in the **GCC Clause 1.1 (ee)** shall be extended if the Contractor is delayed or impeded in the performance of any of its obligations under the Contract by reason of any of the following:

- (a) any Change in the Facilities as provided in GCC Clause 33
- (b) any occurrence of Force Majeure as provided in GCC Clause 32
- (c) any suspension order given by the Employer under GCC Clause 35 hereof or reduction in the rate of progress pursuant to GCC Sub-Clause 35.2 or
- (d) any changes in laws and regulations as provided in GCC Clause 31 or
- (e) any other matter specifically mentioned in the Contract

by such period as shall be fair and reasonable in all the circumstances and as shall fairly reflect the delay or impediment sustained by the Contractor.

34.2 Except where otherwise specifically provided in the Contract, the Contractor shall submit to the Project Manager a notice of a claim for an extension of the Time for Completion, together with particulars of the event or circumstance justifying such extension as soon as reasonably practicable after the commencement of such event or circumstance. As soon as reasonably practicable after receipt of such notice and supporting particulars of the claim, the Employer and the Contractor shall agree upon the period of such extension. In the event that the Contractor does not accept the Employer's estimate of a fair and reasonable time extension, the Contractor shall be entitled to refer the matter to the Settlement Committee, pursuant to GCC Clause 38.

34.3 The Contractor shall at all times use its reasonable efforts to minimize any delay in the performance of its obligations under the Contract.

35. Suspension

35.1 The Employer may request the Project Manager, by notice to the Contractor, to order the Contractor to suspend performance of any or all of its obligations under the Contract. Such notice shall specify the obligation of which performance is to be suspended, the effective date of the suspension and the reasons therefore. The Contractor shall thereupon suspend performance of such obligation (except those obligations necessary for the care or preservation of the Facilities) until ordered in writing to resume such performance by the Project Manager.

If, by virtue of a suspension order given by the Project Manager, other than by reason of the Contractor's default or breach of the Contract, the Contractor's performance of any of its obligations is suspended for an aggregate period of more than ninety (90) days, then at any time thereafter and provided that at that time such performance is still suspended, the Contractor may give a notice to the Project Manager requiring that the Employer shall, within twenty-eight (28) days of receipt of the notice, order the resumption of such performance or request and subsequently order a change in accordance with GCC Clause 33, excluding the performance of the suspended obligations from the Contract.

If the Employer fails to do so within such period, the Contractor may, by a further notice to the Project Manager, elect to treat the suspension, where it affects a part only of the



Facilities, as a deletion of such part in accordance with GCC Clause 33 or, where it affects the whole of the Facilities, as termination of the Contract under GCC Sub-Clause 36.1.

- 35.2 If the Contractor's performance of its obligations is suspended or the rate of progress is reduced pursuant to this GCC Clause 35, then the Time for Completion shall be extended in accordance with GCC Sub-Clause 34.1, and any and all additional costs or expenses incurred by the Contractor as a result of such suspension or reduction shall be paid by the Employer to the Contractor in addition to the Contract Price, except in the case of suspension order or reduction in the rate of progress by reason of the Contractor's default or breach of the Contract.
- 35.3 During the period of suspension, the Contractor shall not remove from the Site any Plant and Equipment, any part of the Facilities or any Contractor's Equipment, without the prior written consent of the Employer.

36. Termination

36.1 Termination for Employer's Convenience

36.1.1 The Employer may at any time terminate the Contract for any reason by giving the Contractor a notice of termination that refers to this GCC Sub-Clause 36.1.

36.1.2 Upon receipt of the notice of termination under GCC Sub-Clause 36.1.1, the Contractor shall either immediately or upon the date specified in the notice of termination

- (a) cease all further work, except for such work as the Employer may specify in the notice of termination for the sole purpose of protecting that part of the Facilities already executed, or any work required to leave the Site in a clean and safe condition
- (b) Terminate all subcontracts, except those to be assigned to the Employer pursuant to paragraph (d) (ii) below
- (c) Remove all Contractor's Equipment from the Site, repatriate the Contractor's and its Subcontractors' personnel from the Site, remove from the Site any wreckage, rubbish and debris of any kind, and leave the whole of the Site in a clean and safe condition
- (d) In addition, the Contractor, subject to the payment specified in GCC Sub-Clause 36.1.3, shall
 - (i) Deliver to the Employer the parts of the Facilities executed by the Contractor up to the date of termination
 - (ii) to the extent legally possible, assign to the Employer all right, title and benefit of the Contractor to the Facilities and to the Plant and Equipment as of the date of termination, and, as may be required by the Employer, in any subcontracts concluded between the Contractor and its Subcontractors
 - (iii) Deliver to the Employer all non-proprietary drawings, specifications and other documents prepared by the Contractor or its Subcontractors as at the date of termination in connection with the Facilities.

36.1.3 In the event of termination of the Contract under GCC Sub-Clause 36.1.1, the Employer shall pay to the Contractor the following amounts:



- (a) The Contract Price, properly attributable to the parts of the Facilities executed by the Contractor as of the date of termination
- (b) The costs reasonably incurred by the Contractor in the removal of the Contractor's Equipment from the Site and in the repatriation of the Contractor's and its Subcontractors' personnel
- (c) Any amounts to be paid by the Contractor to its Subcontractors in connection with the termination of any subcontracts, including any cancellation charges
- (d) Costs incurred by the Contractor in protecting the Facilities and leaving the Site in a clean and safe condition pursuant to paragraph (a) of GCC Sub-Clause 36.1.2
- (e) The cost of satisfying all other obligations, commitments and claims that the Contractor may in good faith have undertaken with third parties in connection with the Contract and that are not covered by paragraphs (a) through (d) above.

36.2 Termination for Contractor's Default

36.2.1 The Employer, without prejudice to any other rights or remedies it may possess, may terminate the Contract forthwith in the following circumstances by giving a notice of termination and its reasons therefore to the Contractor, referring to this GCC Sub-Clause 36.2:

- (a) if the Contractor becomes bankrupt or insolvent, has a receiving order issued against it, compounds with its creditors, or, if the Contractor is a corporation, a resolution is passed or order is made for its winding up (other than a voluntary liquidation for the purposes of amalgamation or reconstruction), a receiver is appointed over any part of its undertaking or assets, or if the Contractor takes or suffers any other analogous action in consequence of debt
- (b) If the Contractor assigns or transfers the Contract or any right or interest therein in violation of the provision of GCC Clause 37.
- (c) If the Contractor, in the judgment of the Employer has engaged in corrupt or fraudulent practices in competing for or in executing the Contract.
- (d) If the contractor fails to achieve mutually agreed deadline (as set in mutually agreed Project Execution Plan/PERT chart) for consecutive 45 days, Employer shall issue contract termination notice giving suitable time to contractors which may be up to time agreed between employer and contractor. In case, contractor does not improve its performance as per contract termination notice, which shall be within overall plan under mutually agreed project execution plan, employer will terminate the contract and encash performance securities.

For the purpose of this Sub-Clause:

"Corrupt practice" is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;

"fraudulent practice" is any act or omission, including a misrepresentation, that knowingly or recklessly misleads or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;



“Collusive practice” is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;

“Coercive practice” is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;

“Obstructive practice” is

(aa) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede an Employer’s investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation;

or

(bb) acts intended to materially impede the exercise of the Employer’s inspection and audit rights.

In pursuance of its policy, the Employer will sanction a firm or individual, including declaring ineligible, either indefinitely or for a stated period of time, to be awarded a contract if it at any time determines that the firm has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for, or in executing, a contract.

36.2.2 If the Contractor

- (a) Has abandoned or repudiated the Contract
- (b) has without valid reason failed to commence work on the Facilities promptly or has suspended (other than pursuant to GCC Sub-Clause 35.2) the progress of Contract performance for more than fifteen (15) days after receiving a written instruction from the Employer to proceed
- (c) Persistently fails to execute the Contract in accordance with the Contract or persistently neglects to carry out its obligations under the Contract without just cause
- (d) refuses or is unable to provide sufficient materials, services or labor to execute and complete the Facilities in the manner specified in the program furnished under GCC Sub-Clause 14.2 at rates of progress that give reasonable assurance to the Employer that the Contractor can attain Completion of the Facilities by the Time for Completion as extended,

Then the Employer may, without prejudice to any other rights it may possess under the Contract, give a notice to the Contractor stating the nature of the default and requiring the Contractor to remedy the same. If the Contractor fails to remedy or to take steps to remedy the same within fourteen (14) days of its receipt of such notice, then the Employer may terminate the Contract forthwith by giving a notice of termination to the Contractor that refers to this GCC Sub-Clause 36.2.



- 36.2.3 Upon receipt of the notice of termination under GCC Sub-Clauses 36.2.1 or 36.2.2, the Contractor shall, either immediately or upon such date as is specified in the notice of termination,
- (a) cease all further work, except for such work as the Employer may specify in the notice of termination for the sole purpose of protecting that part of the Facilities already executed, or any work required to leave the Site in a clean and safe condition
 - (b) terminate all subcontracts, except those to be assigned to the Employer pursuant to paragraph (d) below
 - (c) deliver to the Employer the parts of the Facilities executed by the Contractor up to the date of termination
 - (d) to the extent legally possible, assign to the Employer all right, title and benefit of the Contractor to the Facilities and to the Plant and Equipment as of the date of termination, and, as may be required by the Employer, in any subcontracts concluded between the Contractor and its Subcontractors
 - (e) deliver to the Employer all drawings, specifications and other documents prepared by the Contractor or its Subcontractors as of the date of termination in connection with the Facilities.
- 36.2.4 The Employer may enter upon the Site, expel the Contractor, and complete the Facilities itself or by employing any third party. The Employer may, to the exclusion of any right of the Contractor over the same, take over and use with the payment of a fair rental rate to the Contractor, with all the maintenance costs to the account of the Employer and with an indemnification by the Employer for all liability including damage or injury to persons arising out of the Employer's use of such equipment, any Contractor's Equipment owned by the Contractor and on the Site in connection with the Facilities for such reasonable period as the Employer considers expedient for the supply and installation of the Facilities.
- Upon completion of the Facilities or at such earlier date as the Employer thinks appropriate, the Employer shall give notice to the Contractor that such Contractor's Equipment will be returned to the Contractor at or near the Site and shall return such Contractor's Equipment to the Contractor in accordance with such notice. The Contractor shall thereafter without delay and at its cost remove or arrange removal of the same from the Site.
- 36.2.5 Subject to GCC Sub-Clause 36.2.6, the Contractor shall be entitled to be paid the Contract Price attributable to the Facilities executed as of the date of termination, the value of any unused or partially used Plant and Equipment on the Site, and the costs, if any, incurred in protecting the Facilities and in leaving the Site in a clean and safe condition pursuant to paragraph (a) of GCC Sub-Clause 36.2.3. Any sums due to the Employer from the Contractor accruing prior to the date of termination shall be deducted from the amount to be paid to the Contractor under this Contract.
- 36.2.6 If the Employer completes the Facilities, the cost of completing the Facilities by the Employer shall be determined.
- If the sum that the Contractor is entitled to be paid, pursuant to GCC Sub-Clause 36.2.5, plus the reasonable costs incurred by the Employer in completing the Facilities, exceeds the Contract Price or the entire Facilities if entire Facilities have been



completed or the price for part of the Facilities if part of the Facilities have been completed, the Contractor shall be liable for such excess.

If such excess is greater than the sums due the Contractor under GCC Sub-Clause 36.2.5, the Contractor shall pay the balance to the Employer, and if such excess is less than the sums due the Contractor under GCC Sub-Clause 36.2.5, the Employer shall pay the balance to the Contractor. For facilitating such payment the Employer shall encash the Bank Guarantees of the Contractor available with the Employer and retains such other payments due to the Contractor under the Contract in question or any other Contract that the Employer may have with the Contractor.

The Employer and the Contractor shall agree, in writing, on the computation described above and the manner in which any sums shall be paid.

- 36.3 In this GCC Clause 36, the expression "Facilities executed" shall include all work executed, Installation Services provided, and all Plant and Equipment acquired (or subject to a legally binding obligation to purchase) by the Contractor and used or intended to be used for the purpose of the Facilities, up to and including the date of termination.
- 36.4 In this GCC Clause 36, in calculating any monies due from the Employer to the Contractor, account shall be taken of any sum previously paid by the Employer to the Contractor under the Contract, including any advance payment paid pursuant to the corresponding Appendix (Terms and Procedures of Payment) to the Contract Agreement.

37. Assignment

- 37.1 Neither the Employer nor the Contractor shall, without the express prior written consent of the other party (which consent shall not be unreasonably withheld), assign to any third party the Contract or any part thereof, or any right, benefit, obligation or interest therein or thereunder, except that the Contractor shall be entitled to assign either absolutely or by way of charge any monies due and payable to it or that may become due and payable to it under the Contract.

I. Resolution of Disputes

38. Settlement of Disputes

- 38.1 In any time any question, dispute or difference what so ever which may arise between the JDVVNL and the agency, the same shall be decided by Settlement committee constituted for the purpose. The Settlement committee(s) have been constituted to settle the disputed purchase cases where the firm(s) do not agree with the Discom viewpoint and have given their representations. The settlement committee(s) will be empowered to decide disputed cases. The committee is also authorized to settle such cases which are subjudice in case firm make formal request in this regard. In case of disagreement amongst committee members, the case with full details shall be put-up before the next level committee for decision.
- 38.2 For settlement, firm shall furnish in writing their representation indicating the details of dispute / grievances along with requisite settlement fee within a period of 6 months after receiving communication form **DDUGJY NEW Wing** giving rise to cause of dispute/ grievances. Appeal against any decision of settlement committee can be filed within three months from the date of conveying such decision to the firm.



38.3 The requisite fee either in demand draft/ pay order to be deposited to the **Senior Accounts Officer(CPC), JDVVNL, Jodhpur** along with detailed representation for various settlement are detailed as under :-

- i. For CE Level Settlement Committee (Cases up to Rs.2.5 Lac) - Rs.1000/-
- ii. For Discom Level Settlement Committee (Cases above Rs.2.5 Lac and Appeal Against CE level Committee) - Rs.3000/-
- iii. For review of decision of Discom Level (Settlement Committee by BOD) - Rs.5000/-

39. Deleted - Arbitration

39.1 Deleted

39.2 Deleted

39.3 Deleted

39.4 Deleted

39.5 Deleted

40. Up-front intimation of approved manufacturers and criterion for Fresh Vendor approval:

Employer shall up-front intimate list containing name of already approved vendors/manufacturers of various sub-transmission and distribution materials. Employer shall up-load the list on their web portal. Turnkey contractor shall choose one or more than one vendors from the pre-approved lists depending upon capacity and capability of vendors to supply the materials for DDUGJY NEW Scheme works. No separate approval for vendor shall be required from Employer.

Also, normal procedure being followed for empanelment of new vendors shall be uploaded and up-front intimated to all turnkey contractors. In case turnkey contractor desires to add new vendor, up-front intimation shall be available on criterion and procedure for selection of vendors.

41. Up-front intimation of Guaranteed Technical Particulars:

Technical Specifications are enclosed with the bid documents. Employer shall up-front intimate acceptable Guaranteed Technical Particulars of various materials through their web portal.

Turnkey contractor will examine these documents and supply only that material which meets the above acceptable criterion. In case there are Employer's approved vendor(s) (one or more) through which turnkey contractor wish to procure the materials and are complying with the acceptable GTP parameters of Employer as available on their web portal, there would not be any formality needed like approval of sub-vendor or approval of GTP again.

In event of change in name of vendor or change in GTP parameter, separate approval of Employer shall be sought by successful turnkey contractor.



42. Turnkey Contractor's Store at Project site:

"Project wise separate Site Stores shall be maintained and manned by turnkey contractor. Same store shall not be used for more than one project even if neighboring districts' projects are awarded to the same agency. The turnkey contractor shall deploy his own manpower in stores for round the clock security and for its day to day operation through trained Store-ki-per.

Since materials received in this store are owned by Employer and are pre-dispatch inspected by Employer's representative, materials in a lot shall not be issued to the sub-contractor for physical execution by turnkey contractor. Instead, day to day requirements shall be issued to the working teams of sub-vendors by authorized store-ki-per. In exceptional cases, on prior written permission of Employer, materials for a week time may be issued to working team of sub-vendor. Daily accounting of materials receipt, materials issues, materials in custody of sub-vendors are to be maintained by turnkey contractor. Handing of Stores shall, in no circumstances, be off loaded.

In no case, inter-project transfer of materials shall be permitted.

43. Handing over of assets:

On completion of erection and testing of a section of line, DTR substation, power substation, contracting agency shall submit digital photographs in soft copies of each and every support structures along-with submission of completion report in support of their claim for energisation and handing over of assets. Project Manager within a week time, shall review the photographs for acceptance of quality of works and shall immediately deploy officials for joint measurement and inspection of executed works for energisation. In parallel, a requisition to State Electrical Inspectorate shall also be submitted by Project Manager. Fee/Charges for inspection by electrical inspector shall be paid by Project Manager. Single Line Diagram of created assets using Autocad with GPS co-ordinates shall be submitted invariably while handing over the system.

While offering section of work / substation for commissioning and handing over, turnkey contractor shall provide pre-commissioning test reports and detail checklist (format provided along with quality guidelines at Volume-II : Section-I).

44. Supply of Materials in lots:

Item wise mobilization of materials shall be planned in 6 lots. Employer shall arrange pre-dispatch inspections for 6 lots at his own expenditure. Any additional resource mobilization for inspection of materials by employer beyond 6 lots shall be chargeable at actual. However, in case of approved quantity variation, employer may consider to increase the number of Lots.

45. Contract Closing:

On completion of handing over formality and successfully completion of defect liability / guarantee period, the contract shall be closed on completion of following formality:

- I. Material reconciliation,
- II. Payment reconciliations, submission and verifications that reconciliation of payment toward statutory provisions like GST/Any other taxes, any other dues etc. Reconciliation statement shall be verified and vetted by chartered accountant.



- III. Approval for extension of Completion period, with or without compensation, as required.
- IV. Certification from agency regarding payment of dues to its
 - i. Sub-vendors
 - ii. Workers/ contract laborers,
 - iii. Payment of statutory dues toward Provident Funds, wages, etc. as required.
- V. Certification of Project Manager & agency to the effect that erection, testing and commissioning of the equipment have been completed as per specifications laid down in the contract and defects noted at the time of commissioning and notified to the agency have been liquidated to the satisfaction of Employer.
- VI. Removal of construction meant for site stores, hutment, labour colony etc. in the premises of EMPLOYER.
- VII. Certificate from Project Manager in charge regarding final amendment of drawings and detailed of such amendments,
- VIII. Drawing receipt certificate by the Project Manager,
- IX. Receipt of compliance report on Quality Assurance Mechanism along with photograph, Assurance documents by Project Manager
- X. Shortfall in equipment / Line performance Certificate issued by Project Manager,
- XI. No demand certificate issued by contractor,
- XII. Certificate about completion of Defect Liability Period of the package by Project Manager,
- XIII. Certificate regarding return of Performance Security / Indemnity Bond by Project Manager/Employer.

46. Banning of business dealings

- 46.1. Employer shall ban business dealings with contractor on following grounds for the period as decided by Project Manager:-
 - a. If the contractor fails to submit Performance Security after issuance of Letter of Intent (LoI) within stipulated time.
 - b. If the Contractor fails to accept the award of contract or has abandoned or repudiated the Contract.
 - c. If the Contractor is found to be non-performing in execution of contract by the Employer and penalty shall be levied in accordance with RTPP Act-2012 & RTPP Rules-2013 made thereof.
 - d. If a disaster / major failure / accident / collapse of a structure / system is caused during erection or during defect liability period due to negligence of contractor or design deficiency or poor quality of execution.



- e. Misbehavior or physical manhandling by the Contractor or his representative or any person acting on his behalf with any official of the Company dealing with the concerned contract is established.
- f. If the Director / Owner of the Contractor, proprietor or partner of the Contractor, is convicted by a court of law for offences involving corrupt and fraudulent practices including moral turpitude in relation to its business dealings with the government or State Public Sector Undertakings or Central Public Sector Undertakings or Employer or Employer's group companies, during the last five years.
- g. If the proprietors of the Contractor have been guilty of malpractices such as bribery, corruption, fraud, substitution of the tenders, interpolations, etc.
- h. If the Contractor continuously refuses to return / refund the dues of Employer or Employer's group companies, without showing adequate reason and this is not due to any reasonable dispute which would attract proceedings in arbitration or court of Law;
- i. If the Contractor employs a public servant dismissed / removed or employs a person convicted for an offence involving corruption or abetment of such offences;
- j. If business dealings with the Contractor have been banned by the Ministry of Power or Government of India and the ban is still in force,
- k. If it is established that Contractor has resorted to corrupt, fraudulent practices including misrepresentation of facts;
- l. If the Contractor uses intimidation/threatening or brings undue outside pressure on the Project Manager or his authorised representatives or its officials in acceptance / performance of the job under the contract.
- m. If the Contractor indulges in repeated and / or deliberate use of delay tactics in complying with contractual stipulations;
- n. If the Contractor is found to be involved in cartel formation during bidding.
- o. On willful indulgence by the Contractor in supplying sub-standard material with respect to Technical Specifications under the Contract irrespective of whether pre-dispatch inspection was carried out by Employer or not;
- p. If the Contractor is declared bankrupt or insolvent or its financial position has become unsound, and in the case of a limited company, it is wound up or liquidated.
- q. Established litigant nature of the Contractor to derive undue benefit;
- r. Continued poor performance of the Contractor;
- s. If the Contractor violates the provisions of the Integrity Pact provided in the Contract.
- t. If the Contractor commits fraud as defined under the Fraud Prevention Policy of Employer.
- u. If the Contractor has assigned or transferred the contract or engaged subcontractor(s) without the prior approval of the Competent Authority in violation of the provisions of the contract.



- v. If the Contractor misuses the premises or facilities of the Employer, forcefully occupies, tampers or damages the Employer's properties including land, water resources, forests / trees, etc.
- w. If the security consideration, including questions of loyalty of the Contractor to the state, so warrants;



VOLUME I: SECTION – V SPECIAL CONDITIONS OF CONTRACT (SCC)



SPECIAL CONDITIONS OF CONTRACT (SCC)

The following bid specific data for the Plant and Equipment to be procured shall amend and/or supplement the provisions in the General Conditions of Contract (GCC)

Sl. No.	GCC Clause Ref. No.	Amendment/Supplement to GCC													
1.	GCC 24.2 (b) & GCC 24.3	<p>Supplementing Clause GCC 24.2 (b)</p> <p>LD for Non-Performance of the Equipment</p> <p>The guaranteed loss at rated voltage for each equipment shall be corrected in accordance with IS2026, Part-I for the purpose of comparison of guaranteed losses with measured losses for levy of liquidated damages. However, the equipment (i.e. Power Transformer/Station Transformer) under no circumstances shall be accepted if the measured losses are more than +15 percent of the guaranteed losses at rated voltage, specified in Appendix - 8 (Guarantees, Liquidated Damages for Non - Performance) to the Contract Agreement.</p> <p>In case of Distribution Transformer, the equipment under no circumstances shall be accepted if the total losses exceed the max. limit specified in Technical Specifications.</p> <p>Differential Price Factors for Liquidated Damages</p> <p>The factors and the respective Indian Rupees value per unit of differential loss (applicable for each item/unit of facilities) for purpose of calculation of liquidated damages shall be as stipulated below:</p> <table border="1"> <thead> <tr> <th>Sl. No</th> <th>Equipment</th> <th>Parameter to be taken for applying differential price factor (F)</th> <th>Value of F in Indian Rupees (applicable for each item/unit of the facilities) per unit of parameter differential per KW</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>12/10/8/6.3/5 /3.15/1.6 MVA, 33/11kV or 66/11kV, 3 ph. Power Transformer</td> <td>Differential Copper loss (KW)</td> <td>Rs. 1,18,643 /- (Indian Rupees One Lakh Eighteen Thousand Six Hundred Forty Three only)</td> </tr> <tr> <td></td> <td></td> <td>Differential Iron Loss (KW)</td> <td>Rs. 2,61,713/- (Indian Rupees Two Lakh Sixty One Thousand Seven Hundred Thirteen only)</td> </tr> </tbody> </table> <p>The amount of liquidated damages so recoverable shall be as per the aforesaid ceiling and shall not prejudice the contractor's other liabilities under the Contract in any manner. The liquidated damages for shortfall in guaranteed parameters and for delay in completion are independent of each other and shall be levied separately and concurrently.</p>		Sl. No	Equipment	Parameter to be taken for applying differential price factor (F)	Value of F in Indian Rupees (applicable for each item/unit of the facilities) per unit of parameter differential per KW	1	12/10/8/6.3/5 /3.15/1.6 MVA, 33/11kV or 66/11kV, 3 ph. Power Transformer	Differential Copper loss (KW)	Rs. 1,18,643 /- (Indian Rupees One Lakh Eighteen Thousand Six Hundred Forty Three only)			Differential Iron Loss (KW)	Rs. 2,61,713/- (Indian Rupees Two Lakh Sixty One Thousand Seven Hundred Thirteen only)
Sl. No	Equipment	Parameter to be taken for applying differential price factor (F)	Value of F in Indian Rupees (applicable for each item/unit of the facilities) per unit of parameter differential per KW												
1	12/10/8/6.3/5 /3.15/1.6 MVA, 33/11kV or 66/11kV, 3 ph. Power Transformer	Differential Copper loss (KW)	Rs. 1,18,643 /- (Indian Rupees One Lakh Eighteen Thousand Six Hundred Forty Three only)												
		Differential Iron Loss (KW)	Rs. 2,61,713/- (Indian Rupees Two Lakh Sixty One Thousand Seven Hundred Thirteen only)												



Sl. No.	GCC Clause Ref. No.	Amendment/Supplement to GCC
2.	Others	<p>Rating of Transformers - Standard Ratings of Distribution & Power Transformers as per IS are covered in bid documents. Transformer ratings must be confirming to IS specifications. Non Standard ratings shall not be permitted.</p> <p>The Distribution Transformers shall be BIS certified in line with Electrical Transformers (Quality Control) order, 2015 (along with its latest amendments) issued by Department of Heavy Industries, Ministry of Heavy Industries & Public Enterprise, Govt. of India.</p> <p>(i) The Bidder shall guarantee individually the no Load loss and Load loss without any positive tolerance. The Bidder shall also guarantee the total Losses (No Load + Load Losses at 75°C) at the 50% of rated load and total losses at 100% of rated shall not exceed the maximum total loss values given in Table- 3 & 9 of IS1180(Part-I):2014.</p> <p>(ii) The maximum allowable losses at rated voltage and rated frequency permitted at 75°C for 11/0.433 KV transformers be chosen as per Table-3 up to 200KVA and Table-6 for rating above 200 KVA and 6.35 KV / 240V transformers be as per table-9 for ratings 5,10,16,25 KVA as per <u>Energy Efficiency level-2 specified in IS 1180 (Part-1):2014</u> for all Distribution Transformers.</p> <p>(iii) The above losses are maximum allowable and there would not be any positive tolerance. Bids with higher losses than the above specified values would be treated as non-responsive. However, the manufacturer can offer losses less than above stated values.</p>
3.	Others	<p>Performance Guarantee of major items such as Distribution Transformers and meters shall be given/ furnished by Manufacturers & shall be arranged by the Contractor directly in favour of the Discom for the period of 60 months from the date of supply. For this purpose, Tripartite Agreement shall be executed to ensure the replacement/ repair of the guarantee period failed equipment in a time bound manner between Contractor, firm & Discom.</p>



Annexure – I to SCC - LIST OF ELIGIBLE SCHEDULED COMMERCIAL PRIVATE INDIAN BANKS

Sl. No.	Name of Banks
1	HDFC Bank Ltd.
2	Axis Bank Ltd.
3	Kotak Mahindra Bank Ltd.
4	Federal Bank Ltd.
5	Indusind Bank Ltd.
6	Development Credit Bank Ltd.
7	ING Vysya Bank Ltd.
8	Karnataka Bank Ltd.
9	Karur Vysya Bank Ltd.
10	Ratnakar Bank Ltd.
11	South Indian Bank Ltd.
12	Yes Bank Ltd.
13	ICICI Bank
14	IDFC Bank



VOLUME I: SECTION – VI

SAMPLE FORMS AND PROCEDURES



SAMPLE FORMS AND PROCEDURES (FORMS)

Preamble

This Section (Section –VI) of the Bidding Documents [named as Sample Forms and Procedures (FORMS)] provides proforma to be used by the bidders at the time of their bid preparation and by the Contractor subsequent to the award of Contract.

The Bidder shall complete, sign and submit with its bid the relevant FORMS to be used un-amended, in accordance with the requirements included in the Bidding Documents.

The Bidder shall provide the Bid Security, either in the form included hereafter or in another form acceptable to the Employer, pursuant to the provisions in the instructions to Bidders.

The Form of Contract Agreement shall be used un-amended, except for the need to complete Article 1.1 (Contract Documents), as appropriate and as may be required to suit the specific requirement of the Contract. The form shall also include the Appendices listed, as required, which should be completed according to the instructions for their completion provided at the beginning of each Appendix. The Price Schedule deemed to form part of the contract shall be modified according to any corrections or modifications to the accepted bid resulting from price corrections, pursuant to the provisions of the Instructions to Bidders.

The Performance Security(ies) and Bank Guarantee for Advance Payment forms should not be completed by the bidders at the time of their bid preparation. Only the successful Bidder will be required to provide the Performance Security(ies) and Bank Guarantee for Advance Payment, according to one of the forms indicated herein or in another form acceptable to the Employer and pursuant to the provisions of the General and Special Conditions of Contract, respectively.

Depending on specific facts and circumstances related to the Bid, other specific agreement, if any, and the contract, the text of the Forms herein may need to be modified to some extent. The Employer reserves the right to make such modifications in conformity with such specific facts and circumstances and rectify and consequent discrepancies, if any. However, modifications, if any, to the text of the Forms that may be required in the opinion of the Bidder/Contractor shall be effected only if the same is approved by the Employer. The Employer's decision in this regard shall be final and binding.

1. BID FORMS AND PRICE SCHEDULES

1.1 Bid Form

Please see Volume – II.

1.2 Price Schedule

As specified in the attached BOQ.



2. BID SECURITY FORM

(On the Rajasthan Non- Judicial Stamp Paper @Rs.50/- with the 30% surcharge)

Form of Bid-Securing Declaration

Date:

Bid No. :

Alternative No. :

To:

.....
.....

We, the undersigned, declare that: We understand that, according to your conditions, bids must be supported by a Bid-Securing Declaration. We accept that we ate required to pay the bid security amount specified in the Term and Condition of Bid, in the following cases, namely :-

- f) when we withdraw or modify our bid after opening of bids;
- g) when we do not execute the agreement, if any, after placement of supply/work order within the specified period;
- h) when we fail to commence the supply of the goods or service or execute work as per supply/work order within the time specified;
- i) when we do not deposit the performance security within specified period after the supply/work order is placed; and
- j) if we breach any provision of code of integrity prescribed for bidding specified in the Act and Chapter VI of these rules.

In addition to above, the State Government shall debar us from participating in any procurement process undertaken for a period not exceeding three years in case where the entire bid security or any part thereof is required to be forfeited by procuring entity.

We understand this Bid Securing Declaration shall expire if:-

- vi. we are not the successful Bidder;
- vii. the execution of agreement for procurement and performance security is furnished by us in case we are successful bidder;
- viii. thirty days after the expiration of our Bid.
- ix. the cancellation of the procurement process; or
- x. the withdrawal of bid prior to the deadline for presenting bids, unless the bidding documents stipulate that no such withdrawal is permitted.

Signed.:-----

Name :-----

In the capacity of :-----

Duly authorized to sign the bid for and on behalf of:

Dated on day of

Corporate Seal -----

Note: In case of a Joint Venture, the Bid Securing Declaration must be signed in name of all partners of the Joint Venture that is submitting the bid.



3a. FORM OF NOTIFICATION BY THE EMPLOYER TO THE BANK
(Applicable for Forfeiture of Bank Guarantee)

To: *(insert Name and Address of the issuing Bank)*

Ref.: ~~Forfeiture of Bid Security Amount against Bank Guarantee No. dated for
....., issued by you on behalf of M/s.(insert name of the Bidder)~~

Dear Sirs,

~~Please refer to the subject Bank Guarantee executed by you in our favour for as Bid
Security for the bid submitted by M/s.(insert name of the Bidder) against (insert
name of the Package) ; Specification No.~~

~~As per the terms of the said guarantee, the bank has guaranteed and undertaken to pay
immediately on demand by the Employer the amount of without any reservation,
protest, demur and recourse. Further, any demand made by the Employer shall be conclusive and
binding on the Bank irrespective of any dispute or difference raised by the Bidder.~~

~~In terms of the said guarantee, we hereby submit our claim/demand through this letter for
remittance of Bid Security amount to Jodhpur Vidyut Vitran Nigam Limited, owing to the
occurrence of the condition referred to at Sl. No. The Bank is requested to remit the full
guaranteed sum towards proceeds of the bid security in the form of Demand Draft
in favour of 'Jodhpur Vidyut Vitran Nigam Limited', payable at(insert place of the Employer)....'~~

Thanking you,

_____ For.....(Name of the Employer)

_____ (AUTHORISED SIGNATORY)

Copy to:

....(Registered Office of the Bank)....



3b. FORM OF NOTIFICATION BY THE EMPLOYER TO THE BANK
(Applicable for conditional claim pending extension of Bank Guarantee by the Bidder)

To: *(insert Name and Address of the issuing Bank)*

Ref.: Conditional Claim against Bank Guarantee No. dated for valid up to issued by you on behalf of M/s.*(insert name of the Bidder)*

Dear Sirs,

Please refer to the subject Bank Guarantee executed by you in our favour on behalf of M/s.*(insert name of the Bidder)*, who have submitted this Bank Guarantee to us towards Bid Security against *(insert name of the Package)* ; Specification No.

We, Jodhpur Vidyut Vitran Nigam Limited, do hereby request you to lodge our claim/demand against the subject Bank Guarantee for full guaranteed sum. Kindly note that this claim/demand against the subject Bank Guarantee is without any further notice in case the amendment to Bank Guarantee No. datedextending its validity upto is not got arranged by*(insert name of the Bidder)* in our favour and are not received by us upto In such an event you are requested to remit the full guaranteed amount in terms of the subject guarantee in its letter and spirit and proceeds of this Bank Guarantee shall be forwarded to us in form of demand draft in favour of ` Jodhpur Vidyut Vitran Nigam Limited , payable at Jodhpur`

This is without prejudice to our right under this guarantee and under the law.

Thanking you,

For.....*(Jodhpur Vidyut Vitran Nigam Limited)*

(AUTHORISED SIGNATORY)

Copy to:

(insert Name and Address of the Bidder)

- You are requested to do the needful so that the amendment to the subject Bank Guarantee extending the validity up to is received by us by



4. FORM OF 'NOTIFICATION OF AWARD OF CONTRACT'

4a. FORM OF 'NOTIFICATION OF AWARD OF CONTRACT' FOR SUPPLY OF PLANT AND EQUIPMENT

Ref. No. :

Date :

.....(insert Contractor's Name & Address).....

.....

.....

.....

[in case of Joint Venture, the aforesaid details shall be of the Lead Partner and the following shall also be included:

(Lead Partner of the Joint Venture of M/s. and M/s.)]

Attn : Mr.....

Sub. : Notification of Award for Ex-works Supply Contract for Post Saubhagya Rural households **electrification works of xxxx district (name of district) in Jodhpur Discom,Rajasthan under DDUGJY NEW** (insert name of the Package)
Specification No.: Domestic Competitive Bidding. (Project Funding: Domestic).

Dear Sir,

1.0 REFERENCE

This has reference to the following:

1.1 Our Invitation for Bids (IFB) dated

1.2 Bidding documents for the subject package issued to you vide our letter Ref. No. dated, comprising the following:

- a) Conditions of Contract Volume-I
(Document Code No.)



- b) Technical Specifications, Drawings Volume-II
(Document Code No.)
- c) Bid Form, Price Schedules Volume-III
& Technical Data Sheets
(Document Code No.)
- 1.2.1 Amendment/Errata No. to Bidding Documents issued to you vide our letter no.
dated
*(Applicable only if any Errata/Amendment to the Bidding Documents has been issued
subsequently)*
- 1.2.2 Clarifications to the Bidding Documents, pursuant to pre-bid conference held on,
issued to you vide our letters no. dated *(Use as applicable)*
*(Applicable only if any clarification to the Bidding Documents has been issued
subsequently)*
- (INCLUDE AS FURTHER SUB-PARAGRAPHS ANY OTHER CORRESPONDENCE MADE TO THE
BIDDER AFTER ISSUANCE OF BIDDING DOCUMENTS UP TO BID OPENING)*
- 1.3 First envelope of your Bid submitted/the Bid submitted by the Joint Venture (JV) of M/s.
..... (Lead Partner) and M/s. (Other Partner) for the subject
package under Proposal reference no. dated was opened on
..... *(Use as applicable)*
- 1.4 Intimation for Opening of Price Schedule issued to you vide our letter no. dated
.....
- 1.5 Your Bid/the Bid by the Joint Venture (JV) of M/s. (Lead Partner) and M/s.
..... (Other Partner) under proposal reference no. dated
was opened on.....*(Use as applicable)*
- 1.6 Post bid discussions we had with you on various dates from to resulting
into the Minutes of Meeting/ Record Notes of Post Bid Discussions enclosed as APPENDIX
(NOA)-1with this Notification of Award.

2.0 **AWARD OF CONTRACT AND ITS SCOPE**

- 2.1 We confirm having accepted your Bid/Bid of the Joint Venture (JV) of M/s.
(Lead Partner) and M/s. (Other Partner) *(Use as applicable)* (referred to at para
1.3 & 1.5 above) read in conjunction with all the specifications, terms & conditions of the



Bidding Documents (referred to at para 1.2, 1.2.1 & 1.2.2[*modify as applicable*] above) and specific confirmations recorded in the Record Notes of Post Bid Discussions (referred to at para 1.6 above), and award on you/the JV(*use as applicable*) the 'Ex-works Supply Contract' (also referred to as the 'First Contract') covering inter-alia Ex-works supply of all equipment and materials including Type Testing to be conducted, required for the complete execution of the (*insert name of Package alongwith name of the Project*), as detailed in the documents referred hereinabove. The scope of work inter-alia includes the following:

..... (Indicate brief Scope of Work)

The scope of work under this Notification of Award (NOA) shall also include all such items which are not specifically mentioned in the Bidding Documents and/or your bid but are necessary for the successful completion of your scope under the Contract for the construction of (*insert name of Package alongwith name of the Project*), unless otherwise specifically excluded in the Bidding Documents or in this NOA.

2.1.1 You, the Lead Partner of the JV, along with M/s., the Other Partner of JV, shall be liable jointly and severally for the execution of the Contract in accordance with terms and conditions of the Contract. As per the Power of Attorney furnished in your favour by the Joint Venture, as enclosed with Bid Proposal of the JV, you shall act as the Partner In-charge (Lead Partner) of the above Joint Venture for execution of the Contract. (*This provision shall be included only in case the Bidder is a Joint Venture*)

2.2 The notification for award of Contract for performance of all other activities, as set forth in the Bidding Documents, viz.

..... (*Indicate brief scope of work of the Second Contract*)

has been issued on you vide our NOA no. dated (hereinafter called the "Second Contract" or "Services Contract").

Notwithstanding the award of work under two separate Contracts in the aforesaid manner, you/the JV (*use as applicable*) shall be overall responsible to ensure the execution of both the Contracts to achieve successful completion and taking over of the works under the package by the Employer as per the requirements stipulated in the Bidding Documents. It is expressly understood and agreed by you/the JV (*use as applicable*) that any default or breach under the 'Second Contract' shall automatically be deemed as a default or breach of this 'First Contract' also and vice-versa, and any such default or breach or occurrence giving us a right to terminate the 'Second Contract', either in full or in part, and/or recover damages there under, shall give us an absolute right to terminate this Contract, at your/JV's (*use as applicable*) risk, cost and responsibility, either in full or in part and/or recover damages under this 'First Contract' as well. However, such default or breach or occurrence in the 'Second Contract', shall not automatically relieve you/the JV (*use as applicable*) of any of your/JV's (*use as applicable*) obligations under this 'First Contract'. It is also expressly understood and agreed by you/the JV (*use as applicable*) that the



equipment/materials supplied by you/the JV (*use as applicable*) under this 'First Contract', when erected, installed & commissioned by you under the 'Second Contract' shall give satisfactory performance in accordance with the provisions of the Contract.

a. **CONTRACT PRICE**

3.1 The total Contract Price for the entire scope of work under this Contract shall be (*Specify the currency and the amount in figures & words*) as per the following break-up:

Sl. No.	Price Component	Amount
1.	Ex-Works Price component, F&I including transportation, Taxes.	
2.	Type Test Charges	Not Applicable
Total Supply Contract Price		

3.2 Notwithstanding the break-up of the Contract Price, the Contract shall, at all times, be construed as a single source responsibility Contract and any breach in any part of the Contract shall be treated as a breach of the entire Contract.

4.0 You/The JV (*use as applicable*)are/is required to furnish at the earliest a Performance Security(ies), as per the Bidding Documents, for an amount of (*Specify the value*) i.e. equal to 10% (Ten percent) of the Contract Price, and valid upto and including and any other securities as per the Bidding Documents.

(In case any other performance security is required to be furnished, the same is to be mentioned here)

5.0 For release of advance payment (admissible as per the Bidding Documents) equal to% of the Ex-works Price component of the Contract Price, you are, inter-alia, required to furnish a Bank Guarantee for the equivalent advance amount. The validity of the Advance Bank Guarantee shall be up to and including Further, please note that furnishing of all the Contract Performance Securities under the 'First Contract' and 'Second Contract' shall be one of the conditions precedent to release of advance under this Contract.

6.0 All the bank guarantees shall be furnished from an eligible bank as described in the Bidding Documents.

7.0 The schedule for Taking Over/Completion of Facilities by the Employer upon successful completion of the (*insert name of Package alongwith name of the Project*) shall be ... (*indicate the completion schedule*) ... days from the date of issue of this Notification of Award for all contractual purposes.



- 8.0 This Notification of Award constitutes formation of the Contract and comes into force with effect from the date of issuance of this Notification of Award.
- 9.0 You shall enter into a Contract Agreement with us within twenty-eight (28) days from the date of this Notification of Award.
- 10.0 This Notification of Award is being issued to you in duplicate. We request you to return its duplicate copy duly signed and stamped on each page including the enclosed Appendix as a token of your acknowledgement.

Please take the necessary action to commence the work and confirm action.

Yours faithfully,

of For and on behalf

(Jodhpur Vidyut Vitran Nigam Limited)

(Authorised Signatory)

Enclosures:

- APPENDIX (NOA) – 1 - Record Notes of Post - Bid Discussions held on various dates from to



4b. FORM OF 'NOTIFICATION OF AWARD OF CONTRACT' FOR INSTALLATION OF PLANT AND EQUIPMENT

Ref. No. :

Date :

.....(insert Contractor's Name & Address).....

.....

.....

.....

[in case of Joint Venture, the aforesaid details shall be of the Lead Partner and the following shall also be included:

(Lead Partner of the Joint Venture of M/s. and M/s.)]

Attn : Mr.....

Sub. : Notification of Award for Services Contract for Post Saubhagya Rural households **electrification works of xxxx district (name of district) in Jodhpur Discom,Rajasthan under DDUGJY NEW** (insert name of the Package)
Specification No.: Domestic Competitive Bidding. (Project Funding: Domestic).

Dear Sir,

1.0 REFERENCE

This has reference to the following:

1.1 Our Invitation for Bids (IFB) dated

1.2 Bidding documents for the subject package issued to you vide our letter Ref. No. dated, comprising the following:

a) Conditions of Contract Volume-I
(Document Code No.)

b) Technical SpecificationsVolume-II



(Document Code No.)

- c) Bid Form, Price Schedules Volume-III
& Technical Data Sheets

(Document Code No.)

- 1.2.1 Amendment/Errata No. to Bidding Documents issued to you vide our letter no. dated

(Applicable only if any Errata/Amendment to the Bidding Documents has been issued subsequently)

- 1.2.2 Clarifications to the Bidding Documents, pursuant to pre-bid conference held on, issued to you vide our letters no. dated *(Use as applicable)*

(Applicable only if any clarification to the Bidding Documents has been issued subsequently)

(INCLUDE AS FURTHER SUB-PARAGRAPHS ANY OTHER CORRESPONDENCE MADE TO THE BIDDER AFTER ISSUANCE OF BIDDING DOCUMENTS UP TO BID OPENING)

- 1.3 First envelope of your Bid submitted/the Bid submitted by the Joint Venture (JV) of M/s. (Lead Partner) and M/s. (Other Partner) for the subject package under Proposal reference no. dated was opened on *(Use as applicable)*

- 1.4 Intimation for Opening of Price Schedule issued to you vide our letter no. dated

- 1.5 Your Bid/the Bid by the Joint Venture (JV) of M/s. (Lead Partner) and M/s. (Other Partner) under proposal reference no. dated was opened on.....*(Use as applicable)*

- 1.6 Post bid discussions we had with you on various dates from to resulting into the Minutes of Meeting/ Record Notes of Post Bid Discussions enclosed as APPENDIX (NOA)-1with this Notification of Award.

2.0 **AWARD OF CONTRACT AND ITS SCOPE**

- 2.1 We confirm having accepted your Bid/Bid of the Joint Venture (JV) of M/s. (Lead Partner) and M/s. (Other Partner) *(Use as applicable)* (referred to at para 1.3 & 1.5 above) read in conjunction with all the specifications, terms & conditions of the



Bidding Documents (referred to at para 1.2, 1.2.1 & 1.2.2[*modify as applicable*] above) and specific confirmations recorded in the Record Notes of Post Bid Discussions (referred to at para 1.6 above), and award on you/the JV(*use as applicable*) the 'Services Contract' (also referred to as the 'Second Contract') for performance of all other activities, as set forth in the documents, viz. (*Indicate brief scope of work*) for the (*insert name of Package alongwith name of the Project*)....

The scope of work under this Notification of Award (NOA) shall also include all such items which are not specifically mentioned in the Bidding Documents and/or your bid but are necessary for the successful completion of your scope under the Contract for the construction of (*insert name of Package alongwith name of the Project*), unless otherwise specifically excluded in the Bidding Documents or in this NOA.

2.1.1 You, the Lead Partner of the JV, along with M/s., the Other Partner of JV, shall be liable jointly and severally for the execution of the Contract in accordance with terms and conditions of the Contract. As per the Power of Attorney furnished in your favour by the Joint Venture, as enclosed with Bid Proposal of the JV, you shall act as the Partner In-charge (Lead Partner) of the above Joint Venture for execution of the Contract. (*This provision shall be included only in case the Bidder is a Joint Venture*)

2.2 The notification for award of Contract for Ex-works Supply of all equipment and materials including Type Testing to be conducted, as set forth in the documents, viz.

..... (*Indicate brief scope of work of the First Contract*)

has been issued on you vide our NOA no. dated (hereinafter called the "Ex-works Supply Contract" or "First Contract").

Notwithstanding the award of work under two separate Contracts in the aforesaid manner, you/the JV (*use as applicable*) shall be overall responsible to ensure the execution of both the Contracts to achieve successful completion and taking over of the works under the package by the Employer as per the requirements stipulated in the Bidding Documents. It is expressly understood and agreed by you/the JV(*use as applicable*) that any default or breach under the 'First Contract' shall automatically be deemed as a default or breach of this 'Second Contract' also and vice-versa, and any such default or breach or occurrence giving us a right to terminate the 'First Contract', either in full or in part, and/or recover damages there under, shall give us an absolute right to terminate this Contract, at your/JV's (*use as applicable*) risk, cost and responsibility, either in full or in part and/or recover damages under this 'Second Contract' as well. However, such default or breach or occurrence in the 'First Contract', shall not automatically relieve you/the JV(*use as applicable*) of any of your obligations under this 'Second Contract'. It is also expressly understood and agreed by you/the JV (*use as applicable*) that the equipment/materials supplied by you/the JV (*use as applicable*) under the 'First Contract', when erected, installed & commissioned by you/the JV (*use as applicable*) under this 'Second Contract' shall give satisfactory performance in accordance with the provisions of the Contract.



3.0 **CONTRACT PRICE**

3.1 The total Contract Price for the entire scope of work under this Contract shall be
(Specify the currency and the amount in figures & words) as per the following
break-up:

Sl. No.	Price Component	Amount
1.	Erection/Installation, Testing, Commissioning, Local Transportation, Insurance and other Incidental Services (including port clearance etc)& taxes.	
2.	Installation Services	Not Applicable
3.	Training Charges	Not Applicable
Total for Erection Contract Price		

3.2 Notwithstanding the break-up of the Contract Price, the Contract shall, at all times, be construed as a single source responsibility Contract and any breach in any part of the Contract shall be treated as a breach of the entire Contract.

4.0 You/the JV (use as applicable) are/is required to furnish at the earliest a Performance Security (ies), as per the Bidding Documents, for an amount of (Specify the value) i.e. equal to 10% (Ten percent) of the Contract Price, and valid upto and including and any other securities as per the Bidding Documents.

(In case any other performance security is required to be furnished, the same is to be mentioned here)

5.0 All the bank guarantees shall be furnished from an eligible bank as described in the Bidding Documents.

6.0 The schedule for Taking Over/Completion of Facilities by the Employer upon successful completion of the (Insert name of Package alongwith name of the Project) shall be ... (indicate the completion schedule) days from the date of issue of this Notification of Award for all contractual purposes.

7.0 This Notification of Award constitutes formation of the Contract and comes into force with effect from the date of issuance of this Notification of Award.

8.0 You shall enter into a Contract Agreement with us within 7(Seven) days from the date of this Notification of Award.



- 9.0 This Notification of Award is being issued to you in duplicate. We request you to return its duplicate copy duly signed and stamped on each page including the enclosed Appendix as a token of your acknowledgement.

Please take the necessary action to commence the work and confirm action.

Yours faithfully,

For and on behalf of

Jodhpur Vidyut Vitran Nigam Limited

Enclosures:

- APPENDIX (NOA) – 1 - Record Notes of Post - Bid Discussions held on various dates from to

Note:

- (1) Instructions indicated in italics in this notification of award are to be taken care of by the issuing authority. The Forms may be modified appropriately to suit the specific requirement of the Contract.



5. FORM OF CONTRACT AGREEMENT

[Alternative – a]

As per notification dated 06.11.2020, Finance Deptt.(Tax Div.), GoR, the contract agreement shall be executed on Rajasthan Non-Judicial Stamp Paper worth 0.15% of Contract value or maximum Rs. 25,00,000/-, whichever is less for each work order

SUPPLY CONTRACT AGREEMENT BETWEEN..... (*Jodhpur Vidyut Vitran Nigam Limited*)..... AND M/s. (*Name of Contractor*)/JOINT VENTURE (JV) OF M/s. (*Name of Lead Partner*)... (THE LEAD PARTNER OF THE JV) AND M/s. (*Name of Other Partner*)..... (THE PARTNER OF THE JV) [*Use as applicable*]

THIS CONTRACT AGREEMENT No. (also referred to as 'Supply Contract/the First Contract') is made on the day of 20....

BETWEEN

(1)Jodhpur Vidyut Vitran Nigam Limited, a company incorporated under the laws of Companies Act 1956/2013 (with amendment from time to time) and having its Registered Office at Vidyut Bhawan, Jodhpur(*registered address of the Employer*) and its Corporate Office at Vidyut Bhawan, Jodhpur(*address of the Employer*)..... (hereinafter called "the Employer" and also referred to as " JDVVNL"*(insert abbreviated name of the Employer)*)

and

(2) M/s..... (*Name of Contractor*), a company incorporated under the laws of Companies Act 1956/2013 (with amendment from time to time) and having its Principal place of business at(*Address of Contractor*) and Registered Office at(*Registered address of Contractor*) (hereinafter called "the Contractor" and also referred to as ".....(*insert abbreviated name of the Contractor*)")

or

Joint Venture (JV) of M/s..... (*Name of Lead Partner*)..... (the Lead Partner of JV), a company incorporated under the laws of Companies Act 1956 and having its Principal place of business at(*Address of Lead Partner*) and Registered Office at(*Registered address of Lead Partner*) and M/s (*Name of Other Partner*)..... (the Partner of JV), a company incorporated under the laws of Companies Act 1956/2013 (with amendment from time to time) and having its Principal place of business at(*Address of Other Partner*) and Registered Office at(*Registered address of Other Partner*) (hereinafter called "the Contractor" and also referred to as "Joint Venture"/the 'JV'")

(Applicable only in case of Joint Venture)

WHEREAS the Employer desires to engage the Contractor for the supply of all equipment and materials including taxes and duties as applicable, Type Testing to be conducted inter-alia including (*Indicate brief scope of work*) for the complete execution of the (*insert name of Package alongwith name of the Project*)..... as detailed in the Contract Document ("the Facilities"), and the Contractor has agreed to such engagement upon and subject to the terms and conditions hereinafter appearing.



NOW IT IS HEREBY AGREED as follows:

Article 1. Contract Documents

1.1 Contract Documents (Reference GCC Clause 2.2)

The following documents shall constitute the Contract between the Employer and the Contractor, and each shall be read and construed as an integral part of the Contract:

VOLUME – A

1. This Contract Agreement and the Appendices thereto.
2. Invitation for bids (Reference No..... dated.....)
3. Pre-bid clarification (Reference No..... dated.....)
4. Letter of Intent (Reference No..... dated.....)
5. Mutually agreed contract execution plan/PERT chart (Reference No..... dated.....)
6. Contract Performance Securities (Reference No..... dated.....)
7. Letter of Award (Reference No..... dated.....)

VOLUME – B

3. "Bidding Documents" comprising of the following:

The Bidding Document is a compilation of the following and shall include amendments.... to, if any, thereto:

a. VOLUME – I: Condition of contract (Document Code No.:):

- Section I: Invitation for Bid (Section - IFB)
- Section II: Instructions to Bidders (Section – ITB)
- Section III: Bid Data sheets (BDS)
- Section IV: General Conditions of Contract (GCC)
- Section V: Special Conditions of Contract (SCC)
- Section VI: Sample Forms and Procedures (FP)

1. Bid Form & Price Schedule
 - 1.1 Bid Form
 - 1.2 Price Schedule
2. Bid Security Form
3. Form of Notification by the Employer to the Bank
 - 3.a Applicable for forfeiture of Bank Guarantee
 - 3.b Applicable for conditional claim pending extension of Bank Guarantee by the bidder.
4. Form of 'Notification of Award of Contract'
 - 4(a) Form of 'Notification of Award of Contract' for Supply of Plant and equipment
 - 4(b) Form of 'Notification of Award of Contract' for Installation of Plant and equipment



5. Form of Contract Agreement
 - Alternative A
 - Alternative B
 - 5.1 Appendix-1: Terms and Procedures of Payment:
11KV, Distribution Transformer, LT and Service connection
 - 5.2 Appendix-2: Price Adjustment
 - 5.3 Appendix-3: Insurance Requirements
 - 5.4 Appendix-4: Time Schedule
 - 5.5 Appendix-5: List of Approved Sub-contractors
 - 5.6 Appendix-6: Scope of Works and Supply by the Employer
 - 5.7 Appendix-7: List of Document for Approval or Review
 - 5.8 Appendix-8: Guarantees, Liquidated Damages for Non-Performance
6. Performance Security Form
7. Bank Guarantee Form for Advance Payment
 8. Form of Taking over Certificate
 9. Form of Indemnity Bond to be executed by the Contractor for the Equipment handed over in one lot by Employer for performance of its contract
 10. Form of Indemnity Bond to be executed by the Contractor for the Equipment handed over in installments by Employer For performance of its contract
 11. Form of Authorisation Letter
 12. Form of Trust Receipt for Plant, Equipment and Materials received
 13. Form of Extension of Bank Guarantee
 14. Form of Power of Attorney for Joint Venture
 15. Form of Undertaking by the Joint Venture Partners
 16. Format for Evidence of Access to or Availability of Credit/ Facilities
 17. Form of Operational Acceptance
- 18 Form of Safety Plan to be submitted by the Contractor within sixty days of award of contract
19. Form of joint deed of undertaking by the Sub-contractor along with the bidder /contractor
 20. Form of Certificate of Financial Parameters for QR
- Section VII: Scope of works,
- b. VOLUME-II: Bid –Proposal Sheets** (Document Code No.:):
- Section I: Project Management System (PMS), Quality Assurance & Evaluation Mechanism, Documentation & PMA
- Section II: Bid Forms
- Section III: Price Schedules



- c. Volume-III: Technical Specifications, Drawings** (Document Code No.:):
- Section I: Technical Specifications
 - Section II: Tender Drawings
 - Section III: Technical Specifications for DDUGJY NEW

VOLUME – C

4. Bid Submitted by the Contractor.

(Only relevant extracts are attached herewith for easy reference. Should the circumstances warrant, the original Bid along with the enclosures thereof, shall be referred to.)

1.2 Order of Precedence (Reference GCC Clause 2)

In the event of any ambiguity or conflict between the Contract Documents listed above, the order of precedence shall be the order in which the Contract Documents are listed in Article 1.1 (Contract Documents) above.

1.3 Definitions (Reference GCC Clause 1/SCC Clause 1)

1.3.1 Capitalized words and phrases used herein shall have the same meanings as are ascribed to them in the General Conditions of Contract/Special Conditions of Contract.

Article 2. Contract Price and Terms of Payment

2.1 Contract Price (Reference GCC Clause 7)

The Employer hereby agrees to pay to the Contractor the Contract Price in consideration of the performance by the Contractor of its obligations hereunder. The Contract Price shall be the aggregate of..... (*Amount in words*)..... (*Amount in figures*)), or such other sums as may be determined in accordance with the terms and conditions of the Contract. The break-up of the Contract price is as under:

Sl. No.	Price Component	Amount
1.	Ex-Works Price component, F&I including transportation, Taxes.	
2.	Type Test Charges	Not Applicable
Total Supply Contract Price		

The detailed break-up of Contract Price is given in the relevant Appendices hereto.

2.2 Terms of Payment (Reference GCC Clause 8)

The terms and procedures of payment according to which the Employer will reimburse the Contractor are given in Appendix 1 (Terms and Procedures of Payment) hereto.

Article 3. Effective Date for Determining Time for Completion

3.1 Effective Date (Reference GCC Clause 1)

The Time of Completion of Facilities shall be determined from the date of the Notification of Award i.e., from

Article 4. Appendices



The Appendices listed in the List of Appendices, as mentioned below, shall be deemed to form an integral part of this Contract Agreement.

Reference in the Contract to any Appendix shall mean the Appendices attached hereto, and the Contract shall be read and construed accordingly.

List of Appendices

- Appendix 1 Terms and Procedures of Payment
- Appendix 2 Price Adjustment
- Appendix 3 Insurance Requirements
- Appendix 4 Time Schedule
- Appendix 5 List of Approved Sub-contractors
- Appendix 6 Scope of Works and Supply by the Employer
- Appendix 7 List of Document for Approval or Review
- Appendix 8 Guarantees, Liquidated Damages for Non-Performance

Article 5.

The Contract Agreement No. has also been made on the day of 20...., between the Employer and the Contractor for the Services Contract (hereinafter referred to as the "Second Contract") for the subject package which includes performance of all the services interalia including (*Indicate brief scope of work*) for the complete execution of the (*insert name of Package alongwith name of the Project*).....

Notwithstanding the award of contract under two separate contracts in the aforesaid manner, the Contractor shall be overall responsible to ensure the execution of both the contracts to achieve successful completion and taking over of the facilities by the Employer as per the requirements stipulated in the Contract. It is expressly understood and agreed by the Contractor that any default or breach under the 'Second Contract' shall automatically be deemed as a default or breach of this 'First Contract' also and vice-versa and any such breach or occurrence or default giving the Employer a right to terminate the 'Second Contract' either in full or in part, and/or recover damages there under that Contract, shall give the Employer an absolute right to terminate this Contract at the Contractor's risk, cost and responsibility, either in full or in part and /or recover damages under this 'First Contract' as well. However, such breach or default or occurrence in the 'Second Contract' shall not automatically relieve the Contractor of any of its responsibility/ obligations under this 'First Contract'. It is also expressly understood and agreed by the Contractor that the equipment /materials supplied by the Contractor under this 'First Contract' when installed and commissioned by the Contractor under the 'Second Contract' shall give satisfactory performance in accordance with the provisions of the Contract.

IN WITNESS WHEREOF the Employer and the Contractor have caused this Agreement to be duly executed by their duly authorized representatives the day and year first above written.

Signed by for and
on behalf of the Employer
.....

Signature

Signed by for and
on behalf of the Contractor
.....

Signature



.....

Title

in the presence of

.....

Title

in the presence of



5. FORM OF CONTRACT AGREEMENT

[Alternative – b]

As per notification dated 06.11.2020, Finance Deptt.(Tax Div.), GoR, the contract agreement shall be executed on Rajasthan Non-Judicial Stamp Paper worth 0.15% of Contract value or maximum Rs. 25,00,000/-, whichever is less for each work order

SERVICES CONTRACT AGREEMENT BETWEEN Jodhpur Vidyut Vitran Nigam Limited (*Name of Employer*)..... AND M/s. (*Name of Contractor*)/JOINT VENTURE (JV) OF M/s. (*Name of Lead Partner*).... (THE LEAD PARTNER OF THE JV) AND M/s.(*Name of Other Partner*)..... (THE PARTNER OF THE JV) [*Use as applicable*]

THIS CONTRACT AGREEMENT No. (also referred to as 'Services Contract/the Second Contract') is made on the day of 20....

BETWEEN

(1) Jodhpur Vidyut Vitran Nigam Limited (*Name of Employer*)..... a company incorporated under the laws of Companies Act 1956/2013 (with amendment from time to time) and having its Registered Office at Vidyut Bhawan, Jodhpur(*registered address of the Employer*) and its Corporate Office at Vidyut Bhawan, Jodhpur(*address of the Employer*)..... (hereinafter called "the Employer" and also referred to as "JDVVNL(*insert abbreviated name of the Employer*)")

and

(2) M/s (*Name of Contractor*), a company incorporated under the laws of Companies Act 1956/2013 (with amendment from time to time) and having its Principal place of business at(*Address of Contractor*) and Registered Office at(*Registered address of Contractor*) (hereinafter called "the Contractor" and also referred to as ".....(*insert abbreviated name of the Contractor*)")

or

Joint Venture (JV) of M/s (*Name of Lead Partner*) (the Lead Partner of JV), a company incorporated under the laws of Companies Act 1956 and having its Principal place of business at(*Address of Lead Partner*) and Registered Office at(*Registered address of Lead Partner*) and M/s (*Name of Other Partner*) (the Partner of JV), a company incorporated under the laws of Companies Act 1956/2013 (with amendment from time to time) and having its Principal place of business at(*Address of Other Partner*) and Registered Office at(*Registered address of Other Partner*) (hereinafter called "the Contractor" and also referred to as "Joint Venture"/the 'JV'")

(*Applicable only in case of Joint Venture*)

WHEREAS the Employer desires to engage the Contractor for providing all the services inter-alia including (*Indicate brief scope of work*) for the complete execution of the (*insert name of Package alongwith name of the Project*)..... as detailed in the



Contract Document ("the Facilities"), and the Contractor has agreed to such engagement upon and subject to the terms and conditions hereinafter appearing.

NOW IT IS HEREBY AGREED as follows:

Article 1. Contract Documents

1.1 Contract Documents (Reference GCC Clause 2.2)

The following documents shall constitute the Contract between the Employer and the Contractor, and each shall be read and construed as an integral part of the Contract:

VOLUME – A

1. This Contract Agreement and the Appendices thereto.
2. Invitation for bids (Reference No..... dated.....)
3. Pre-bid clarification (Reference No..... dated.....)
4. Letter of Intent (Reference No..... dated.....)
5. Mutually agreed contract execution plan/PERT chart (Reference No..... dated.....)
6. Contract Performance Securities (Reference No..... dated.....)
7. Letter of Award (Reference No..... dated.....)

VOLUME – B

3. "Bidding Documents" comprising of the following:

The Bidding Document is a compilation of the following and shall include amendments.... to, if any, thereto:

- a. **VOLUME – I: Condition of contract** (Document Code No.:):
 - Section I: Invitation for Bid (Section - IFB)
 - Section II: Instructions to Bidders (Section – ITB)
 - Section III: Bid Data sheets (BDS)
 - Section IV: General Conditions of Contract (GCC)
 - Section V: Special Conditions of Contract (SCC)
 - Section VI: Sample Forms and Procedures (FP)



1. Bid Form & Price Schedule
 - 1.1 Bid Form
 - 1.2 Price Schedule
2. Bid Security Form
3. Form of Notification by the Employer to the Bank
 - 3.a Applicable for forfeiture of Bank Guarantee
 - 3.b Applicable for conditional claim pending extension of Bank Guarantee by the bidder.
4. Form of 'Notification of Award of Contract'
 - 4(a) Form of 'Notification of Award of Contract' for Supply of Plant and equipment
 - 4(b) Form of 'Notification of Award of Contract' for Installation of Plant and equipment
5. Form of Contract Agreement
 - Alternative A
 - Alternative B
 - 5.1 Appendix-1: Terms and Procedures of Payment:
11KV, Distribution Transformer, LT and Service connection
 - 5.2 Appendix-2: Price Adjustment
 - 5.3 Appendix-3: Insurance Requirements
 - 5.4 Appendix-4: Time Schedule
 - 5.5 Appendix-5: List of Approved Sub-contractors
 - 5.6 Appendix-6: Scope of Works and Supply by the Employer
 - 5.7 Appendix-7: List of Document for Approval or Review
 - 5.8 Appendix-8: Guarantees, Liquidated Damages for Non-Performance
6. Performance Security Form
7. Bank Guarantee Form for Advance Payment
8. Form of Taking over Certificate
9. Form of Indemnity Bond to be executed by the Contractor for the Equipment handed over in one lot by Employer for performance of its contract
10. Form of Indemnity Bond to be executed by the Contractor for the Equipment handed over in installments by Employer For performance of its contract
11. Form of Authorisation Letter
12. Form of Trust Receipt for Plant, Equipment and Materials received
13. Form of Extension of Bank Guarantee
14. Form of Power of Attorney for Joint Venture



15. Form of Undertaking by the Joint Venture Partners
16. Format for Evidence of Access to or Availability of Credit/ Facilities
17. Form of Operational Acceptance
18. Form of Safety Plan to be submitted by the Contractor within sixty days of award of contract
19. Form of joint deed of undertaking by the Sub-contractor along with the bidder /contractor
20. Form of Certificate of Financial Parameters for QR

Section VII: Scope of works

d. VOLUME-II: Bid –Proposal Sheets (Document Code No.:):

Section I: Project Management System (PMS), Quality Assurance & Evaluation Mechanism, Documentation & PMA

Section II: Bid Forms

Section III: Price Schedules

e. Volume-III: Technical Specifications, Drawings (Document Code No.:):

Section I: Technical Specifications

Section II: Tender Drawings

Section III: Technical Specifications for DDUGJY NEW

VOLUME – C

4. Bid Submitted by the Contractor.

(Only relevant extracts are attached herewith for easy reference. Should the circumstances warrant, the original Bid along with the enclosures thereof, shall be referred to.)

1.2 Order of Precedence (Reference GCC Clause 2)

In the event of any ambiguity or conflict between the Contract Documents listed above, the order of precedence shall be the order in which the Contract Documents are listed in Article 1.1 (Contract Documents) above.

1.3 Definitions (Reference GCC Clause 1/SCC Clause 1)

1.3.1 Capitalized words and phrases used herein shall have the same meanings as are ascribed to them in the General Conditions of Contract/Special Conditions of Contract.

Article 2. Contract Price and Terms of Payment

2.1 Contract Price (Reference GCC Clause 7)

The Employer hereby agrees to pay to the Contractor the Contract Price in consideration of the performance by the Contractor of its obligations hereunder. The Contract Price shall be



the aggregate of (*amount in words*) (*amount in figures*)
.....), or such other sums as may be determined in accordance with the terms and
conditions of the Contract.

The break-up of the Contract price is as under:

Sl. No.	Price Component	Amount
1.	Erection/Installation, Testing, Commissioning, Local Transportation, Insurance and other Incidental Services (including port clearance etc)& taxes.	
2.	Installation Services	Not Applicable
3.	Training Charges	Not Applicable
Total for Erection Contract Price		

The detailed break-up of Contract Price is given in the relevant Appendices hereto.

2.2 Terms of Payment (Reference GCC Clause 8)

The terms and procedures of payment according to which the Employer will reimburse the Contractor are given in Appendix 1 (Terms and Procedures of Payment) hereto.

Article 3. Effective Date for Determining Time for Completion

3.1 Effective Date (Reference GCC Clause 1)

The Time of Completion of Facilities shall be determined from the date of the Notification of Award i.e., from

Article 4. Appendices

The Appendices listed in the List of Appendices, as mentioned below, shall be deemed to form an integral part of this Contract Agreement.

Reference in the Contract to any Appendix shall mean the Appendices attached hereto, and the Contract shall be read and construed accordingly.

List of Appendices

Appendix 1 Terms and Procedures of Payment

Appendix 2 Price Adjustment

Appendix 3 Insurance Requirements

Appendix 4 Time Schedule

Appendix 5 List of Approved Sub-contractors

Appendix 6 Scope of Works and Supply by the Employer

Appendix 7 List of Document for Approval or Review

Appendix 8 Guarantees, Liquidated Damages for Non-Performance

Article 5.



The Contract Agreement No. has also been made on the day of 20...., between the Employer and the Contractor for the Ex-Works Supply Contract (hereinafter referred to as the "First Contract") for the subject package which includes Ex-works supply of all equipment and materials including Type Testing to be conducted interalia including (*Indicate brief scope of work*) for the complete execution of the (*insert name of Package alongwith name of the Project*).....

Notwithstanding the award of contract under two separate contracts in the aforesaid manner, the Contractor shall be overall responsible to ensure the execution of both the contracts to achieve successful completion and taking over of the facilities by the Employer as per the requirements stipulated in the Contract. It is expressly understood and agreed by the Contractor that any default or breach under the 'First Contract' shall automatically be deemed as a default or breach of this 'Second Contract' also and vice-versa and any such breach or occurrence or default giving the Employer a right to terminate the 'First Contract' either in full or in part, and/or recover damages there under that Contract, shall give the Employer an absolute right to terminate this Contract at the Contractor's risk, cost and responsibility, either in full or in part and /or recover damages under this 'Second Contract' as well. However, such breach or default or occurrence in the 'First Contract' shall not automatically relieve the Contractor of any of its responsibility/ obligations under this 'Second Contract'. It is also expressly understood and agreed by the Contractor that the equipment /materials supplied by the Contractor under the 'First Contract' when installed and commissioned by the Contractor under this 'Second Contract' shall give satisfactory performance in accordance with the provisions of the Contract.

IN WITNESS WHEREOF the Employer and the Contractor have caused this Agreement to be duly executed by their duly authorized representatives the day and year first above written.

Signed by for and
on behalf of the Employer

Signed by for and
on behalf of the Contractor

.....
Signature

.....
Signature

.....
Title

.....
Title

in the presence of

in the presence of



(Separate Contract Agreements shall be executed by the Employer and the Contractor in accordance with the Construction of the Contract stipulated at Clause [GCC 2.1]. The forms of Contract under both Alternative i.e., a & b shall be used).



Appendix-1: TERMS AND PROCEDURES OF PAYMENT

- I. "Billable Items" are worked out and attached to Price Schedule. Items otherwise required for completion of work but not listed in the Price Schedule shall also be in the scope of the contractor. The costs of such "Non- billable Items" may be included in the quoted price of "Billable Items" by the bidder in the Price Schedule. The payment shall be made on billable item wise basis only as indicated in Price Schedule.
- II. The payment to the Contractor under the contract will be made by the Employer in line with Clause 8, Section GCC, Vol.-I and as per the guidelines and conditions specified hereunder.
- III. All progressive payments shall be released on validity of Contract Performance Security and securities against Initial Advance.
- IV. The interest rate on advance payment shall be SBI's Base rate on the date of disbursement of advance payment. The interest accrued on interest bearing advance shall be adjusted first before releasing any payment. The interest rate shall be calculated on the daily progressive balances outstanding as on the date of recovery/adjustment i.e. on daily rest basis.
- V. Upon award of the contract, contractor shall be free to take on the work at all the fronts or at specified fronts as advised by Project Manager.
- VI. Unmeasured ad-hoc payment: The employer, at his discretion in exigencies, to ensure liquidity of funds with the contractor may accept un-measured ad-hoc bill of the contractor. In this method, following methodology shall be adopted:
- VII.
 - a. Submission of certificate
 - a. Submission of certificate on measurement book by Project Manager that materials under consideration have been erected tested and commissioned as per technical specification, scope of work & approved drawings.
 - b. Quantum and completion of works is certified by Project Manager jointly with contractor and eligible amount of such works are computed as per approved payment terms.
 - c. 50% of such eligible amount shall be released to the contractor immediately within a week. The amount of un-measured bill should not be more than average of previous two measured bill.
 - d. Next bill of the work shall invariably be a measured bill in which, various quantities of unmeasured bill shall be verified and measured jointly by Project Manager and contractor.

A. Supply, Erection, Testing and Commissioning of works under DDUGJY NEW:



1. Advance payment (Optional):

- i. For Ex-works Supply contract, initial interest bearing adjustable Mobilization Advance of 15% of ex-works contract cost excluding taxes and duties shall be released for all the materials in two tranches of 7.5% each, First installment of 7.5% of ex-works price component shall be released on presentation of the following:
 - a. Unconditional acceptance of the Letter of Award and signing of contract agreement by the Contractor.
 - b. Contractor's detailed invoice.
 - c. Submission and acceptance of unconditional & irrevocable part Bank Guarantees (as many number as proposed recovery installments and should be of 110% amount of each installment) in favor of employer with total amounting to 110% of total advance amount as per proforma attached with Section-VI of Vol.-I (Conditions of Contract). The said Bank Guarantees shall be initially valid upto end of ninety (90) days after the scheduled month of supply of materials and shall be extended from time to time till ninety (90) days beyond revised scheduled month of supply of materials, as may be required under the Contract.
 - d. An unconditional & irrevocable Bank Guarantee for ten percent (10%) of the total Contract price towards Contract Performance Guarantee (CPG) in accordance with the provisions of Clause 34.1, Section ITB and as per proforma attached with Section-VI of Vol.-I (Conditions of Contract). The said bank guarantee shall be initially valid up to ninety (90) days after expiry of the Warranty Period and shall be extended from time to time till ninety (90) days beyond successful completion of warranty period, as may be required under the Contract.
 - e. Detailed PERT Network/Bar chart and its approval by the Employer.

The bidder must utilize first advance installment of 7.5% of ex-works supply component before requesting for second advance installment. Second installment of 7.5% shall be released on presentation of contractor's invoice and satisfactory utilization certificate supported with documentary evidence of first advance installment.

- ii. **For Services Contract**, initial interest bearing adjustable Mobilization Advance of 10% of erection contract price excluding taxes and duties shall be released for all the works in two tranches of 5% each. First installment of 5% of total erection price shall be released on presentation of the following:
 - a. Submission of detailed invoice for advance payment.
 - b. Establishment of Contractor's site offices and certification by Engineer that satisfactory mobilization for erection exists.
 - c. Submission and acceptance of unconditional & irrevocable part Bank Guarantees (as many number as proposed recovery installments and should be of 110% amount of each installment) in favor of employer with total



amounting to 110% of total advance amount as per proforma attached with Section-VI of Vol.-I (Conditions of Contract). The said Bank Guarantees shall be initially valid up to end of ninety (90) days after the scheduled month of erection of materials and shall be extended from time to time till ninety (90) days beyond revised scheduled month of erection of materials, as may be required under the Contract.

- d. Submission of an unconditional & irrevocable Bank Guarantee in favor of Employer for ten percent (10%) of the total Contract price towards Contract Performance Guarantee (CPG) in accordance with Clause 34.1 of Section-ITB, Vol.-I and as per proforma attached with Section-VI of Volume-I (Conditions of Contract). The said Bank Guarantee shall be initially valid up to 90 (ninety) days after the expiry of warranty period and shall be extended from time to time till ninety (90) days beyond successful completion of warranty period, as may be required under the Contract.

The bidder must utilize first advance installment of 5% of total erection price before requesting for second advance installment. Second installment of 5% shall be released on presentation of contractor's invoice and satisfactory utilization certificate of first advance installment.

2. Payments (Supply and Erection contract):

A. First Instalment (90% Payments of Supply and Erection contract):

- 2.1.** The bidder shall prepare the bills against Supply contract and Erection contract after completing and commissioning of work in minimum **one cluster**:

Work in One Cluster comprises of:

- i. Works in one census village;

- 2.2.** The 90% payments against supply contract of various items including Taxes etc. and 90% payment against erection contract shall be paid on receipt and acceptance of material only on successful erection, testing and commissioning of the works in a particular cluster and issuance of taking over certificate by the employer on submission of documents indicated herein under:

- a. Unconditional acceptance of the Letter of Award and signing of contract agreement by the Contractor.
- b. An unconditional & irrevocable Bank Guarantee for ten percent (10%) of the total Contract price towards Contract Performance Guarantee (CPG) in accordance with the provisions of Clause 34.1, Section ITB and as per proforma attached with Section-VI of Vol.-I (Conditions of Contract). The said bank guarantee shall be initially valid up to ninety (90) days after expiry of the Warranty Period and shall be extended from time to time till ninety (90) days beyond successful completion of warranty period, as may be required under the Contract.



- c. Detailed Project Execution Plan/PERT chart and its approval by the Employer.
- d. Evidence of dispatch (R/R or receipted L/R)
- e. Contractor's detailed invoice & packing list identifying contents of each shipment.
- f. Invoice certifying payments of ED, Taxes for the direct transaction between Employer and Contractor,
- g. Copy of Certificate to the effect of payments of State/ Central taxes, duties, levies etc have been made against supply of materials through sub-vendors under the contract.
- h. Certified copy of Insurance policy/Insurance Certificate.
- i. Manufacturer's/Contractor's guarantee certificate of Quality.
- j. Material Dispatch Clearance Certificate (MDCC) / Dispatch Instructions (DI) for dispatch of materials from the manufacturer's works. MDCC/DI shall be issued by authorized officer of Employer
- k. Manufacturer's copy of challan
- l. submission of the certificate by the Employer's representative that the item(s) have been received,
- m. Material reconciliation statement consisting of the materials utilized for erection, testing & commissioning vis-à-vis erection activity of the lot of villages.
- n. Submission of certificate by Project Manager that materials have been supplied as per technical specification, scope of work & approved drawings enclosing certified copy of inspection reports and dispatch clearances.
- o. On submission of the certificate by the Project Manager that the item(s) have been received, erected, tested and commissioned.
- p. 'Commissioning' for the purpose of payments shall mean satisfactory completion of all supplies, erection, commissioning checks and successful completion of all site tests and continuous energisation of the equipment/materials at rated voltage as per the Contract and to the satisfaction/approval of the Employer.
- q. Test check certification on Measurement Book be recorded by officers in hierarchy with the claim as per policy.
- r. In case, for any reason not attributable to the contractor, the commissioning and charging of equipment/materials is delayed beyond 120 days of successful completion of final checking and testing of works, the payment shall be



released against an unconditional & irrevocable bank guarantee of equivalent amount initially valid till 6 months from the readiness of works for commissioning and charging at rated voltage, to be extended till 90 days beyond actual commissioning & taking over.

90% of proportionate Mobilization Advance against Supply and erection shall be adjusted while making payments. In case of delay of project, the entire mobilization advance should get recovered from the contractor as per supply and erection contracts' works completion schedule respectively.

B. Final Instalment (10% Payments of Supply and Erection contract):

2.3. The balance ten percent (10%) of payment against Supply contracts and Erection Contract including GST and other Taxes etc. shall be made after 12 months of handing over the system after successful completion, commissioning and charging in all respect and also subject to clearance/ verification of 3rd party inspection.

C. Deleted - Retrieval of material

2.4. Deleted

2.5. Deleted

2.6. Deleted



Appendix-2: PRICE ADJUSTMENT

The prices for execution of the entire works covered under the scope of this work shall be quoted by the Bidder in the manner specified, in the BPS. The Ex-works price component, less advance will be subject to price adjustment, only for equipment/materials/items of work specifically stated under clause 1.0 below, (for which the bidder shall quote a base price), based on separate formulae as per price adjustment provisions given herein.

Prices for Ex-works price component for all other equipment/items except specified at Clause 1.0 below, Charges for Erection, Inland Freight & Insurance etc shall be FIRM and no price adjustment shall be applicable for these components for the entire duration of the Contract.

No price adjustment shall be applicable on the portion of the Contract Price payable to the Contractor as advance payment.

1.0 **Materials and Labour portion:**

1.0.1 **For ACSR Conductor**

The price adjustment on the Ex-works price component, less advance, of Conductor shall be as follows:

$$dECc = ECc [0.80 \times \{(A_1 - A_0) / A_0\} + 0.05 \times \{(L_1 - L_0) / L_0\}]$$

Where,

dECc = Price adjustment amount payable on Ex-works price of Conductor, shipment-wise (if it works out negative, that would mean the amount to be recovered by the employer from the contractor).

ECc = Ex-works price for Conductor, shipment wise, less advance (Quoted Price)

A = Published price indices for EC grade aluminum ingots as published by IEEMA

L = All India consumer price index for industrial workers as published by Labour Bureau, Shimla (Govt. of India)

Fixed portion of the ex-works price component shall be 0.15. This shall not be subject to any adjustment.

In the above price adjustment formulae:

Subscript '0' refers to indices as on 30 days prior to date of bid opening (referred to as base date indices),

Subscript '1' refers to indices as on 60 days prior to date of shipment.

1.0.2 **For Station/ Power Transformer (Copper Wound)**

The price adjustment on the Ex-works price component, less advance, of Transformers shall be as follows:

1.0.2.1 For power transformer (Copper wound)

$$dP = P_0 \times [0.15 + 0.23 \times (C_1/C_0) + 0.26 \times (ES_1/ES_0) + 0.08 \times (IS_1/IS_0) + 0.05 \times (IM_1/IM_0) + 0.11 \times (TB_1/TB_0) + 0.12 \times (L_1/L_0)] - P_0$$

Where,

dP = Price adjustment amount shipmentwise,



- P0 = Ex-works price component of Transformer (Quoted Price),
C, ES, IS, IM, TB & L are the price indices for material and labour as below,
C = Price of copper wire bars, in Rupees per MT, as published by IEEMA,
ES = Price of Electrical steel sheets, C&F price of M4 grade Electrical Steel Sheets in Rupees per MT, as published by IEEMA,
IS (Iron & Steel) = Wholesale Price Index Number for 'Iron & Steel' (Base 2004-05 = 100), as published by IEEMA,
IM (Insulating Materials) = Price of Insulating Materials, as published by IEEMA,
TB = Price of Transformer Oil Base Stock (TOBS) in Rs./KL, as published by IEEMA,
L = All India Average Consumer Price Index Number, for Industrial Workers (base 2001=100) as published / declared by Labour Bureau, Shimla, GOI and circulated by IEEMA.

In the above price adjustment formulae:

Subscript '0' refers to indices as on 30 days prior to date of bid opening (referred to as base date indices),

Subscript '1' refers to indices as on 60 days prior to date of shipment.

1.0.3 **Station / Distribution Transformer (Aluminium Wound)**

The price adjustment on the Ex-works price component, less advance, of Transformers shall be as follows:

1.0.3.1 For station/distribution transformer(Aluminium wound) (of rating up to 160 kVA and voltage up to 33 kV)

$$dP = P_0 \times [0.13 + 0.27 \times (A_1/A_0) + 0.31 \times (ES_1/ES_0) + 0.09 \times (IS_1/IS_0) + 0.02 \times (IM_1/IM_0) + 0.06 \times (TB_1/TB_0) + 0.12 \times (L_1/L_0)] - P_0$$

Where,

- dP = Price adjustment amount shipmentwise,
P0 = Ex-works price component of Transformer (Quoted Price),
C, ES, IS, IM, TB & L are the price indices for material and labour as below,
A = Published price indices for EC grade aluminum ingots as published by IEEMA
ES = Price of Electrical steel sheets, C&F price of M4 grade Electrical Steel Sheets in Rupees per MT, as published by IEEMA,
IS (Iron & Steel) = Wholesale Price Index Number for 'Iron & Steel'



(Base 2004-05 = 100), as published by IEEMA,

IM (Insulating Materials) = Price of Insulating Materials, as published by IEEMA,

TB = Price of Transformer Oil Base Stock (TOBS) in Rs./KL, as published by IEEMA,

L = All India Average Consumer Price Index Number, for Industrial Workers (base 2001=100) as published / declared by Labour Bureau, Shimla, GOI and circulated by IEEMA.

In the above price adjustment formulae:

Subscript '0' refers to indices as on 30 days prior to date of bid opening (referred to as base date indices),

Subscript '1' refers to indices as on 60 days prior to date of shipment.

1.0.4 Cables

The price adjustment on the Ex-works price component, less advance, of Cables shall be as follows:

$$dP = P_0 \times \{0.85 + 0.15 \times (A_1/A_0)\} - P_0 + (M_1 - M_0),$$

Where,

- dP = Price Adjustment amount per kilometer of cable,
P₀ = Ex-works price per kilometer of cable (Quoted Price)
A = Price Index for PVC / XLPE as published by IEEMA,
M₁-M₀ = Change in metal component of the ex-works price of particular type and size of cable,
M = (Weight in MT of metal per kilometer of cable) x (published price index of metals per MT as published by IEEMA)

The bidder has to specify in his bid the metal component per km for each type and size of cable.

In the above price adjustment formulae:

Subscript '0' refers to indices as on 30 days prior to date of bid opening (referred to as base date indices),

Subscript '1' refers to indices as on 60 days prior to date of shipment.

1.0.5 Steel Structure

Steel structure (excluding nuts, bolts) used in fabrication work at various places in Sub-Transmission and Distribution network (such as lattice structure used in ST&D network/line, switchyard etc.), which are billable items in the Bill of quantity (BOQ) shall be covered under this head. The price adjustment formula for such structural steel items shall be as mentioned hereinafter.



The price component of the structural steel for any shipment/ dispatch comprises of a fixed portion (designated as 'F' and the value of which is specified hereunder) and a variable portion linked with the indices for respective materials and labour (description and coefficient as enumerated below).

The amount of price adjustment towards variable portion payable/recoverable on each shipment/dispatch shall be computed as under:

$$EC = EC1 - EC0$$

EC1 will be computed as follows in any of appropriate manner as applicable (a or b or c):

a) For structure using both heavy and lighter angles:

$$EC1 = EC0 * [F + 0.18 * (HA1/HA0) + 0.40 * (LA1/LA0) + 0.16 * (Zn1/Zn0) + 0.11 * (L1/L0)]$$

b) For structure using only heavy angles:

$$EC1 = EC0 * [F + 0.58 * (HA1/HA0) + 0.16 * (Zn1/Zn0) + 0.11 * (L1/L0)]$$

c) For structure using only lighter angles:

$$EC1 = EC0 * [F + 0.58 * (LA1/LA0) + 0.16 * (Zn1/Zn0) + 0.11 * (L1/L0)]$$

Where

EC = Adjustment to Ex-Works price component payable to contractor for each shipment/dispatch

EC1 = Adjusted amount of Ex-works price component of Contract payable to Contractor for each shipment / dispatch.

EC0 = Ex-works price for the respective item of the Contract, Shipment/dispatch wise (quoted price).

F = Fixed portion of the ex-works/FOB component of the Contract Price (F) shall be 0.15.

HA = Price of Heavy angle steel, as published by IEEMA

LA = Price of Lighter angle steel, as published by IEEMA

Zn = Price of electrolytic high grade zinc, as published by IEEMA

L = All India average Consumer Price Index Number for Industrial Workers (base 2001=100) as published/declared by Labour Bureau, Shimla, Government of India and circulated by IEEMA.

For the indices, subscript 'o' refers to indices as on 30 days prior to date set for opening of bids. Subscript '1' refers to indices as of

- (a) two months/sixty (60) days prior to the date of shipment/dispatch for labour, and
- (b) at the expiry of two third (2/3) period from the date of Notification of Award to the date of shipment/dispatch, for material.

For the purpose of this clause the date of shipment/ dispatch shall mean the Schedule date of shipment/dispatch or actual date of shipment/dispatch, whichever is earlier. The schedule date of shipment/dispatch shall be as identified in line with provisions of Time Schedule in the Contract Agreement.

In case of shipments/ dispatches which are delayed beyond the schedule date of shipment/dispatch for reasons attributable to the Contractor, the price adjustment



provision shall not be applicable for the period of time between the schedule date of shipment/dispatch and the actual date of shipment/dispatch.

Note: As per IEEMA Circular No. IEEMA(PVC)/TLT/(R)/02/2007-

- 1) Heavy Steel Angles of size 150mm*150mm*12mm as per IS-2062 has been categorized as Heavy Angles (HA).
- 2) Re-rolled steel angles of size 50mm*50mm*4 mm Lighter has been categorized as Lighter Angles (LA).
- 3) Input costs for all heavy angles of size above 110m*110mm are deemed to be related to the price under Sr No.1.
- 4) Input costs for all lighter angles of size below & including 110m*110mm are deemed to be related to the price under Sr No.2.

1.0.6 66/11 KV & 33/11 KV Switchgear (indoor/outdoor) including 66/33/11 KV Circuit Breakers, RMU, Sectionalizer and Isolators:

The Contract Price shall be subject to price adjustment during performance of the Contract to reflect changes in the cost of labour and material components in accordance with the provisions described below.

The Ex-Works price of 66/11 KV & 33/11 KV Switchgear (Indoor/Outdoor), Circuit Breakers, RMU, Sectionalizer and Isolators excluding Mandatory Spares and Type Tests Charges (if any) will be subject to Price adjustment. The price adjustment formula for the components of the Contract Price, as mentioned above shall be as stipulated hereinafter.

The price component of the equipment for any shipment/ dispatch comprises of a fixed portion (designated as 'F' and the value of which is specified hereunder) and a variable portion linked with the indices for various materials and labour (description and co-efficient as enumerated below).

The amount of price adjustment towards variable portion payable/recoverable on each shipment/dispatch shall be computed as under:

$$EC = EC_1 - EC_0$$

EC₁ will be computed as follows:

$$EC_1 = EC_0 * [F + 0.17 * (IS_1/IS_0) + 0.18 * (C_1/C_0) + 0.10 * (AL_1/AL_0) + 0.13 * (ER_1/ER_0) + 0.17 * (L_1/L_0)]$$

Where

EC = Adjustment to Ex-Works price component payable to contractor for each shipment/dispatch



EC1 = Adjusted amount of Ex-works price component of Contract payable to Contractor for each shipment / dispatch.

EC_o = Ex-works price for the respective equipment of the Contract, shipment/dispatch wise.

F = Fixed portion of the ex-works/FOB component of the Contract Price (F) shall be 0.25.

IS = Wholesale Price Index Number for 'Iron & Steel' (Base 2004-05=100), as published by IEEMA

C = Price of copper wire bars, as published by IEEMA

AL = Price of EC grade Aluminium rods, as published by IEEMA

ER = Price of Insulating Materials (epoxy resin), as published by IEEMA

L = All India average Consumer Price Index Number for Industrial Workers (base 2001=100) as published/declared by Labour Bureau, Shimla, Government of India and circulated by IEEMA.

For the indices, subscript 'o' refers to indices as on 30 days prior to date set for opening of bids.

Subscript '1' refers to indices as of:

three months/ninety (90) days prior to the date of shipment/dispatch for labour, and

at the expiry of two third (2/3) period from the date of Notification of Award to the date of shipment/dispatch, for material.

For the purpose of this clause the date of shipment/dispatch shall mean the Schedule date of shipment/dispatch or actual date of shipment/dispatch, whichever is earlier. The schedule date of shipment/dispatch shall be as identified in line with provisions of Time Schedule in the Contract Agreement.

In case of shipments/dispatches which are delayed beyond the schedule date of shipment/dispatch for reasons attributable to the Contractor, the price adjustment provision shall not be applicable for the period of time between the schedule date of shipment/dispatch and the actual date of shipment/ dispatch.

- 1.0.7 The price adjustment amount towards price components of aforesaid materials i.e. conductor, transformers, cable, Steel structure and 66/11 KV & 33/11 KV Switchgear shall be subject to a ceiling of twenty percent (20%) of Ex-works price component of the corresponding Contract Price.
- 1.0.8 For the purpose of price adjustment for Ex-works price component, the date of shipment for goods shall mean the scheduled date of shipment or actual date of shipment, whichever is earlier. Scheduled date of shipment will be ex-works date of dispatch, governed by the approved Bar Chart.
- 1.0.9 No price increase shall be allowed beyond the original delivery dates unless specifically stated in the Time Extension letter, if any, issued by the Employer. The Employer will, however, be entitled to any decrease in the Contract price which may be caused due to lower price adjustment amount in case of delivery beyond the original delivery dates. Therefore, in case of delivery of goods beyond the original delivery dates, the liability of the Employer shall be limited to the lower of the price adjustment amount which may be worked out either on scheduled date or actual date of dispatch of goods.



- 1.0.10 In case of non-publication of applicable indices on a particular date, which happens to be the applicable date for price adjustment purposes, the published indices prevailing immediately prior to the particular date shall be applicable.
- 1.0.11 If the price adjustment amount works out to be positive, the same is payable to the Contractor by the Employer and if it works out to be negative, the same is to be recovered by the Employer from the Contractor without any ceiling.
- 1.0.12 The Contractor shall promptly submit the price adjustment invoices for the supplies made and works executed at site, positively within three (3) months from the date of shipment/work done whether it is positive or negative.
- 1.0.13 Bids shall conform to the price adjustment provisions detailed above. Bids specifying prices for items on variable basis run the risk of rejection. A bid submitted on a fixed price basis will not be rejected but the price adjustment will be treated as zero.



Appendix-3: INSURANCE REQUIREMENTS

A) Insurances to be taken out by the Contractor

In accordance with the provisions of GCC Clause 30, the Contractor shall at its expense take out and maintain in effect, or cause to be taken out and maintained in effect, during the performance of the Contract, the insurances set forth below in the sums and with the deductibles and other conditions specified. The identity of the insurers and the form of the policies shall be subject to the approval of the Employer, such approval not to be unreasonably withheld. The inability of the insurers to provide insurance cover in the sums and with the deductibles and other conditions as set forth below, shall not absolve the Contractor of his risks and liabilities under the provisions of GCC Clause 30. However, in such a case the Contractor shall be required to furnish to the Employer documentary evidence from the insurer in support of the insurer's inability as aforesaid.

(a) Marine Cargo Policy/Transit Insurance Policy:

(I) Transit Insurance Policy for indigenous equipment

Similarly, Transit Insurance Policy shall be taken wherein only inland transit is involved for the movement of Plant and Equipment supplied from within India. The policy shall cover movement of Plant and Equipment from the manufacturer's works to the project's warehouse at final destination site. Inland Transit Clause (ITC) 'A' along with war & Strike Riots & Civil Commotion (SRCC) extension cover shall be taken.

Amount	Deductible Limits	Parties insured	From	To
120% of Ex-work Price of all the Plant and Equipment to be supplied from within India plus applicable duties and taxes etc., if additionally payable.	Nil	Contractor & Employer	Mfrs ware-house	Project's ware-house store at final destination

(II) If during the execution of Contract, the Employer requests the Contractor to take any other add-on cover(s)/ supplementary cover(s) in aforesaid insurance, in such a case, the Contractor shall promptly take such add-on cover(s)/ supplementary cover(s) and the charges towards such premium for such add-on cover(s)/ supplementary cover(s) shall be reimbursed to the Contractor on submission documentary evidence of payment to the Insurance company. Therefore, charges towards premium for such add-on cover(s)/ supplementary cover(s) are not included in the Contract Price.

(III) The Contractor shall take the policy in the joint names of Employer and the Contractor. The policy shall indicate the Employer as the beneficiary. However, if the Contractor is having an open policy for its line of business, it should obtain an endorsement of the open cover policy from the insurance company indicating that the dispatches against this Contract are duly covered under its open policy and include the name of the Employer as jointly Insured in the endorsements to the open policy.

(b) Erection All Risk Policy/Contractor All Risk Policy:



- (I) The policy should cover all physical loss or damage to the facility at site during storage, erection and commissioning covering all the perils as provided in the policy as a basic cover and the add on covers as mentioned at Sl. No. (III) below.

Amount	Deductible limits	Parties insured	From	To
105% of Ex-work Price of all the Plant and Equipment to be supplied from within India plus GST, applicable duties & taxes, etc., if additionally payable. and 100% of erection price component	Nil	Contractor & Employer	Receipt at site of first lot of the Plant and Equipment	Up to Operational Acceptance

- (II) The Contractor shall take the policy in the joint name of Employer and the Contractor. All these policies shall indicate Employer as the beneficiary. The policy shall be kept valid till the date of the Operational Acceptance of the project and the period of the coverage shall be determined with the approval of the Employer.

If the work is completed earlier than the period of policy considered, the Contractor shall obtain the refund as per provisions of the policy and pass on the benefit to Employer. In case no refund is payable by the insurance company then the certificate to that effect shall be submitted to Employer at the completion of the project.

- (III) The following add-on covers shall also be taken by the Contractor:

- i) Earthquake
- ii) Terrorism
- iii) Escalation cost (approximately @10% of sum insured on annual basis)
- iv) Extended Maintenance cover for Defect Liability Period
- v) Design Defect
- vi) Other add-on covers viz., 50-50 clause, 72 hours clause, loss minimization clause, waiver of subrogation clause (for projects of more than Rs.100 crores, cover for offsite storage/fabrication (over Rs.100 crores).

- (IV) **Third Party Liability cover with cross Liability within Geographical limits of India as on ADD-on cover to the basic EAR cover:**

The third party liability add-on cover shall cover bodily injury or death suffered by third parties (including the Employer's personnel) and loss of or damage to



property (including the Employer's property and any parts of the Facilities which have been accepted by the Employer) occurring in connection with supply and installation of the Facilities.

Amount	Deductible limits	Parties insured	From	To
<ul style="list-style-type: none"> For projects upto Rs. 100 crores, the third party liability limit shall be 10% of the project value for single occurrence/ multiple occurrences in aggregate during the entire policy period. For projects from Rs. 100 crores to Rs. 500 crores, the third party liability limit shall be Rs. 10 crores for single occurrence/multiple occurrences in aggregate during entire policy period. For projects of more than Rs.500 crores, the third party liability limit shall be Rs. 25 crores for single occurrence/ multiple occurrences in aggregate during entire policy period. 	Nil	Contractor/ Sub- contractor	Receipt at site	Upto Defect Liability Period.

- (V) As per GCC Clause 30.8, the cost of insurance premium is to be reimbursed to the Contractor for Owner Supplied Materials (OSM) for which the insurer is to be finalized by the Contractor as detailed therein. Alternatively, the Contractor may take a single policy covering the entire cost of the project including the cost of OSM. For this purpose, the Contractor shall submit documentary evidence for the premium paid for the entire project to the Employer and Employer shall reimburse to the Contractor the proportion of premium equal to value of OSM to total sum insured.

If during the execution of Contract, the Employer requests the Contractor to take any other add-on cover(s)/ supplementary cover(s) in aforesaid insurance, in such a case, the Contractor shall promptly take such add-on cover(s)/ supplementary cover(s) and the charges towards such premium for such add-on cover(s)/ supplementary cover(s) shall be reimbursed to the Contractor on submission documentary evidence of payment to the Insurance company. Therefore, charges towards premium for such add-on cover(s)/ supplementary cover(s) are not included in the Contract Price.

(c) **Automobile Liability Insurance**

The Contractor shall ensure that all the vehicles deployed by the Contractor or its Sub-contractors (whether or not owned by them) in connection with the supply and installation of the Facilities in the project are duly insured as per RTA act. Further the Contractor or its Sub-contractors may also take comprehensive policy (own damage plus third party liability) of each individual vehicles deployed in the project on their own discretion in their own name to protect their own interest.

(d) **Workmen Compensation Policy:**



- (I) Workmen Compensation Policy shall be taken by the Contractor in accordance with the statutory requirement applicable in India. The Contractor shall ensure that all the workmen employed by the Contractor or its Sub-contractors for the project are adequately covered under the policy.
- (II) The policy may either be project specific covering all men of the Contractor and its Sub-contractors. The policy shall be kept valid till the date of Operational Acceptance of the project.

Alternatively, if the Contractor has an existing 'Workmen Compensation Policy' for all its employees including that of the Sub-contractor(s), the Contractor must include the interest of the Employer for this specific Project in its existing 'Workmen Compensation Policy'.

- (III) Without relieving the Contractor of its obligations and responsibilities under this Contract, before commencing work the Contractor shall insure against liability for death of or injury to persons employed by the Contractor including liability by statute and at common law. The insurance cover shall be maintained until all work including remedial work is completed including the Defect Liability Period. The insurance shall be extended to indemnify the Principal for the Principal's statutory liability to persons employed by the Contractor.

The Contractor shall also ensure that each of its Sub-contractors shall effect and maintain insurance on the same basis as the 'Workmen Compensation Policy' effected by the Contractor.

(e) **Contractor's Plant and Machinery (CPM) Insurance**

The Employer (including without limitation any consultant, servant, agent or employee of the Employer) shall not in any circumstances be liable to the Contractor for any loss of or damage to any of the Contractor's Equipment or for any losses, liabilities, costs, claims, actions or demands which the Contractor may incur or which may be made against it as a result of or in connection with any such loss or damage.

The Employer shall be named as co-insured under all insurance policies taken out by the Contractor pursuant to GCC Sub-Clause 30.1, except for the Third Party Liability, Workmen Compensation Policy Insurances, and the Contractor's Sub-contractors shall be named as co-insureds under all insurance policies taken out by the Contractor pursuant to GCC Sub-Clause 30.1 except for the Cargo Insurance During Transport and Workmen Compensation

Policy Insurances. All insurer's rights of subrogation against such co-insureds for losses or claims arising out of the performance of the Contract shall be waived under such policies.

B) Insurances to be taken out by the Employer

The Employer shall at its expense take out and maintain in effect during the performance of the Contract the following insurances.

Amount	Deductible limits	Parties Insured	From	To



Appendix-4: TIME SCHEDULE

1. The Project Completion Schedule shall be as follows:

Sl. No.	Activities	Time of completion schedule with effective from date of LoI
1.	<p>Taking Over by the Employer upon successful Completion of Post Saubhagya Rural households electrification works in Jodhpur, Barmer, Bikaner, Jalore, Jaisalmer and Sirohi District of Jodhpur Discom, Rajasthan under DDUGJY NEW on behalf of Government of Rajasthan.)</p> <p>Specification Nos. as specified in the IFB Document Volume I Section I of Bidding Documents</p>	<p>The work shall be completed and Taking Over by the Employer within the 06(six) months from date of Letter of Intent.</p> <ol style="list-style-type: none">1. First 2 (two) months: 20 % of total awarded work including commencement and survey.2. In the next 2(two) months:40% of total awarded work(i.e. 60% work of total awarded value in 04 months)3. In remaining 2(two) months: 40% of total awarded work(i.e. 100% work of total awarded value in 06 months)

- 1.1 The activity (ies) under the Contractor's programme for Project Completion shall be in the form a PERT chart and shall identify the various activities like engineering, vendor finalization, placement of orders to sub-vendors, survey, Resource mobilization, erection, testing & commissioning including submission of closure proposals. Format of PERT chart is enclosed at Annexure-A. The PERT Chart shall conform to the above Project Completion Schedule.

This PERT Chart shall be discussed and agreed before Award in line with above, engineering drawing and data submission schedule shall also be discussed and finalised before Award. Liquidated damages for delay in successful Completion of the Facilities or specific part thereof (where specific parts are specified in SCC) and Operational Acceptance at rates specified in Clause 21 of GCC shall be applicable beyond the date specified above.

- 1.2 The Employer reserves the right to request minor changes in the work schedule at the time of Award of Contract to the successful Bidder.
- 1.3 The successful Bidder shall be required to prepare detailed PERT Chart and finalise the same with the Employer as per the requirement, which shall form a part of the Contract.



Appendix-5 : LIST OF APPROVED SUB-CONTRACTORS

Prior to award of Contract, the following details shall be completed indicating those sub-contractors proposed by the Bidder by Attachment to its bid that are approved by the Employer for engagement by the Contractor during the performance of the contract.

The following Sub-contractors are approved for carrying out the item of the facilities indicated. Where more than one Sub-contractor is listed, the Contractor is choose between them, but it must notify the Employer of its choice in good time prior to appointing any selected Sub-contractor. In accordance with GCC Sub-Clause 15.1, the Contractor is free to submit proposals for Sub-contractors for additional items from time to time. No Subcontracts shall be placed with any such Sub-contractors for additional items until the Sub-contractors have been approved in writing by the Employer and their names have been added to this list of Approved Sub-contractors.

Item of Facilities	Approved Sub-contractors	Nationality

Further, erection portion of the contract shall not be subcontracted without the prior approval of the Employer. However, such approval shall not be necessary for engaging labour.



Appendix-6: SCOPE OF WORKS AND SUPPLY BY THE EMPLOYER

The following personnel, facilities, works and supplies will be provided/supplied by the Employer, and the provisions of GCC 6, 16, 17 and 20 as well as Employer responsibilities stated in technical specifications shall apply as appropriate.

All personnel, facilities, works and supplies will be provided by the Employer in good time so as not to delay the performance of the Contractor in accordance with the approved Time Schedule and Program of Performance pursuant to GCC Sub-Clause 14.2.

Unless otherwise indicated, all personnel, facilities, works and supplies will be provided free of charge to the Contractor.

Personnel Charge to Contractor – None

-----NIL-----

Facilities Charge to Contractor - None except as noted

Electricity and Water as noted Charge to Contractor -

The Contractor shall be entitled to use for the purposes of the facilities such supplies of electricity and water as may be available on the Site and shall provide any apparatus necessary for such use. The Contractor shall pay the Employer at the applicable tariff plus Employer's overheads, if any, for such use. Where such supplies are not available, the Contractor shall make his own arrangement for provision of any supplies he may require.

Works Charge to Contractor -
None

-----NIL-----

Supplies Charge to
Contractor – None

-----NIL-----



Appendix-7: LIST OF DOCUMENTS FOR APPROVAL OR REVIEW

Pursuant to GCC Sub-Clause 16.3.1, the Contractor shall prepare, or cause it's Sub-contractor to prepare, and present to the Project Manager in accordance with the requirements of GCC Sub-Clause 14.2 (Program of Performance), the following documents for:

A. Approval

1.

2.

3.

B. Review

1.

2.

3.

Note:

Bidder shall furnish the exhaustive list, which shall be discussed and finalised for incorporation into the Contract Agreement.



Appendix-8: GUARANTEES, LIQUIDATED DAMAGES FOR NON – PERFORMANCE

1. The equipment offered shall meet the rating and performance requirements stipulated in Technical Specification for various equipment or indicated in Data requirement.
2. The ratings and performance figures of the below mentioned equipment are guaranteed as per losses given in respective Indian Standard (up to date) by bidder.

Sl. No.	Description
A.	Deleted
B.	Deleted
C.	16/10/5 KVA, 6.5/0.25 kV, 1 phase Distribution Transformer

3. If the aforementioned guarantees are not established at factory tests, then the Employer shall reject the equipment.



6. PERFORMANCE SECURITY FORM

Shall be executed on Rajasthan Non-Judicial Stamp Paper worth 0.25% of BG value or maximum Rs. 25,000/-, whichever is less.

Bank Guarantee No.

Date.....

Contract No.....

.....[Name of Contract].....

To:[Name and address of Employer]

Dear Ladies and/or Gentlemen,

We refer to the Letter of Intent ("LOI") <Insert LOI No:>, issued on <Insert Date of Issue of LOI by Discom.....> by Jodhpur Vidyut Vitran Nigam Limited (hereinafter referred to as "JDVVNL"/ "Employer"), having its Registered Office at, **on behalf of Government of Rajasthan (hereinafter referred to as 'GoR' / 'Owner')**, to M/s (Name of Contractor), having its Principal place of business at(Address of Contractor) and Registered Office at(Registered address of Contractor) ("the Contractor") concerning **"Post Saubhagya Rural households electrification works in <.....Insert name of District....> which inter-alia include construction of 11 kV & LT line, Installation of distribution transformer and providing service connection to Post Saubhagya Rural households in respective district,** for the complete execution of the Package Specification No: **<.....Insert Specification/Package No from Clause 3.0 from Volume I Section I IFB of Tender Document....>** for Post Saubhagya Rural households electrification works of **<.....Insert name of District....>** District under JDVVNL in Rajasthan under DDUGJY NEW Scheme on turnkey basis, and the LOI having been accepted by the selected Contractor vide **<.....Insert Letter No....>**, resulting in Letter of Award to be issued and Contract Agreement to be entered into. [Applicable for Bank Guarantees issued by Contractor/Associate for those Contracts awarded to them]

Or(Select Option accordingly as applicable)

We refer to the Letter of Intent ("LOI") <Insert LOI No:>, issued on <Insert Date of Issue of LOI by Discom.....> by Jodhpur Vidyut Vitran Nigam Limited (hereinafter referred to as "JDVVNL"/ "Employer"), having its Registered Office at, **on behalf of Government of Rajasthan (hereinafter referred to as 'GoR' / 'Owner')**, to M/s (Name of Contractor), having its Principal place of business at(Address of Contractor) and Registered Office at(Registered address of Contractor) ("the Contractor") and M/s (Name of Associate), having its Principal place of business at(Address of Associate) and Registered Office at(Registered address of Associate), the Associate of the Contractor, for executing the Facilities concerning **"Post Saubhagya Rural households electrification works in <.....Insert name of District....> which inter-alia include construction of 11 kV & LT line, Installation of distribution transformer and providing service connection to Post Saubhagya Rural households in respective district,** for the complete execution of the Package Specification No: **<.....Insert Specification/Package No from Clause 3.0 from Volume I Section I IFB of Tender Document....>** for Post Saubhagya Rural households electrification works of **<.....Insert name of District....>** District under JDVVNL in Rajasthan under DDUGJY NEW Scheme on turnkey basis, and the LOI having been accepted by the selected Contractor vide **<.....Insert Letter No....>**, resulting in Letter of



Award to be issued and Contract Agreement to be entered into. *[Applicable for Bank Guarantees to be issued by Contractor against those Contracts awarded to their Associate]*

By this letter we, the undersigned,*(insert name & address of the issuing bank)*, a Bank (which expression shall include its successors, administrators, executors and assigns) organized under the laws of and having its Registered/Head Office at*(insert address of registered office of the bank)*..... do hereby irrevocably guarantee payment to the Employer up to i.e., Ten percent (10%) of the Contract Price until ninety (90) days beyond the Defect Liability Period i.e., upto and inclusive of *(dd/mm/yy)*.

Or (Select Option accordingly as applicable)

By this letter we, the undersigned,*(insert name & address of the issuing bank)*, a Bank (which expression shall include its successors, administrators, executors and assigns) organized under the laws of and having its Registered/Head Office at*(insert address of registered office of the bank)*..... do hereby irrevocably guarantee payment to the Employer up to i.e., Two percent (2%) of the Contract Price (instead of 10% Performance Security for completing contractual formalities as contractor is agree to furnish an undertaking to the Employer in respect of remaining 8% Performance Security be recovered from his first three running Bills, failing which Employer shall be entitled to invoke this Bank Guarantee) until ninety (90) days beyond the Defect Liability Period i.e., upto and inclusive of *(dd/mm/yy)*.

We undertake to make payment under this Letter of Guarantee upon receipt by us of your first written demand signed by the Employer duly authorized officer or the authorized officer of **Owner** declaring the Contractor to be in default under the Contract and without cavil or argument any sum or sums within the above named limits, without your need to prove or show grounds or reasons for your demand and without the right of the Contractor to dispute or question such demand.

Our liability under this Letter of Guarantee shall be to pay to the Employer whichever is the lesser of the sum so requested or the amount then guaranteed hereunder in respect of any demand duly made hereunder prior to expiry of the Letter of Guarantee, without being entitled to inquire whether or not this payment is lawfully demanded.

This letter of Guarantee shall remain in full force and shall be valid from the date of issue until ninety (90) days beyond the Defect Liability Period of the Facilities i.e. upto and inclusive of *(dd/mm/yy)* and shall be extended from time to time for such period (not exceeding one year), as may be desired by <M/s.> on whose behalf this Letter of Guarantee has been given.

Except for the documents herein specified, no other documents or other action shall be required, notwithstanding any applicable law or regulation.

Our liability under this Letter of Guarantee shall become null and void immediately upon its expiry, whether it is returned or not, and no claim may be made hereunder after such expiry or after the aggregate of the sums paid by us to the Employer shall equal the sums guaranteed hereunder, whichever is the earlier.

All notices to be given under shall be given by registered (airmail) posts to the addressee at the address herein set out or as otherwise advised by and between the parties hereto.

All disputes arising under the said Guarantee between the Bank and the Employer or between the contractor and the Employer pertaining to the Guarantee shall be subject to the jurisdiction of courts only at Jodhpur in Rajasthan alone.



We hereby agree that any part of the Contract may be amended, renewed, extended, modified, compromised, released or discharged by mutual agreement between you and the Contractor, and this security may be exchanged or surrendered without in any way impairing or affecting our liabilities hereunder without notices to us and without the necessity for any additional endorsement, consent or guarantee by us, provided, however, that the sum guaranteed shall not be increased or decreased.

No action, event or condition which by any applicable law should operate to discharge us from liability hereunder shall have any effect and we hereby waive any right we may have to apply such law so that in all respects our liability hereunder shall be irrevocable and, except as stated herein, unconditional in all respects.

For and on behalf of the Bank

[Signature of the authorised signatory(ies)]

Signature_____

Name_____

Designation_____

POA Number_____

Contact Number(s): Tel._____ Mobile_____

Fax Number_____

email _____

Common Seal of the Bank_____

Witness:

Signature_____

Name_____

Address_____

Contact Number(s): Tel._____ Mobile_____

email _____

Note:

1. For the purpose of executing the Bank Guarantee, the non-judicial stamp papers of appropriate value shall be purchased in the name of Bank who issues the 'Bank Guarantee'.
2. The Bank Guarantee shall be signed on all the pages by the Bank Authorities indicating their POA nos. and should invariably be witnessed.



3. The Bank Guarantee should be in accordance with the proforma as provided. However, in case the issuing bank insists for additional paragraph for limitation of liability, the following may be added at the end of the proforma of the Bank Guarantee [*i.e., end paragraph of the Bank Guarantee preceding the signature(s) of the issuing authority(ies) of the Bank Guarantee*]:

Quote

“Notwithstanding anything contained herein:

1. Our liability under this Bank Guarantee shall not exceed _____ (*value in figures*) _____ [*_____ (value in words)*_____].
2. This Bank Guarantee shall be valid upto _____ (*validity date*)_____.
3. We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only & only if we receive a written claim or demand on or before _____ (*validity date*) _____.”

Unquote



7. BANK GUARANTEE FORM FOR ADVANCE PAYMENT

Bank Guarantee No.

Date.....

Contract No.....

.....[Name of Contract].....

To: [Name and address of the Employer]

Dear Ladies and/or Gentlemen,

We refer to the Contract ("the Contract") signed on(insert date of the Contract)..... between you and M/s (Name of Contractor), having its Principal place of business at(Address of Contractor) and Registered Office at(Registered address of Contractor) ("the Contractor") concerning (Indicate brief scope of work) for the complete execution of the (insert name of Package alongwith name of the Project).....

Whereas, in accordance with the terms of the said Contract, the Employer has agreed to pay or cause to be paid to the Contractor an Advance Payment in the amount of(Amount in figures and words).....

By this letter we, the undersigned, (insert name & address of the issuing bank), a Bank (which expression shall include its successors, administrators, executors and assigns) organized under the laws of and having its Registered/Head Office at(insert address of registered office of the bank)..... do hereby irrevocably guarantee repayment of the said amounts upon the first demand of the Employer without cavil or argument in the event that the Contractor fails to commence or fulfill its obligations under the terms of the said Contract, and in the event of such failure, refuses to repay all or part (as the case may be) of the said advance payment to the Employer.

Provided always that the Bank's obligation shall be limited to an amount equal to the outstanding balance of the advance payment, taking into account such amounts, which have been repaid by the Contractor from time to time in accordance with the terms of payment of the said Contract as evidenced by appropriate payment certificates.



This Guarantee shall remain in full force from the date upon which the said advance payment is received by the Contractor upto ninety (90) days beyond the date on which the entire advance so advanced alongwith the interest if any due thereon has been fully adjusted in terms of the Contract i.e., upto of ninety (90) days beyond the date of Completion of the Facilities under the Contract. This Guarantee may be extended from time to time, as may be desired by M/s. on whose behalf this Guarantee has been issued.

Any claims to be made under this Guarantee must be received by the Bank during its period of validity, i.e. upto ninety (90) days beyond the date of Completion of the Facilities by the Employer i.e. upto and inclusive of (dd/mm/yy).

For and on behalf of the Bank

[Signature of the authorised signatory(ies)]

Signature_____

Name_____

Designation_____

POA Number_____

Contact Number(s): Tel._____ Mobile_____

Fax Number_____

email _____

Common Seal of the Bank_____

Witness:

Signature_____

Name_____



Address _____

Contact Number(s): Tel. _____ Mobile _____

email _____

Note:

1. For the purpose of executing the Bank Guarantee, the non-judicial stamp papers of appropriate value shall be purchased in the name of Bank who issues the 'Bank Guarantee'.
2. The Bank Guarantee shall be signed on all the pages by the Bank Authorities indicating their POA nos. and should invariably be witnessed.
3. The Bank Guarantee should be in accordance with the proforma as provided. However, in case the issuing bank insists for additional paragraph for limitation of liability, the following may be added at the end of the proforma of the Bank Guarantee [*i.e., end paragraph of the Bank Guarantee preceding the signature(s) of the issuing authority(ies) of the Bank Guarantee*]:

Quote

"Notwithstanding anything contained herein:

1. Our liability under this Bank Guarantee shall not exceed _____ (*value in figures*) _____ [*_____ (value in words)*].
2. This Bank Guarantee shall be valid upto _____ (*validity date*) _____.
3. We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only & only if we receive a written claim or demand on or before _____ (*validity date*) _____."

Unquote



8. FORM OF TAKING OVER CERTIFICATE

Date.....

Name of Contract.....

Contract No.....

To:

(Name and address of the Contractor)

Dear Ladies and/or Gentlemen,

Pursuant to GCC 20 (Completion of the Facilities) of the General Conditions of the Contract entered into between yourselves and the Employer dated relating to the.....
(Insert brief description of the Facilities)..... we hereby notify you that the following part(s) of the Facilities was (were) complete on the date specified below, and that, in accordance with the terms of the Contract, the Employer hereby takes over the said part(s) of the Facilities, together with the responsibility for care and custody and the risk of loss thereof on the date mentioned below :

1. Description of the Facilities or part thereof.....
2. Date of Completion:.....

However, you are required to complete the outstanding items listed in the attachment hereto as soon as practicable.

This letter does not relieve you of your obligation to complete the execution of the Facilities in accordance with the Contract nor of your obligations during the Defects Liability Period.

Very truly yours,

Title

(Project Manager)



9. FORM OF INDEMNITY BOND TO BE EXECUTED BY THE CONTRACTOR FOR THE EQUIPMENT HANDED OVER IN ONE LOT BY..... (Abbreviated name of the Employer)..... FOR PERFORMANCE OF ITS CONTRACT

INDEMNITY BOND

THIS INDEMNITY BOND is made this..... day of 20..... by a Company registered under the Companies Act, 1956/2013 (with amendment from time to time)/Partnership firm/ proprietary concern having its Registered Office at.....(hereinafter called as 'Contractor' or "Obligor" which expression shall include its successors and permitted assigns) in favour of Jodhpur Vidyut Vitran Nigam Limited (*insert name of the Employer*)....., a Company incorporated under the Companies Act, 1956/2013 (with amendment from time to time) having its Registered Office at (*insert registered address of the Employer*) and its project at (hereinafter called " JDVVNL (*abbreviated name of the Employer*)....." which expression shall include its successors and assigns):

WHEREAS JDVVNL (*abbreviated name of the Employer*)..... has awarded to the Contractor a Contract for..... vide its Notification of Award/Contract No..... dated..... and its Amendment No. (applicable when amendments have been issued) (hereinafter called the "Contract") in terms of which(*abbreviated name of the Employer*)..... is required to hand over various Equipment to the Contractor for execution of the Contract.

And WHEREAS by virtue of Clause No.....of the said Contract, the Contractor is required to execute an Indemnity Bond in favour of JDVVNL(*abbreviated name of the Employer*)..... for the Equipment handed over to it by(*abbreviated name of the Employer*)..... for the purpose of performance of the Contract/Erection portion of the contract (hereinafter called the "Equipment").

AND THEREFORE, This Indemnity Bond witnessed as follows:

1. That in consideration of various Equipment as mentioned in the Contract, valued at (amount in words.....) handed over to the Contractor for the purpose of performance of the Contract, the Contractor hereby undertakes to indemnify and shall keep(*abbreviated name of the Employer*)..... indemnified, for the full value of the Equipment. The Contractor hereby acknowledges receipt of the Equipment as per despatch title documents handed over to the Contractor duly endorsed in their favour and detailed in the Schedule appended hereto. It is expressly understood by the Contractor that handing over of the despatch title documents in respect of the said Equipments duly endorsed by(*abbreviated name of the Employer*)..... in favour of the Contractor shall be construed as handing over of the Equipment purported to be covered by such title documents and the Contractor shall hold such Equipment in trust as a Trustee for and on behalf of(*abbreviated name of the Employer*).....
2. That the Contractor is obliged and shall remain absolutely responsible for the safe transit/protection and custody of the Equipment at JDVVNL (*abbreviated name of the Employer*)..... project Site against all risks whatsoever till the Equipment are duly used/erected in accordance with the terms of the Contract and the Plant/Package duly erected and commissioned in accordance with the terms of the Contract, is taken over by



- JDVVNL(*abbreviated name of the Employer*)..... The Contractor undertakes to keep JDVVNL(*abbreviated name of the Employer*)..... harmless against any loss or damage that may be caused to the Equipment.
3. The Contractor undertakes that the Equipment shall be used exclusively for the performance/execution of the Contract strictly in accordance with its terms and conditions and no part of the equipment shall be utilised for any other work of purpose whatsoever. it is clearly understood by the Contractor that non-observance of the obligations under this Indemnity Bond by the Contractor shall inter-alia constitute a criminal breach of trust on the part of the Contractor for all intents and purpose including legal/penal consequences.
 4. That JDVVNL(*abbreviated name of the Employer*)..... is and shall remain the exclusive Employer of the Equipment free from all encumbrances, charges or liens of any kind, whatsoever. The equipment shall at all times be open to inspection and checking by the Employee or Employer's Representative in this regard. Further, JDVVNL(*abbreviated name of the Employer*)..... shall always be free at all times to take possession of the Equipment in whatever form the equipment may be, if in its opinion, the Equipment are likely to be endangered, misutilised or converted to uses other than those specified in the Contract, by any acts of omission or commission on the part of the Contractor or any other person or on account of any reason whatsoever and the Contractor binds himself and undertakes to comply with the directions of demand of JDVVNL(*abbreviated name of the Employer*)..... to return the equipment without any demur or reservation.
 5. That this indemnity Bond is irrevocable. If at any time any loss or damage occurs to the Equipment or the same or any part thereof is misutilised in any manner whatsoever, then the Contractor hereby agrees that the decision of the Employer's Representative as to assessment of loss or damage to the Equipment shall be final and binding on the Contractor. The Contractor binds itself and undertakes to replace the lost and/or damaged Equipment at his own cost and/or shall pay the amount of loss to JDVVNL(*abbreviated name of the Employer*)..... without any demur, reservation or protest. This is without prejudice to any other right or remedy that may be available to JDVVNL(*abbreviated name of the Employer*)..... against the Contractor under the Contract and under this Indemnity Bond.
 6. NOW THE CONDITION of this Bond is that if the Contractor shall duly and punctually comply with the terms and conditions of this Bond to the satisfaction of JDVVNL(*abbreviated name of the Employer*)....., THEN, the above Bond shall be void, but otherwise, it shall remain in full force and virtue.

IN WITNESS WHEREOF, the Contractor has hereunto set its hand through its authorized representative under the common seal of the Company, the day, month and year first above mentioned.

SCHEDULE

Particulars of the Equipment handed over	Quantity	Particulars of Dispatch title Documents		Value of the Equipment	Signature of the Attorney in token of receipt
		RR/GR No. date of lading	Carrier		



--	--	--	--	--	--

For and on behalf of

M/s.....

WITNESS

1. Signature.....

Signature.....

Name.....

Name.....

Address.....

Address.....

2. Signature.....

Authorised
representative

Name.....

(Common Seal)

Address.....

(In case of Company)

Indemnity Bonds are to be executed by the authorised person and (i) in case of contracting Company under common seal of the Company or (ii) having the power of attorney issued under common seal of the company with authority to execute Indemnity Bonds, (iii) In case of (ii), the original Power of Attorney if it is specifically for this Contract or a Photostat copy of the Power of Attorney if it is General Power of Attorney and such documents should be attached to Indemnity Bond.



FORM OF INDEMNITY BOND TO BE EXECUTED BY THE CONTRACTOR FOR THE EQUIPMENT HANDED OVER IN INSTALLMENTS BY(abbreviated name of the Employer)..... FOR PERFORMANCE OF ITS CONTRACT

INDEMNITY BOND

THIS INDEMNITY BOND is made this day of 20..... by a Company registered under the Companies Act, 1956/2013 (with amendment from time to time)/Partnership firm/proprietary concern having its Registered Office at(hereinafter called as 'Contractor' or 'Obligor' which expression shall include its successors and permitted assigns) in favour of Jodhpur Vidyut Vitran Nigam Limited (*insert name of the Employer*)....., a company incorporated under the Companies Act, 1956/2013 (with amendment from time to time) having its Registered Office at Vidyut Bhawan, Jodhpur(*insert registered address of the Employer*)..... and its project at (hereinafter called "JDVVNL(*abbreviated name of the Employer*)....." which expression shall include its successors and assigns):

WHEREAS JDVVNL(*abbreviated name of the Employer*)..... has awarded to the Contractor a Contract forvide its Notification of Award/Contract No. datedand Amendment No. (applicable when amendments have been issued) (hereinafter called the "Contract") in terms of which JDVVNL(*abbreviated name of the Employer*)..... is required to handover various Equipment to the Contractor for execution of the Contract.

AND WHEREAS by virtue of Clause No.....of the said Contract, the Contractor is required to execute an Indemnity Bond in favour of JDVVNL(*abbreviated name of the Employer*)..... for the Equipment handed over to it by JDVVNL(*abbreviated name of the Employer*)..... for the purpose of performance of the contract/Erection portion of the Contract (hereinafter called the "Equipment".)

NOW THEREFORE, This Indemnity Bond witnessed as follows:

1. That in consideration of various Equipments as mentioned in the Contract, valued at (amount in words _____) to be handed over to the Contractor in installments from time to time for the purpose of performance of the contract, the Contractor hereby undertakes to indemnify and shall keep(*abbreviated name of the Employer*)..... indemnified, for the full value of Equipment. The Contractor hereby acknowledges receipt of the initial installment of the equipment per details in the schedule appended hereto. Further, the Contractor agrees to acknowledge receipt of the subsequent installments of the Equipment as required by JDVVNL(*abbreviated name of the Employer*)..... in the form of Schedules consecutively numbered which shall be attached to this Indemnity bond so as to form integral parts of this Bond. It is expressly understood by the Contractor that handing over the dispatch title documents in respect of the said Equipments duly endorsed by JDVVNL(*abbreviated name of the Employer*)..... in favour of the Contractor shall be construed as handing over the Equipment purported to be covered by such title documents and the Contractor shall hold such Equipments in trust as a Trustee for and on behalf of JDVVNL(*abbreviated name of the Employer*).....



2. That the Contractor is obliged and shall remain absolutely responsible for the safe transit/protection and custody of the Equipment at JDVVNL(*abbreviated name of the Employer*)..... project Site against all risks whatsoever till the Equipment are duly used/erected in accordance with the terms of the Contract and the Plant/Package duly erected and commissioned in accordance with the terms of the Contract, is taken over by JDVVNL(*abbreviated name of the Employer*)..... The Contractor undertakes to keep JDVVNL(*abbreviated name of the Employer*)..... harmless against any loss or damage that may be caused to the Equipment.
3. The Contractor undertakes that the Equipment shall be used exclusively for the performance/execution of the Contract strictly in accordance with its terms and conditions and no part of the equipment shall be utilised for any other work or purpose whatsoever. It is clearly understood by the Contractor that non-observance of the obligations under this Indemnity Bond by the Contractor shall inter-alia constitute a criminal breach of trust on the part of the Contractor for all intents and purpose including legal/penal consequences.
4. That JDVVNL(*abbreviated name of the Employer*)..... is and shall remain the exclusive Employer of the Equipment free from all encumbrances, charges or liens of any kind, whatsoever. The equipment shall at all times be open to inspection and checking by the Employer or Employer's Representative in this regard. Further, JDVVNL(*abbreviated name of the Employer*)..... shall always be free at all times to take possession of the Equipment in whatever form the Equipment may be, if in its opinion, the Equipment are likely to be endangered, misutilised or converted to uses other than those specified in the Contract, by any acts of omission or commission on the part of the Contractor or any other person or on account of any reason whatsoever and the Contractor binds himself and undertakes to comply with the directions of demand of JDVVNL(*abbreviated name of the Employer*)..... to return the equipment without any demur or reservation.
5. That this indemnity Bond is irrevocable. If at any time any loss or damage occurs to the Equipment or the same or any part thereof is misutilised in any manner whatsoever, then the Contractor hereby agrees that the decision of the Employer's Representative as to assessment of loss or damage to the Equipment shall be final and binding on the Contractor. The Contractor binds itself and undertakes to replace the lost and/or damaged Equipment at its own cost and/or shall pay the amount of loss to JDVVNL(*abbreviated name of the Employer*)..... without any demur, reservation or protest. This is without prejudice to any other right or remedy that may be available to JDVVNL(*abbreviated name of the Employer*)..... against the Contractor under the Contract and under this Indemnity Bond.
6. NOW THE CONDITION of this Bond is that if the Contractor shall duly and punctually comply with the terms and conditions of this Bond to the satisfaction of JDVVNL(*abbreviated name of the Employer*)....., THEN, the above Bond shall be void, but otherwise, it shall remain in full force and virtue.

IN WITNESS WHEREOF, the Contractor has hereunto set its hand through its authorised representative under the common seal of the Company, the day, month and year first above mentioned.



SCHEDULE No. 1

Particulars of the Equipment handed over	Quantity	Particulars of Despatch title Documents		Value of the Equipment	Signature of the Attorney in token of receipt
		RR/GR No. date of lading	Carrier		

For and on behalf of

M/s.....

WITNESS

1. Signature.....

Signature.....

Name.....

Name.....

Address.....

Address.....

2. Signature.....

Authorised representative

Name.....

(Common Seal)

Address.....

(In case of Company)

Indemnity Bonds are to be executed by the authorised person and (i) in case of contracting Company under common seal of the Company or (ii) having the power of attorney issued under common seal of the company with authority to execute Indemnity Bonds, (iii) In case of (ii), the original Power of Attorney if it is specifically for this Contract or a Photostat copy of the Power of Attorney if it is General Power of Attorney and such documents should be attached to Indemnity Bond.



11. FORM OF AUTHORISATION LETTER

Ref. No:

Date :

To

M/s.....

.....

.....

REF.: Contract No. dated for awarded by(insert name of the Employer).....

Dear Sir,

Kindly refer to Contract No. dated for
You are hereby authorised on behalf of Jodhpur Vidyut Vitran Nigam Limited (*Name of Employer*)..... a company incorporated under the laws of Companies Act 1956/2013 (with amendment from time to time) and having its Registered Office at Vidyut Bhawan, Jodhpur(*registered address of the Employer*) and its Project at to take physical delivery of materials/equipments covered under Despatch Document/Consignment Note No.*..... datedand as detailed in the enclosed schedule for the sole purpose of successful performance of the aforesaid contract and for no other purpose, whatsoever.

(Signature of Project Authority)**

Designation.....

Date.....

Encl: As Above.

** To be signed not below the rank of Manager.

* Mention LR/RR No.



Schedule of Material/Equipment covered under Despatch Title Document (RR No./LR No.)

Sl. No.	Contract Name	NOA No./ CA No.	Description of Materials/ Equipments	Spec. No.	Qty.	Value	Remarks

(Signature of the Project Authority)

(Designation)

(Date)



12. FORM OF TRUST RECEIPT FOR PLANT, EQUIPMENT AND MATERIALS RECEIVED

We M/s.(*insert name of the Contractor*) having our Principal place of business at having been awarded a Contract No. dated for (*insert Package name alongwith name of the Project*)..... by(*insert name of the Employer*)

We do hereby acknowledge the receipt of the Plant, Equipment and Materials as are fully described and mentioned under Documents of Title/RR/LR etc. and in the schedule annexed hereto, which shall form an integral part of this receipt as "Trustee" of Jodhpur Vidyut Vitran Nigam Limited (*insert name of the Employer*)..... The aforesaid materials etc. so received by us shall be exclusively used in the successful performance of the aforesaid Contract and for no other purpose whatsoever. We undertake not to create any charge, lien or encumbrance over the aforesaid materials etc, in favour of any other person/institution(s)/Banks.

For M/s.....

(*Contractor's Name*)

Dated... ..

(AUTHORISED SIGNATORY)

Place.....

SEAL OF COMPANY



13. FORM OF EXTENSION OF BANK GUARANTEE

Ref. No.....

Dated:.....

To: *[Name and address of the Employer]*

Dear Sirs,

Sub.: Extension of Bank Guarantee No. dated for, issued to you on behalf of M/s.*(insert name of the Contractor)* in respect of Contract No. dated for *(insert name of the Package alongwith the Project name)* (hereinafter called original Bank Guarantee).

At the request of M/s..... *(insert name of the Contractor)*, We*(insert name & address of the issuing bank)*, a Bank organized under the laws of and having its Registered/Head Office at*(insert address of registered office of the bank)*..... do hereby extend our liability under the above-mentioned Guarantee No. Dated for a further period of Years/Months from to expire on Except as provided above, all other terms and conditions of the original Bank Guarantee No. dated shall remain unaltered and binding.

Please treat this as an integral part of the original Guarantee to which it would be attached.

For and on behalf of the Bank

[Signature of the authorised signatory(ies)]

Signature_____

Name_____

Designation_____

POA Number_____

Contact Number(s): Tel._____ Mobile_____



Fax Number_____

email _____

Common Seal of the Bank_____

Witness:

Signature_____

Name_____

Address_____

Contact Number(s): Tel._____ Mobile_____

email _____

Note:

1. For the purpose of executing the Bank Guarantee, the non-judicial stamp papers of appropriate value shall be purchased in the name of Bank who issues the 'Bank Guarantee'.
2. The Bank Guarantee shall be signed on all the pages by the Bank Authorities indicating their POA nos. and should invariably be witnessed.



14. FORM OF POWER OF ATTORNEY FOR JOINT VENTURE

KNOW ALL MEN BY THESE PRESENTS THAT WE , the Partners whose details are given hereunder have formed a Joint Venture under the laws of and having our Registered Office(s)/Head Office(s) at (hereinafter called the 'Joint Venture' which expression shall unless repugnant to the context or meaning thereof, include its successors, administrators and assigns) acting through M/s being the Partner in-charge do hereby constitute, nominate and appoint M/s..... a Company incorporated under the laws of and having its Registered/Head Office at as our duly constituted lawful Attorney (hereinafter called "Attorney" or "Authorised Representative" or "Partner In-charge") to exercise all or any of the powers for and on behalf of the Joint Venture in regard to Specification No..... Package the bids for which have been invited by Jodhpur Vidyut Vitran Nigam Limited, Vidyut Bhawan, Jodhpur (insert name of the Employer alongwith address) (hereinafter called the 'Employer') to undertake the following acts:

- i) To submit proposal and participate in the aforesaid Bid Specification of the Employer on behalf of the "Joint Venture".
- ii) To negotiate with the Employer the terms and conditions for award of the Contract pursuant to the aforesaid Bid and to sign the Contract with the Employer for and on behalf of the "Joint Venture".
- iii) To do any other act or submit any document related to the above.
- iv) To receive, accept and execute the Contract for and on behalf of the "Joint Venture".

It is clearly understood that the Partner In-charge (Lead Partner) shall ensure performance of the Contract(s) and if one or more Partner fail to perform their respective portions of the Contract(s), the same shall be deemed to be a default by all the Partners.

It is expressly understood that this Power of Attorney shall remain valid binding and irrevocable till completion of the Defect Liability Period in terms of the Contract.

The Joint Venture hereby agrees and undertakes to ratify and confirm all the whatsoever the said Attorney/Authorised Representatives/Partner in-charge quotes in the bid, negotiates and signs the Contract with the Employer and/or proposes to act on behalf of the Joint Venture by virtue of this Power of Attorney and the same shall bind the Joint Venture as if done by itself.



IN WITNESS THEREOF the Partners Constituting the Joint Venture as aforesaid have executed these presents on this day of under the Common Seal(s) of their Companies.

for and on behalf of the
Partners of Joint Venture

.....
.....
.....

The Common Seal of the above Partners of the Joint Venture:

The Common Seal has been affixed there unto in the presence of:

WITNESS

1. Signature.....
Name
Designation
Occupation

2. Signature.....
Name
Designation
Occupation

Note:

- 1. For the purpose of executing the Agreement, the non-judicial stamp papers of appropriate value shall be purchased in the name of Joint Venture.
- 2. The Agreement shall be signed on all the pages by the authorised representatives of each of the partners and should invariably be witnessed.



15. FORM OF UNDERTAKING BY THE JOINT VENTURE PARTNERS

THIS JOINT DEED OF UNDERTAKING executed on this..... day of..... Two Thousand and..... by a company incorporated under the laws of and having its Registered Office at(hereinafter called the "Party No.1" which expression shall include its successors, executors and permitted assigns) and M/s.....a company incorporated under the laws of and having its Registered Office at (hereinafter called the "Party No.2" which expression shall include its successors, executors and permitted assigns) and M/s.. a Company incorporated under the laws of and having its Registered Office at (hereinafter called the "Party No.3" which expression shall include its successors, executors and permitted assigns) for the purpose of making a bid and entering into a contract [hereinafter called the "Contract" {in case of award}] against the Specification No..... for (*insert name of the package alongwith project name*)of Jodhpur Vidyut Vitran Nigam Limited (*insert names of the Employer*), a Company incorporated under the Companies Act of 1956/2013 (with amendment from time to time) having its registered office at Vidyt Bhawan, Jodhpur(*insert registered address of the Employer*)..... (hereinafter called the "Employer").

WHEREAS the Party No.1, Party No.2 and Party No.3 have entered into an Agreement dated.....

AND WHEREAS the Employer invited bids as per the above mentioned Specification for the design, manufacture, supply, erection, testing and commissioning of Equipment/ Materials stipulated in the Bidding Documents under (*insert name of the package alongwith project name*)

AND WHEREAS Clause 9.3, Section-ITB and BDS (documents establishing the Qualification of Bidder) & Qualification Criteria in BDS forming part of the Bidding Documents, inter-alia stipulates that an Undertaking of two or more qualified manufacturers as partners, meeting the requirements of Qualification Criteria in BDS, as applicable may bid, provided, the Joint Venture fulfills all other requirements under Clause 9.3 (c) of ITB and Qualification Criteria in BDS and in such a case, the Bid Forms shall be signed by all the partners so as to legally bind all the Partners of the Joint Venture, who will be jointly and severally liable to perform the Contract and all obligations hereunder.

The above clause further states that this Undertaking shall be attached to the bid and the Contract performance guarantee will be as per the format enclosed with the Bidding Documents without any restrictions or liability for either party.

AND WHEREAS the bid is being submitted to the Employer vide proposal No.....dated by Party No.1 based on this Undertaking between all the parties; under these presents and the bid in accordance with the requirements of Clause 9.3, Section-ITB and BDS (documents establishing the Qualification of Bidder) & Qualification Criteria in BDS, has been signed by all the parties.

NOW THIS UNDERTAKING WITNESSETH AS UNDER:



In consideration of the above premises and agreements all the parties of this Deed of Undertaking do hereby declare and undertake:

1. In requirement of the award of the Contract by the Employer to the Joint Venture Partners, we, the Parties do hereby undertake that M/s..... the Party No.1, shall act as Lead Partner and further declare and confirm that we the parties to the Joint Venture shall jointly and severally be bound unto the Employer for the successful performance of the Contract and shall be fully responsible for the design, manufacture, supply and successful performance of the equipment in accordance with the Contract:
2. In case of any breach or default of the said Contract by any of the parties to the Joint Venture, the party(s) do hereby undertake to be fully responsible for the successful performance of the Contract and to carry out all the obligations and responsibilities under the Contract in accordance with the requirements of the Contract.
3. Further, if the Employer suffers any loss or damage on account of any breach in the Contract or any shortfall in the performance of the equipment in meeting the performances guaranteed as per the specification in terms of the Contract, the Party(s) of these presents undertake to promptly make good such loss or damages caused to the Employer, on its demand without any demur. It shall not be necessary or obligatory for the Employer to proceed against Lead Partner to these presents before proceeding against or dealing with the other Party(s), the Employer can proceed against any of the parties who shall be jointly and severally liable for the performance and all other liabilities/obligations under the Contract to the Employer.
4. The financial liability of the Parties of this Deed of Undertaking to the Employer, with respect to any of the claims arising out of the performance or non-performance of the obligations set forth in this Deed of Undertaking, read in conjunction with the relevant conditions of the Contract shall, however not be limited in any way so as to restrict or limit the liabilities or obligations of any of the Parties of this Deed of Undertaking.
5. It is expressly understood and agreed between the Parties to this Undertaking that the responsibilities and obligations of each of the Parties shall be as delineated in Appendix – I *(to be suitably appended by the Parties alongwith this Undertaking in its bid)* to this Deed of Undertaking. It is further undertaken by the parties that the above sharing of responsibilities and obligations shall not in any way be a limitation of joint and several responsibilities of the Parties under the Contract.
6. It is also understood that this Undertaking is provided for the purposes of undertaking joint and several liabilities of the partners to the Joint Venture for submission of the bid and performance of the Contract and that this Undertaking shall not be deemed to give rise to any additional liabilities or obligations, in any manner or any law, on any of the Parties to this Undertaking or on the Joint Venture, other than the express provisions of the Contract.



- 7. This Undertaking shall be construed and interpreted in accordance with the provisions of the Contract.
- 8. In case of an award of a Contract, we the parties to this Deed of Undertaking do hereby agree that we shall be jointly and severally responsible for furnishing a Contract performance security from a bank in favour of the Employer in the currency/currencies of the Contract.
- 9. It is further agreed that this Deed of Undertaking shall be irrevocable and shall form an integral part of the bid and shall continue to be enforceable till the Employer discharges the same or upon the completion of the Contract in accordance with its provisions, whichever is earlier. It shall be effective from the date first mentioned above for all purposes and intents.

IN WITNESS WHEREOF, the Parties to this Deed of Undertaking have through their authorised representatives executed these presents and affixed Common Seals of their companies, on the day, month and year first mentioned above.

Common Seal of
has been affixed in my/ our
presence pursuant to Board of
Director's Resolution dated

For Lead Partner (Party No.-1)
For and on behalf of M/s
.....

Name
Designation

Signature

(Signature of the authorized
representative)

WITNESS :

- I.
- II.

Common Seal of
has been affixed in my/ our
presence pursuant to Board of
Director's Resolution dated

For Party No.-2
For and on behalf of M/s.....



(Signature of the authorized
representative)

Name

Designation

Signature

WITNESS :

I.

II.

Common Seal of
has been affixed in my/ our
presence pursuant to Board of
Director's Resolution dated

For Party No.-3
For and on behalf of M/s.
.....

Name

Designation

(Signature of the authorized
representative)

Signature

WITNESS :

I.

II.

Note:



1. For the purpose of executing the Joint Deed of Undertaking, the non-judicial stamp papers of appropriate value shall be purchased in the name of Joint Venture.
2. The Undertaking shall be signed on all the pages by the authorised representatives of each of the partners and should invariably be witnessed.



16. FORMAT FOR EVIDENCE OF ACCESS TO OR AVAILABILITY OF CREDIT/FACILITIES

BANK CERTIFICATE

This is to certify that M/s. _____ (*insert Name & Address of the Contractor*) _____ who have submitted their bid to Jodhpur Vidyut Vitran Nigam Limited (*insert name of the Employer*)..... against their tender specification Vide ref. No. for (*insert name of the package alongwith the project name*) is our customer for the past years.

Their financial transaction with our Bank have been satisfactory. They enjoy the following fund based and non-fund based limits including for guarantees, L/C and other credit facilities with us against which the extent of utilization as on date is also indicated below:

Sl. No.	Type of Facility	Sanctioned Limit as on Date	Utilisation as on Date

This letter is issued at the request of M/s. _____.

Signature _____

Name of Bank _____

Name of Authorised Signatory _____

Designation _____

Phone No. _____

Address _____

SEAL OF THE BANK



17. FORM OF OPERATIONAL ACCEPTANCE

Date.....

Name of Contract.....

Contract No.....

To:

(Name and address of the Contractor)

Dear Ladies and/or Gentlemen,

Pursuant to GCC 20 (Completion of the Facilities) of the General Conditions of the Contract entered into between yourselves and the Employer dated relating to the.....
(insert brief description of the Facilities)..... we hereby notify you that the we System tests and Acceptance tests of the following part(s) of the Facilities were satisfactorily completed on the date specified below :

1. Description of the Facilities or part thereof.....

2. Date of Operational Acceptance:.....

This letter does not relieve you of your obligation during the Defects Liability Period and Latent Defect warranty.

Very truly yours,

Title

(Project Manager)



18. FORM OF SAFETY PLAN TO BE SUBMITTED BY THE CONTRACTOR WITHIN FIFTEEN DAYS OF AWARD OF CONTRACT

[TO BE EXECUTED ON A NON JUDICIAL STAMP PAPER WORTH RS. TWENTY ONLY]

SAFETY PLAN

THIS SAFETY PLAN is made this day of 20..... by a Company registered under the Companies Act, 1956/2013 (with amendment from time to time)/Partnership firm/proprietary concern having its Registered Office at[*to be modified suitably for JV Contractor*] (hereinafter called as 'Contractor' which expression shall include its successors and permitted assigns) for approval of Jodhpur Vidyut Vitran Nigam Limited, a company incorporated under the Companies Act, 1956/2013 (with amendment from time to time) having its Registered Office at Vidhut Bhawan, Jodhpur for its Contract for(insert package name, project name alongwith Specification number of the Contract).....

WHEREAS JDVVNL(*abbreviated name of the Employer*)..... has awarded to the Contractor the aforesaid Contract vide its Notification of Award/Contract No. datedand Amendment No. (applicable when amendments have been issued) (hereinafter called the "Contract") in terms of which the Contractor is required to submit 'Safety Plan' alongwith certain documents to the Engineer In-Charge/Project Manager of the Employer within Sixty (60) days of Notification of Award for its approval.

NOW THEREFORE, the Contractor undertakes to execute the Contract as per the safety plan as follows:

1. THAT the Contractor shall execute the works as per provisions of Bidding Documents including those in regard to Safety Precautions / provisions as per statutory requirements.
2. THAT the Contractor shall execute the works in a wellplanned manner from the commencement of Contract as per agreed mile stones of work completion schedule so that planning and execution of construction works goes smoothly and consistently through out the contract duration without handling pressure in last quarter of the financial year/last months of the Contract and the shall be finalized in association with XXXX (*Name of Employer*) Engineer In-charge/Project Manager from time to time as required.
3. THAT the Contractor has prepared the safe work procedure for each activity i.e. foundation works including civil works, erection, stringing (as applicable), testing & commissioning, disposal of materials at site / store etc. to be executed at site, which is enclosed at **Annexure – 1A (SP)** for acceptance and approval of Engineer In-charge/Project Manager. The Contractor shall ensure that on approval of the same from Engineer In-charge/Project Manager , the approved copies will be circulated to Employer's personnel at site [Supervisor(s)/Executive(s)] and Contractor's personnel at site [Gang leader, supervisor(s) etc.] in their local language / language understood by gang.

THAT the Contractor has prepared minimum manpower deployment plan, activity wise as stated above, which is enclosed at **Annexure – 1B (SP)**for approval of Engineer In-charge/Project Manager.

4. THAT the Contractor shall ensure while executing works that they will deploy minimum 25% of their own experienced work force who are on the permanent roll of the company and balance 75% can be a suitable mixed with the hired gangs / local workers / casual workers if required. The above balance 75% work force should be provided with at least 10 days training by the construction agencies at sites and shall be issued with a certificate. No worker shall be engaged without a valid certificate. Hired gang workers shall also follow safe working procedures and safety norms as is being followed by company's workmen. It should

also be ensured by the contractor that certified **workers** fitters who are climbing towers / doing stringing operations can be easily identifiable with a system like issue of Badge / Identification cards (ID cards) etc. Colour identification batches should be worn by the workers. Contractor has to ensure that inexperience workers / unskilled workers should not be deployed for skilled job.

5. THAT the Contractor's Gang leader / Supervisor / Senior most member available at every construction site shall brief to each worker daily before start of work about safety requirement and warn about imminent dangers and precautions to be taken against the imminent dangers (Daily Safety Drill). This is to be ensured without fail by Contractor and maintain record of each gang about daily safety instructions issued to workers and put up to XXXX(Name of Employer) site In-charge for his review and record.
6. THAT the Contractor shall ensure that working Gangs at site should not be left at the discretion of their Gang Leaders who are generally hired and having little knowledge about safety. Gang leader should be experienced and well versed with the safe working procedures applicable for transmission line/ Sub Station works. In case gang is having Gang leader not on permanent roll of the company then additional Supervisor from company's own roll having thorough knowledge about the works would be deployed so as to percolate safety instructions upto the grass root level in healthy spirits. Contractor has to ensure close supervision while executing critical locations of transmission lines / sub stations and ensures that all safety instructions are in place and are being followed.
7. THAT the Contractor shall maintain in healthy and working condition all kind of Equipments / Machineries / Lifting tools / Lifting tackles / Lifting gears / All kind of Ropes including wire ropes / Polypropylene ropes etc. used for Lifting purpose during execution of the project and get them periodically examined and load tested for safe working load in accordance with relevant provisions and requirement of Building & other construction workers Regulation of Employment and Conditions of Services Act and Central Rule 1998 or latest, Factories Act 1948 or latest, Indian Electricity Act 2003 before start of the project. A register of such examinations and tests shall be properly maintained by the contractor and will be promptly produced as and when desired by the Engineer In-charge/Project Manager or by the person authorised by him. The Contractor has to ensure to give special attention on the formation / condition of eye splices of wire rope slings as per requirement of IS 2762 Specification for wire rope slings and sling legs.

THAT the Contractor has prepared a list of all Lifting machines, lifting Tools / Lifting Tackles / Lifting Gears etc. / All types of ropes and Slings which are subject to safe working load is enclosed at **Annexure – 2 (SP)** for review and approval of Engineer In-charge/Project Manager.

8. THAT the Contractor has to procure sufficient quantity of Personal Protective Equipment (PPE) conforming to Indian / International standards and provide these equipment to every workman at site as per need and to the satisfaction of Engineer-in-charge/Project Manager of **JDVVNL**. The Contractor's Site Supervisor/ Project Manager has to ensure that all workmen must use Personal Protective Equipment at site. The Contractor shall also ensure that Industrial Safety helmets are being used by all workmen at site irrespective of their working (at height or on ground). The Contractor shall further ensure use of safety shoes by all ground level workers and canvas shoes for all workers working at height, Rubber Gum Boots for workers working in rainy season and concreting job, Use of Twin Lanyard Full body Safety Harness with attachment of light weight such as aluminium alloy etc. and having features of automatic locking arrangement of snap hook, by all workers working at height for more than three meters and also for horizontal movement on tower shall be ensured by contractor. The Contractor shall not use ordinary half body safety harness at site. The Contractor has to ensure use of Retractable type fall arrestors by workers for ascending / descending on suspension insulator string and other similar works etc., Use of Mobile fall arrestor for ascending / descending from tower by all workers. The contractor has to provide



cotton / leather hand gloves as per requirement, Electrical Resistance Hand gloves for operating electrical installations / switches, Face shield for protecting eyes while doing welding works and Dust masks to workers as per requirement. The Contractor will have to take action against the workers not using Personal Protective Equipment at site and those workers shall be asked to rest for that day and also their Salary be deducted for that day. **JDVVNL** may issue warning letter to Project Manager of contractor in violation of above norms.

THAT the Contractor shall prepare a detailed list of PPEs, activity wise, to commensurate with manpower deployed, which is enclosed at **Annexure – 3 (SP)** for review and approval of Engineer In-charge/Project Manager. It shall also be ensured that the sample of these equipment shall be got approved from JDVVNL supervisory staff before being distributed to workers. The contractor shall submit relevant test certificates as per IS / International Standard as applicable to PPEs used during execution of work. All the PPE's to be distributed to the workers shall be checked by JDVVNL supervisory staff before its usage.

The Contractor also agrees for addition / modification to the list of PPE, if any, as advised by Engineer In-Charge/Project Manager.

9. THAT the Contractor shall procure, if required sufficient quantity of Earthing Equipment / Earthing Devices complying with requirements of relevant IEC standards (Generally IECs standards for Earthing Equipments / Earthing Devices are – 855, 1230, 1235 etc.) and to the satisfaction of Engineer In-Charge/ Project Manager and contractor to ensures to maintained them in healthy condition.

THAT the Contractor has prepared / worked out minimum number of healthy Earthing Equipments with Earthing lead confirming to relevant IS / European standards per gang wise during stringing activity/as per requirement, which is enclosed herewith at **Annexure – 4 (SP)** for review and acceptance of Engineer In-Charge/ Project Manager prior to execution of work.

10. THAT the Contractor shall provide communication facilities i.e. Walky – Talkie / Mobile Phone, Display of Flags / whistles for easy communication among workers during Tower erection / stringing activity, as per requirement.
11. THAT the Contractor undertakes to deploy qualified safety personnel responsible for safety as per requirements of Employer/Statutory Authorities.

THAT the Contractor employing more than 250 workmen whether temporary, casual, probationer, regular or permanent or on contract, shall employ at least one full time officer exclusively as qualified safety officer having diploma in safety to supervise safety aspects of the equipment and workmen who will coordinate with Engineer In-charge /Project Manager/Safety Co-ordinator of the Employer. In case of work being carried out through sub contractors the sub – contractor's workmen / employees will also be considered as the contractor's employees / workmen for the above purpose. If the number of workers are less than 250 then one qualified safety officer is to be deployed for each contract. He will report directly to his head of organization and not the Project Manager of contractor He shall also not be assigned any other work except assigning the work of safety. The curriculum vitae of such person shall be got cleared from **JDVVNL** Project Manager / Construction staff.

The name and address of such safety officers of contractor will be promptly informed in writing to Engineer In-charge with a copy to safety officer - In-charge before start of work or immediately after any change of the incumbent is made during the currency of the contract. The list is enclosed at **Annexure – 5A (SP)**.

THAT the Contractor has also prepared a list including details of Explosive Operator (if required), Safety officer / Safety supervisor / nominated person for safety for each erection / stringing gang, list of personnel trained in First Aid Techniques as well as copy of



organisation structure of the Contractor in regard to safety. The list is enclosed at **Annexure – 5B (SP)**.

12. The Project Manager shall have the right at his sole discretion to stop the work, if in his opinion the work is being carried out in such a way that it may cause accidents and endanger the safety of the persons and/or property, and/or equipment. In such cases, the Contractor shall be informed in writing about the nature of hazards and possible injury/accident and he shall comply to remove shortcomings promptly. The Contractor after stopping the specific work can, if felt necessary, appeal against the order of stoppage of work to the Project Manager within 3 days of such stoppage of work and decision of the Project Manager in this respect shall be conclusive and binding on the Contractor.
13. THAT, if, any Employer's Engineer/ supervisor at site observes that the Contractor is failing to provide safe working environment at site as per agreed Safety Plan / **JDVNL** Safety Rule/ Safety Instructions / Statutory safety requirement and creates hazardous conditions at site and there is possibility of an accident to workmen or workmen of the other contractor or public or the work is being carried out in an unsafe manner or he continues to work even after being instructed to stop the work by Engineer / Supervisor at site / RHQ / Corp. Centre, the Contractor shall be bound to pay a penalty of Rs. 10,000/- per incident per day till the instructions are complied and as certified by Engineer / Supervisor of Employer at site. The work will remain suspended and no activity will take place without compliance and obtaining clearance / certification of the Site Engineer / Supervisor of the Employer to start the work.
14. THAT, if the investigation committee of Employer observes any accident or the Engineer In-charge/Project Manager of the Employer based on the report of the Engineer/Supervisor of the Employer at site observes any failure on the Contractor's part to comply with safety requirement / safety rules/ safety standards/ safety instruction as prescribed by the Employer or as prescribed under the applicable law for the safety of the equipment, plant and personnel and the Contractor does not take adequate steps to prevent hazardous conditions which may cause injury to its own Contractor's employees or employee of any other Contractors or Employer or any other person at site or adjacent thereto, or public involvement because of the Contractor's negligence of safety norms, the Contractor shall be liable to pay a compensation of Rs. 10,00,000/- (Rupees Ten Lakh only) per person affected causing death and Rs. 1,00,000/- (Rupees One Lakh only) per person for serious injuries / 25% or more permanent disability to the Employer for further disbursement to the deceased family/ Injured persons. The permanent disability has the same meaning as indicated in Workmen's Compensation Act 1923 or latest. The above stipulations is in addition to all other compensation payable to sufferer as per workmen compensation Act / Rules

THAT as per the Employer's instructions, the Contractor agrees that this amount shall be deducted from their running bill(s) immediately after the accident, That the Contractor understands that this amount shall be over and above the compensation amount liable to be paid as per the Workmen's Compensation Act /other statutory requirement/ provisions of the Bidding Documents.
15. THAT the Contractor shall submit Near-Miss-Accident report alongwith action plan for avoidance such incidence /accidents to Engineer – In-charge/ Project Manager. Contractor shall also submit Monthly Safety Activities report to Engineer – In-charge/ Project Manager and copy of the Monthly Safety Activities report also to be sent to Safety In-charge at RHQ of the Employer for his review record and instructions.
16. THAT the Contractor is submitting a copy of Safety Policy/ Safety Documents of its Company which is enclosed at **Annexure – 6 (SP)**and ensure that the safety Policy and safety documents are implemented in healthy spirit.



17. THAT the Contractor shall make available of First Aid Box [Contents of which shall be as per Building & other construction workers (Regulation of Employment and Conditions of Services Act and Central Rule 1998 or latest / **JDVVNL** Guidelines)] to the satisfaction of Engineer In-Charge/ Project Manager with each gang at site and not at camp and ensures that trained persons in First Aid Techniques with each gang before execution of work.
18. THAT the Contractor shall submit an 'Emergency Preparedness Plan' for different incidences i.e. Fall from height, Electrocutation, Sun Stroke, Collapse of pit, Collapse of Tower, Snake bite, Fire in camp / Store, Flood, Storm, Earthquake, Militancy etc. while carrying out different activities under execution i.e. foundation works including civil works, erection, stringing (as applicable), testing & commissioning, disposal of materials at site / store etc. which is enclosed at **Annexure – 7 (SP)** for approval of the Engineer In-Charge/ Project Manager before start of work.
19. THAT the Contractor shall organize Safety Training Programs on Safety, Health and Environment and for safe execution of different activities of works i.e. foundation works including civil works, erection, stringing (as applicable), testing & commissioning, disposal of materials at site / store etc. for their own employees including sub-contractor workers on regular basis.

The Contractor, therefore, submits copy of the module of training program, enclosed at **Annexure – 9 (SP)**, to Engineer In-charge/Project Manager for its acceptance and approval and records maintained.

20. THAT the Contractor shall conduct safety audit, as per Safety Audit Check Lists enclosed at **Annexure – 8 (SP)**, by his Safety Officer(s) every month during construction of Transmission Lines / Sub Stations / any other work and copy of the safety audit report will be forwarded to the Employer's Engineer In-charge / Site In-charge/Project Manager for his comments and feedback. During safety audit, healthiness of all Personal Protective Equipments (PPEs) shall be checked individually by safety officer of contractor and issue a certificate of its healthiness or rejection of faulty PPEs and contractor has to ensure that all faulty PPEs and all faulty lifting tools and tackles should be destroyed in the presence of **JDVVNL** construction staff. Contractor has to ensure that each gang be safety audited at least once in two months. During safety audit by the contractor, Safety officer's feedback from **JDVVNL** concerned shall be taken and recorded. The Employer's site officials shall also conduct safety audit at their own from time to time when construction activities are under progress. Apart from above, the Employer may also conduct surveillance safety audits. The Employer may take action against the person / persons as deemed fit under various statutory acts/provisions under the Contract for any violation of safety norms / safety standards.
21. THAT the Contractor shall develop and display Safety Posters of construction activity at site and also at camp where workers are generally residing.
22. THAT the Contractor shall ensure to provide potable and safe drinking water for workers at site / at camp.
23. THAT the Contractor shall do health checkup of all workers from competent agencies and reports will be submitted to Engineer In-Charge within fifteen (15) days of health checkup of workers as per statutory requirement.
24. THAT the Contractor shall submit information alongwith documentary evidences in regard to compliance to various statutory requirements as applicable which are enclosed at **Annexure – 10A (SP)**.

The Contractor shall also submit details of Insurance Policies taken by the Contractor for insurance coverage against accident for all employees are enclosed at **Annexure – 10B (SP)**.



25. THAT a check-list in respect of aforesaid enclosures alongwith the Contractor’s remarks, wherever required, is attached as **Annexure – Check List** herewith.

THE CONTRACTOR shall incorporate modifications/changes in this ‘Safety Plan’ necessitated on the basis of review/comments of the Engineer In-Charge/Project Manager within fourteen (14) days of receipt of review/comments and on final approval of the Engineer In-Charge/Project Manager of this ‘Safety Plan’, the Contractor shall execute the works under the Contract as per approved ‘Safety Plan’. Further, the Contractor has also noted that the first progressive payment towards Services Contract shall be made on submission of ‘Safety Plan’ alongwith all requisite documents and approval of the same by the Engineer In-Charge/Project Manager.

IN WITNESS WHEREOF, the Contractor has hereunto set its hand through its authorised representative under the common seal of the Company, the day, month and year first above mentioned.

For and on behalf of

M/s.....

WITNESS

1. Signature.....	Signature.....
Name.....	Name.....
Address.....	Address.....
2. Signature.....	Authorised representative
Name.....	(Common Seal)
Address.....	(In case of Company)

Note:

All the annexure referred to in this “Safety Plan” are required to be enclosed by the contractor as per the attached “ Check List “

- Safety Plan is to be executed by the authorised person and (i) in case of contracting Company under common seal of the Company or (ii) having the power of attorney issued



under common seal of the company with authority to execute such contract documents etc., (iii) In case of (ii), the original Power of Attorney if it is specifically for this Contract or a Photostat copy of the Power of Attorney if it is General Power of Attorney and such documents should be attached to this Safety Plan.

2. For all safety monitoring/ documentation, Engineer In-charge / Regional In-charge of safety at RHQ will be the nodal Officers for communication.

CHECK LIST FOR SEFETY PLAN

S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
1.	<p>Annexure – 1A (SP)</p> <p>Safe work procedure for each activity i.e. foundation works including civil works, erection, stringing (as applicable), testing & commissioning, disposal of materials at site / store etc. to be executed at site.</p>	Yes/No	
2.	<p>Annexure – 1B (SP)</p> <p>Manpower deployment plan, activity wise foundation works including civil works, erection, stringing (as applicable), testing & commissioning, disposal of materials at site / store etc.</p>	Yes/No	
3.	<p>Annexure – 2 (SP)</p> <p>List of Lifting Machines i.e. Crane, Hoist, Triffor, Chain Pulley Blocks etc. and Lifting Tools and Tackles i.e. D shackle, Pulleys, come along clamps, wire rope slings etc. and all types of ropes i.e. Wire ropes, Poly propylene Rope etc. used for lifting purposes along with test certificates.</p>	Yes/No	
4.	<p>Annexure – 3 (SP)</p> <p>List of Personal Protective Equipment (PPE), activity wise including the following along with test certificate of each as applicable:</p> <ol style="list-style-type: none"> 1. Industrial Safety Helmet to all workmen at site. (EN 397 / IS 2925) with chin strap and back stay arrangement. 2. Safety shoes without steel toe to all ground level workers and canvas shoes for workers working on tower. 3. Rubber Gum Boot to workers working in rainy season / concreting job. 4. Twin lanyard Full Body Safety harness with shock absorber and leg strap arrangement for all workers working at height for more than three meters. Safety 	Yes/No	



S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
	<p>Harness should be with attachments of light weight such as of aluminium alloy etc. and having a feature of automatic locking arrangement of snap hook and comply with EN 361 / IS 3521 standards.</p> <p>5. Mobile fall arrestors for safety of workers during their ascending / descending from tower / on tower. EN 353 -2 (Guided type fall arresters on a flexible anchorage line.)</p> <p>6. Retractable type fall arrestor (EN360: 2002) for ascending / descending on suspension insulator string etc.</p> <p>7. Providing of good quality cotton hand gloves / leather hand gloves for workers engaged in handling of tower parts or as per requirement at site.</p> <p>8. Electrical Resistance hand gloves to workers for handling electrical equipment / Electrical connections. IS : 4770</p> <p>9. Dust masks to workers handling cement as per requirement.</p> <p>10. Face shield for welder and Grinders. IS : 1179 / IS : 2553</p> <p>11. Other PPEs, if any, as per requirement etc.</p>		
5.	<p>Annexure – 4 (SP)</p> <p>List of Earthing Equipment / Earthing devices with Earthing lead conforming to IECs for earthing equipments are – (855, 1230, 1235 etc.) gang wise for stringing activity/as per requirement</p>	Yes/No	
6.	<p>Annexure – 5A (SP)</p> <p>List of Qualified Safety Officer(s) alongwith their contact details</p>	Yes/No	
7.	<p>Annexure – 5B (SP)</p> <p>Details of Explosive Operator (if required), Safety officer / Safety supervisor for every erection / stringing gang, any other person nominated for safety, list of personnel trained in First Aid as well as brief information about safety set up by the Contractor alongwith copy of organisation of the Contractor in regard to safety</p>	Yes/No	
8.	<p>Annexure – 6 (SP)</p> <p>Copy of Safety Policy/ Safety Document of the Contractor's company</p>	Yes/No	
9.	<p>Annexure – 7 (SP)</p> <p>'Emergency Preparedness Plan' for different incidences i.e.</p>	Yes/No	



S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
	Fall from height, Electrocutation, Sun Stroke, Collapse of pit, Collapse of Tower, Snake bite, Fire in camp / Store, Flood, Storm, Earthquake, Militancy etc. while carrying out different activities under execution i.e. foundation works including civil works, erection, stringing (as applicable), testing & commissioning, disposal of materials at site / store etc.		
10.	Annexure – 8 (SP) Safety Audit Check Lists (Formats to be enclosed)	Yes/No	
11.	Annexure – 9 (SP) Copy of the module of Safety Training Programs on Safety, Health and Environment, safe execution of different activities of works for Contractor’s own employees on regular basis and sub-contractor employees.	Yes/No	
12.	Annexure – 10A (SP) Information alongwith documentary evidences in regard to the Contractor’s compliance to various statutory requirements including the following:		
(i)	Electricity Act 2003 _____ [Name of Documentary evidence in support of compliance]	Yes/No	
(ii)	Factories Act 1948 or latest _____ [Name of Documentary evidence in support of compliance]	Yes/No	
(iii)	Building & other construction workers (Regulation of Employment and Conditions of Services Act and Central Act 1996 or latest) and Welfare Cess Act 1996 or latest with Rules. _____ [Name of Documentary evidence in support of compliance]	Yes/No	
(iv)	Workmen Compensation Act 1923 or latest and Rules. _____ [Name of Documentary evidence in support of compliance]	Yes/No	



S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
(v)	Public Insurance Liabilities Act 1991 or latest and Rules. _____ [Name of Documentary evidence in support of compliance]	Yes/No	
(vi)	Indian Explosive Act 1948 or latest and Rules. _____ [Name of Documentary evidence in support of compliance]	Yes/No	
(vii)	Indian Petroleum Act 1934 or latest and Rules. _____ [Name of Documentary evidence in support of compliance]	Yes/No	
(viii)	License under the contract Labour (Regulation & Abolition) Act 1970 or latest and Rules. _____ [Name of Documentary evidence in support of compliance]	Yes/No	
(ix)	Indian Electricity Rule 2003 and amendments if any, from time to time. _____ [Name of Documentary evidence in support of compliance]	Yes/No	
(x)	The Environment (Protection) Act 1986 or latest and Rules. _____ [Name of Documentary evidence in support of compliance]	Yes/No	
(xi)	Child Labour (Prohibition & Regulation) Act 1986 or latest. _____ [Name of Documentary evidence in support of compliance]	Yes/No	
(xii)	National Building Code of India 2005 or latest (NBC 2005). _____ [Name of Documentary evidence in support of compliance]	Yes/No	
(xiii)	Indian standards for construction of Low/ Medium/ High/ Extra High Voltage Transmission Line _____	Yes/No	



S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
	[Name of Documentary evidence in support of compliance]		
(iv)	Any other statutory requirement(s) [please specify] _____ [Name of Documentary evidence in support of compliance]	Yes/No	
13.	Annexure – 10B (SP) Details of Insurance Policies alongwith documentary evidences taken by the Contractor for the insurance coverage against accident for all employees as below:		
(i)	Under Workmen Compensation Act 1923 or latest and Rules. _____ [Name of Documentary evidence in support of insurance taken]	Yes/No	
(ii)	Public Insurance Liabilities Act 1991 or latest _____ [Name of Documentary evidence in support of insurance taken]	Yes/No	
(iii)	Any Other Insurance Policies _____ [Name of Documentary evidence in support of insurance taken]	Yes/No	



19. FORM OF JOINT DEED OF UNDERTAKING BY THE SUB-CONTRACTOR ALONGWITH THE BIDDER/CONTRACTOR

THIS DEED OF UNDERTAKING executed this day of Two Thousand and by M/s., a Company incorporated under the laws of and having its Registered Office at (hereinafter called the "**Sub-contractor**" which expression shall include its successors, executors and permitted assigns), and M/s., a Company incorporated under the laws of having its Registered Office at (hereinafter called the "Bidder"/"Contractor" which expression shall include its successors, executors and permitted assigns) in favour of **JDVVNLa** Company incorporated under the Companies Act of 1956/2013 (with amendment from time to time) having its registered office at **Vidyut Bhawan, Jodhpur** (hereinafter called the "Employer" which expression shall include its successors, executors and permitted assigns)

WHEREAS the "Employer" invited Bid as per its Specification No.....for **works under DDUGJY NEW Scheme of including installation of lines, DTs and providing service connections etc.**

AND WHEREAS Clause No., Section, of, Vol.-I.. forming part of the Bid Documents inter-alia stipulates that the Bidder and/or Sub-contractor must fulfill the Qualifying Requirements and be jointly and severally bound and responsible for the quality and timely execution of **works under DDUGJY NEW Scheme** in the event the Bid submitted by the Bidder is accepted by the Employer resulting in a Contract.

AND WHEREAS the Bidder has submitted its Bid to the Employer vide Proposal No. dated based on tie-up with the **Sub-contractor** for execution of aforesaid **works under DDUGJY NEW Scheme**.

NOW THEREFORE THIS UNDERTAKING WITNESSETH as under:

- 1.0 In consideration of the award of Contract by the Employer to the Bidder (hereinafter referred to as the "Contract") we, the **Sub-contractor** and the Bidder/Contractor do hereby declare that we shall be jointly and severally bound unto the **JDVVNL**, for **execution of works under DDUGJY NEW Scheme** in accordance with the Contract Specifications.
- 2.0 Without in any way affecting the generality and total responsibility in terms of this Deed of Undertaking, the **Sub-contractor** hereby agrees to depute their representatives from time to time to the Employer's Project site as mutually considered necessary by the Employer, Bidder/Contractor and the **Sub-contractor** to ensure proper quality, manufacture, testing and supply on FOR destination delivery at site basis and successful performance of **works under DDUGJY NEW Scheme** in accordance with Contract Specifications. Further, if the Employer suffers any loss or damage on account of non-performance of the material fully meeting the performance guaranteed as per Bid Specification in terms of the contract. We the **Sub-contractor** and the Contractor jointly and severally undertake to pay such loss or damages to the Employer on its demand without any demur.
- 3.0 This Deed of Undertaking shall be construed and interpreted in accordance with the laws of India and the Courts in xxxxx (Headquarter of Employer) shall have exclusive jurisdiction in all matters arising under the Undertaking.
- 4.0 We, the Bidder/Contractor and **Sub-contractor** agree that this Undertaking shall be irrevocable and shall form an integral part of the Contract and further agree that this Undertaking shall continue to be enforceable till the Employer discharges it. It shall become operative from the effective date of Contract.



IN WITNESS WHEREOF the **Sub-contractor** and/or the Bidder/Contractor have through their Authorised Representatives executed these presents and affixed Common seals of their respective Companies, on the day, month and year first above mentioned.

WITNESS

(For **Sub-contractor**)

Signature

(Signature of the authorized representative)

Name

Name

Office Address

Common Seal of Company

WITNESS

(For Bidder)

Signature

(Signature of the authorized representative)

Name

Name

Office Address

Common Seal of Company

Note:

1. For the purpose of executing the Deed of Joint Undertaking, the non-judicial stamp papers of appropriate value shall be purchased in the name of executant(s).
2. The Undertaking shall be signed on all the pages by the authorised representatives of each of the partners and should invariably be witnessed.
3. This Deed of Joint Undertaking duly attested by Notary Public of the place(s) of the respective executant(s), shall be submitted alongwith the bid.
4. In case the bid is submitted by a Joint Venture (JV) of two or more firms as partners, then the Joint deed of undertaking shall be modified accordingly.



20. FORM OF CERTIFICATE OF FINANCIAL PARAMETERS FOR QR
(as per clause ref. no. 1.02 and 2.0 of BDS)

(Rupees in Lakhs)

Sl. No.	Financial parameters	2017-18	2016-17	2015-16	2014-15	2013-14
1.	Net Worth					
a)	Paid up Capital					
b)	Free Reserves and Surplus*					
c)	Misc expenses to the extent not written off					
	Net Worth (a+b-c)					
2.	Annual Turnover **					
3.	Liquid Asset (Total Current Asset – Inventories)					

* Free Reserve and Surplus should be Exclusive of Revaluation Reserve, written back of Depreciation Provision and Amalgamation.

** Annual total Income/ turnover as incorporated in the Profit and Loss Account excluding non-recurring income, i.e. sale of fixed asset etc.

It is certified that all the figures are based on audited accounts read with auditors report and Notes to Accounts etc.

Date

Certified By

Place

(Chartered Accountants)

Membership No.

Seal



PERT Chart Format under DDUGJY NEW Scheme

Name of State
 Name of Project
 Reference No. of PERT Chart (unique code to be given by Employer)
 Version of PERT Chart Original/R1/R2/R3...

Name of Employer
 Name of Turnkey Contractor (TC)
 Date of approval of PERT Chart

LoI No. and date

S. NO	Activity	Responsibility	Unit	Qty as per Scope	week																											
					1																											
1	Letter of Intent (zero date)	Employer																														
2	PERT Chart	TC / E																														
3	Submission of CPG	TC																														
4	Upfront sharing of approved sub-vendors by PIA	Employer																														



10	Approval of Engineering Drawings (other than existing approved)	Employer																					
11	Submission of GTP (other than existing approved)	TC																					
12	Approval of GTP (other than existing approved)	Employer																					
13	Placement of Award for following Key Materials:																						
13.01	Poles																						
13.02	Conductor																						
13.																							



13.	Earthing Materials																				
13.	Stay Sets																				
14	Establishment of Site Office, Office infrastructure, Vehicle																				
15	Deployment of manpower at site																				
16	Survey																				
16.	Foot survey																				
16.	Approval of Survey report																				
17	Receipt of following Key Materials at Site:																				
17.	Poles																				
17.	Conductor																				



02																							
17. 03																							
17. 04	Distribution Transformer																						
17. 05	Steel Structure Materials																						
17. 06	Vacuum circuit breakers																						
17. 07	GI wires																						
17. 08	Insulators																						
17. 09	Meters																						
17. 1	Power & Control Cables																						
17. 11	Distribution Box																						



17. 12	Line Equipments (LA, isolator, AB switch, CT/PT)																				
17. 13	Earthing Materials																				
17. 14	Stay Sets																				
18	Erection, testing & Commissioning of following works																				
18. 01																					
18. 02																					
18. 03	11 KV Lines																				
18. 04	DTR Substation																				
18. 05	LT Line																				



18. 06																																											
18. 07	Service connection																																										
18. 08																																											
18. 09																																											
19	Submission of reconciliation & closure proposal																																										

**(Employer)
Signature
Name of Authorised Signatory
Designation**

**(Turnkey Contractor)
Signature
Name of Authorised Signatory
Designation**

Note-

1. Approving authority of Employer shall sign and stamp the PERT chart on approval.
2. Approved PERT chart shall be part of contract agreement.
3. Original PERT chart shall not be changed during execution of project.



4. Revision in PERT chart or acceptance of catch up plan, shall be within overall contract execution period of the project.
5. Revised PERT chart / catch up plan shall be signed by same authorities of Employer and Turnkey contractor.
6. Approved PERT chart shall be basic document to take a decision on extension of time for contract and to evaluate performance of project execution contractor.
7. Item wise responsibility should be identified between Employer and turnkey contractor
8. Clear time line to be agreed for various activities between Employer and Turnkey Contractor
9. Unique reference no. to be assigned with date to approved PERT chart by Employer.
10. Any revision should be clearly assigned with unique reference no., date and revision no. (R1/R2/R3 etc)
11. Items specified may be customized based on project formation.



VOLUME I: SECTION – VII

SCOPE OF WORKS



Scope of works

The section wise scope of works have been covered as under:

- New single phase 11 kV LineLines
- Single phase DTR Substations
- Single phase LT Line
- Household Connection

Discom has decided to place orders of DDUGJY NEW on full turnkey basis excluding Energy Meters which will be issued as "Free Issue Item". The technical specification for all items including high value items as per latest MM specifications approved by Discom will be considered for DDUGJY NEW. The copy of these specifications will be sent to REC for intimation. Since the technical specifications of Discom will be considered so the CPP rates for high value items are not applicable.

Free Issue Items

- i. The Discom shall provide single & three phase Energy meters as Free Issue Items to Contractors.
- ii. However the Discom may provide any item as free issue item besides items mentioned in the bidding document for which erection charges will be paid as per contract.

The scope of works also include General Technical Instructions enclosed at Annexure-A.



Package wise break up of scope of work

Tender No.	District	Block	11 KV Km	LT Km	16 KVA Nos.	10 KVA Nos.	5 KVA Nos.	All DT Nos.	Grid HHs Nos.
588	Jaisalmer	All	274.0	669.96	56	101	413	570	2710
581	Jodhpur Lot-I	Baleser, Bap, Phalodi, Shergarh	734.25	1699.6	34	225	2151	2410	7385
582	Jodhpur Lot-II	Bilara, Bhopalgarh, Mandore, Osian, Luni	489.5	1133.1	23	150	1434	1607	4923
583	Barmer Lot-I	Barmer, Baytu, Chohtan, Sheo	706.25	1202.86	16	72	1359	1447	7221
584	Barmer Lot-II	Dhorimanna, Sindhari, Balotra, Siwana	651.92	1110.33	15	67	1254	1336	6666
585	Bikaner Lot-I	Bikaner, Kolayat, Lunkaransar	507.672	1221.9	20	125	1269	1414	5377
586	Bikaner Lot-II	Nokha, Sridungergarh	549.98	1323.75	21	136	1374	1531	5825
587	Jalore Sirohi	All	312.84	1275.1	98	196	1745	2039	11351

Note:- Scope of work shown above is tentative, the quantity of work may be increased/decreased.



ANNEXURE-A to VOLUME-I: SECTION – VII GENERAL TECHNICAL INSTRUCTIONS



General Technical Instructions

Following CEA regulations shall be applicable during execution of work:

- a. Construction Regulation – Central Electricity Authority (Technical Standards for construction of electrical plants and electric lines) Regulation, 2010 (as amended time to time)
- b. Safety Regulation for construction and O&M - Central Electricity Authority (Safety requirements for construction, Operation and Maintenance of electrical plants and electric lines) Regulation, 2011 (as amended time to time)
- c. Connectivity Regulation – Technical Standard for connectivity to the grid (Amendment) Regulation 2013; Technical Standards for connectivity of the Distributed Generation resources, 2013; Central Electricity Authority (Grid Standard) Regulation, 2010 (as amended time to time)
- d. Metering Regulations – Central Electricity Authority (Installation and Operation of meters) Regulations, 2006; Central Electricity Authority (Installation and Operation of meters) (Amendment) Regulations, 2010 and 2015 (as amended time to time)
- e. Central Electricity Authority (Measures relating to safety and Electric supply regulations), 2010 and amendment regulation 2015 (as amended time to time)

1.1 Details En-route

All topographical details, permanent features, such as well, trees, building etc. 75 m on either side of the alignment shall be detailed on the profile plan.

1.2 Clearances - General

For the purpose of computing the vertical clearance of an over-head line, the maximum sag of any conductor shall be calculated on the basis of the maximum sag in still air and the maximum design temperature. Similarly, for the purpose of computing any horizontal clearance of an over-head line, the maximum deflection of any conductor shall be calculated on the basis of the wind pressure specified by the State Government under rule 76 (2) (a) [or may be taken as 35°, whichever is greater]. Following clearances shall be maintained by the contractor while executing the work:

- 1.2.1. CLEARANCE ABOVE GROUND OF THE LOWEST CONDUCTOR: No conductor of an over-head line, including service lines, erected across a street shall at any part thereof be at a height less than
 - (a) For low and medium voltage lines 5.8 metres
 - (b) For high voltage lines 6.1 metres
- 1.2.2. No conductor of an over-head line, including service, lines, erected along any street shall at any part thereof be at a height less than

a. For low, medium and high voltage lines upto and including 11,000 volts, if bare -	4.6 metres
b. For low, medium and high voltage lines Upto and including 11,000 volts, if insulated -	4.0 metres
c) For high voltage lines above 11,000 volts -	5.2 metres

or extra-high voltage lines the clearance above ground shall not be less than 5.2 meters plus 0.3 meter for every 33,000 volts or part thereof by which the voltage of the line exceeds 33,000 volts:

Provided that the minimum clearance along or across any street shall not be less than 6.1 meters.



1.2.3. CLEARANCE FROM BUILDINGS OF LOW AND MEDIUM VOLTAGE LINES AND SERVICE LINES:

Where line is to cross over another line of the same voltage or lower voltage, pole with suitable extensions shall be used. Provisions to prevent the possibility of its coming into contact with other overhead lines shall be made in accordance with the latest CEA regulations (as amended from time to time). The contractor will required to under cross higher voltage lines by erecting gantries/suitable Rail Pole structures.

Where a low or medium voltage over-head line passes above or adjacent to or terminates on any building, the following minimum clearances from any accessible point, on the basis of maximum sag, shall be observed:-

- a) For any flat roof, open balcony, verandah roof and lean-to-roof
 - i. When the line passes above the building a vertical clearance of 2.5 meters from the highest point; and
 - ii. When he line passes adjacent to the building a horizontal clearance of 1.2 meters from the nearest point, and
- b) For pitched roof
 - i. When the line passes above the building a vertical clearance of 2.5 meters immediately under the lines, and
 - ii. When the line passes adjacent to the building a horizontal clearance of 1.2 meters.

The horizontal clearance shall be measured when the line is at a maximum deflection from the vertical due to wind pressure.

1.2.4. CLEARANCE FROM BUILDINGS OF HIGH AND EXTRA-HIGH VOLTAGE LINES:

Where a high or extra-high voltage over-head line passes above or adjacent to any building or part of building it shall have on the basis of maximum sag a vertical clearance above the highest part of a building immediately under such line, of not less than

(a)	For High Voltage Lines up to and including 33,000 volts	3.7 m
(b)	For Extra High Voltage Lines	3.7 m plus 0.3 m for every additional 33 KV or part thereof.

1.3 Electrical System Data

	<u>33 KV</u>	<u>11KV</u>
Nominal voltage		33 kV
11KV		
Maximum system voltage		36 kV
12KV		
BIL (Impulse)	170 kVp	75KV



Power frequency withstand voltage (wet)	75 kV (rms) 28KV
Minimum corona extinction voltage for 50 Hz ac system under Dry condition (rms) phase to earth	Not less than 27 kV,
Radio interference voltage at one MHz for volts	Not exceeding 1000 micro-
27 kV (dry condition)	

1.4 Pole Location

In locating poles on lines, the following general principles should be kept in mind:-

1. Keep spans uniform in length as far as possible.
2. Locate to give horizontal grade.
3. By locating the poles on high places short poles can be used and will maintain proper ground clearance at the middle of the span. In extremely hilly or mountainous country, poles are located on ridges there by greatly increasing the spans without greatly increasing the pull on the conductor. This is possible because the sag can be made very large and will maintain the required ground clearance. Special attention should be given to the locations of poles, where the ground washes badly. Poles should not be placed along the edges of cuts at or embankment or along the banks of creeks of streams.

1.5 Construction

The construction of overhead-lines may be divided into the following parts:-

- (1) Pit marking, pit digging.
- (2) Erection of supports and concreting.
- (3) Providing of guys to supports.
- (4) Mounting cross-arms, pin and insulators, and pin binding.
- (5) Paying and stringing of the conductor.
- (6) Sagging and Tensioning of Conductors.
- (7) Crossings.
- (8) Guarding.
- (9) Earthing.
- (10) Testing and Commissioning.

1.6 Erection of DP Structure for Angle Locations

For angles of deviations more than 10 degree, DP structure may be erected. The pit digging should be done along the bisection of angle of deviation.

After the poles are erected, the horizontal/cross bracings should be fitted and the supports held in a vertical position with the help of temporary guys of Manila rope 20/25 mm dia.

Wherever space is not found sufficient to install double Pole structure, single pole cut point may be installed. The support so erected must be grouted.

1.7 Concreting

The concreting mixture of one cum 1:3:6 ratios would mean 1 part cement, 3 parts coarse sand and 6 part 40 mm aggregate size stones. It may be noted that while preparing the concrete mixture, large quantities of water should not be used as this would wash away cement and sand.



1.8 Providing Of Guys To Supports

Guys are installed at locations where terminal poles are erected at sectional cut points. These cut points may be in same alignment or at turn points. Guys are installed to nullify tension on supports resulted due to conductors tension. In spite of careful planning and alignment of line route, certain situations arise where the conductor tries to tilt the pole from its normal position due to abnormal wind pressure and deviation of alignment, etc. When these cases of strain arise, the pole is strengthened and kept in position by guys. One or more guys will have to be provided for all supports where there is unbalanced strain acting on the support, which may result in tilting/uprooting or breaking of the support.

Guys are braces fastened to the pole. In this work anchor type guy sets are to be used. These guys are provided at (i) angle locations (ii) dead end locations (iii) T - off points (iv) Steep gradient locations and (v) where the wind pressure is more than 50 kg / Sq.m.

The fixing of guys stays will involve (i) pit digging and fixing stay rod (ii) fastening guy wire to the support (iii) Tightening guy wire and fastening to the anchor. The marking of guy pit, digging and setting of anchor rod must be carefully carried out. The stay rod should be placed in a position so that the angle of rod with the vertical face of the pit is 30°/45° as the case may be.

Before start of erection of Stay sets, required concreting materials like Cement, Sand, Stone Chips and Construction water need to be made available near the pit.

G.I. stay wires of size 7/3.15 mm (10 SWG) & 7/4.00 mm (8 SWG), for 16 mm/20 mm stay rods respectively, are to be provided. 8.5 Kg. Stay Wire (7/4.00 mm) per Stay with 20 mm Stay rod for 33 KV line and 5.5 Kg. Stay Wire (7/ 3.15 mm) per Stay with 16 mm Stay rod for 11 KV lines are to be used. For double pole structure (DP), four stays along the line, two in each direction and two stays along the bisection of the angle of deviation (or more) as required depending on the angle of deviation are to be provided. Hot dip galvanized stay sets are to be used. One stay to counter the angular deformation force shall be used.

After concreting, back filling and ramming must be done well and allowed 7 days to set. The free end of the guy wire/stay wire is passed through the eye of the anchor rod, bent back parallel to the main portion of the stay/guy and bound after inserting the G.I. thimble, where it bears on the anchor rod. If the guy wire proves to be hazardous, it should be protected with suitable asbestos pipe filled with concrete of about 2 m length above the ground level, painted with white and black strips so that, it may be visible at night. The turn buckle shall be mounted at the pole end of the stay and guy wire so fixed that the turn buckle is half way in the working position, thus giving the maximum movement for tightening or loosening.

1.9 Guy Strain Insulators

Guy insulators are placed to prevent the lower part of the Guy from becoming electrically energized by a contact of the upper part of the guy when the conductor snaps and falls on them or due to leakage. No guy insulator shall be located less than 2.6 m from the ground. Guy insulators are to be used in stay wires only. All stay conductors are to be provided with guy insulators as per following specifications.

11 KV line stay	Type C guy insulator (1 No)
33 KV line stay	Type C guy insulators (2Nos)



1.10 Fixing Of Cross-Arms

After the erection of supports and providing guys, the cross-arms are to be mounted on the support with necessary clamps, bolts and nuts. The practice of fixing the cross arms before the pole erection is also there. In case, the cross-arm is to be mounted after the pole is erected, the lineman should climb the pole with necessary tools. The cross-arm is then tied to a hand line and pulled up by the ground man through a pulley, till the cross-arm reaches the line man. The ground man should station himself on one side, so that if any material drops from the top of the pole, it may not strike him. All the materials should be lifted or lowered through the hand line, and should not be dropped.

1.11 Insulators And Bindings

Line conductors are electrically insulated from each other as well as from the pole by 'Insulators'. Following two type of insulators shall be used for the line insulation:

- (1) Pin type
- (2) Strain type

The pin type insulators will be used for straight stretch of line. The insulator and its pin should be mechanically strong enough to withstand the resultant force due to combined effect of wind pressure and weight of the conductor in the span.

The strain insulators are intended for use at terminal locations or dead end locations and where the angle of deviation of line is more than 10°. Strain insulators are also intending to use at major road crossing locations.

The pins for insulators are fixed in the holes provided in the cross-arms and the pole top brackets. The insulators are mounted in their places over the pins and tightened. In the case of strain or angle supports, where strain fittings are provided for this purpose, one strap of the strain fittings is placed over the cross-arm before placing the bolt in the hole of cross-arms. The nut of the straps is so tightened that the strap can move freely in horizontal direction.

All HT/LT insulators shall be tested for insulation tests before installation on line. They shall be dipped into water for 24 hrs and then tested for insulation resistance tests at the stores. The insulators found fit in IR testing shall be sent to site for erection. 11KV na d33 KV insulators shall be tested by at-least 1 KV megger whereas LT insulators shall be tested by 500 Volts megger.

1.12 Conductor Erection

The main operations are:-

- (a) Transportation of Conductor to works site.
- (b) Paying and Stringing of Conductor
- (c) Jointing of Conductor
- (d) Tensioning and Sagging of Conductor

While transporting conductors drums to site, precautions are to be taken so that the conductor does not get damaged/injured. The drum could be mounted on cable drum support, which generally is made from crow-bar and wooden slippers for small size conductor drums. The direction of rotation of the drum has to be according to the mark in the drum so that the conductor could be drawn. While drawing the conductor,



it should not rub causing damage. The conductor could be passed over poles on wooden or aluminum snatch block (pulley) mounted on the poles for this purpose.

When approaching the end of a drum length at least three coils shall be left in place when the stringing operations are stopped. These coils are to be removed carefully and if another length is required to be run out a joint shall be made as per the recommendations of the accessories manufacturer.

The mid span jointing is done through compressions or if helical fittings are used the jointing could be done manually. After completing the jointing, tensioning operation could be commenced. The conductor is pulled through come-along clamps to stringing the conductor between the tension locations.

Conductor splices shall not crack or otherwise be susceptible to damage in the stringing operation. The Contractor shall use only such equipment / methods during conductor stringing which ensures complete compliance in this regard.

All the joints on the conductor and earth-wire shall be of the compression type, in accordance with the recommendations of the manufacturer, for which all necessary tools and equipment like compressors, dies, etc., shall be obtained by the Contractor. Each part of the joint shall be cleaned by wire brush till it is free of rust or dirt, etc., and be properly greased with anti-corrosive compound. If required and as recommended by the manufacturer, before the final compression is carried out with the compressors.

All the joints or splices shall be made at least 15 meters away from the pole. No joints or splices shall be made in spans crossing over main roads, railways and small river spans. Not more than one joint per sub-conductor per span shall be allowed. The compression type fittings shall be of the self-centering type or care shall be taken to mark the conductors to indicate when the fitting is centered properly. During compression or splicing operation, the conductor shall be handled in such a manner as to prevent lateral or vertical bearing against the dies. After compressing the joint, the aluminum sleeve shall have all corners rounded; burrs and sharp edges removed and smoothed.

During stringing of conductor to avoid any damage to the joint, the contractor shall use a suitable protector for mid span compression joints in case they are to be passed over pulley blocks / aerail rollers. The pulley groove size shall be such that the joint along with protection can be passed over it smoothly.

1.13 Tensioning and Sagging Operations

The tensioning and sagging shall be done in accordance with the approved stringing charts or sag tables. The "initial" stringing chart shall be used for the conductor and "final" stringing chart for the earth-wire. The conductors shall be pulled up to the desired sag and left in running blocks for at least one hour after which the sag shall be rechecked and adjusted, if necessary, before transferring the conductors from the running blocks to the suspension clamps. The conductor shall be clamped within 36 hours of sagging in.

The sag will be checked in the first and the last section span for sections up to eight spans and in one additional intermediate span for sections with more than eight spans. The sag shall also be checked when the conductors have been drawn up and transferred from running blocks to the insulator clamps.

At sharp vertical angles, conductor and earth-wire sags and tensions shall be checked for equality on both sides of the angle and running block. The suspension insulator assemblies will normally assume verticality when the conductor is clamped.



Tensioning and sagging operations shall be carried out in calm weather when rapid changes in temperature are not likely to occur.

1.14 Clipping In

Clipping of the conductors into position shall be done in accordance with the manufacturer's recommendations. Jumpers at section and angle towers shall be formed to parabolic shape to ensure maximum clearance requirements. Fasteners in all fittings and accessories shall be secured in position. The security clip shall be properly opened and sprung into position.

1.15 Fixing of Conductors and Earthwire Accessories

Conductor and earth-wire accessories supplied by the Contractor shall be installed by the Contractor as per the design requirements and manufacturer's instruction within 24 hours of the conductor / earth-wire clamping. While installing the conductor and earth-wire accessories, proper care shall be taken to ensure that the surfaces are clean and smooth and that no damage occurs to any part of the accessories or of the conductors.

1.16 Replacement

If any replacements are to be effected after stringing and tensioning or during maintenance e.g. replacement of cross arms, the conductor shall be suitably tied to the pole at tension points or transferred to suitable roller pulleys at suspension points.

Sagging of conductor has to be in accordance to the Sag Tension chart. In order to achieve it, it is preferred to pull the conductor to a tension a little above the theoretical value so that while transferring it from the snatch blocks to the pit insulators and to take care of temperature variation. Proper sag could be achieved. Sagging for 33/11 KV line is mostly done by "Sighting". A horizontal strip of wood is fixed below the cross-arm on the pole at the required sag. The lineman sees from other end and the sag is adjusted by increasing or decreasing the tension. The tension clamps could then be finally fixed and conductor be fixed on pin-insulators. All fittings, accessories like guys, cross-arms, etc., could be checked as they should not have deformalities.

The maximum permissible spans for all the lines of 33/11/0.4 KV are prescribed according to the design of the supports. Sag-tension charts for these conductors are to be followed.

1.17 Tying Of Conductor On Pin Insulators

Conductors should occupy such a position on the insulator as will produce minimum strain on the tie wire. The function of the wire is only to hold the conductor, in place on the insulator, leaving the insulator and pin to take the strain of the conductor.

In straight line, the best practice is to use a top groove insulator. These insulators will carry grooves on the side as well. When the conductor is placed on the top groove, the tie wire serves only to keep the conductor from slipping out.

On corners and angles (below 5 degree deviations) the conductors should be placed on the outside of the insulators. On the far side of the pole, this pulls the conductor against the insulator instead of away from the insulator.

1.18 Kind And Size Of Tie Wire To Be Used



Helically formed fittings are to be used for tying the insulators, end terminal connectors etc.. The tie should always be made of soft annealed wire so that it may not be brittle and injure the line conductor. A tie wire should never be used for second time. Specifications of helically formed fittings are given in this section.

1.19 Rules Of Good Tying Practice

- a. Use only helically formed fittings.
- b. Use of size of tie wire which can be readily handled yet one which will provide adequate strength.
- c. Use length of tie wire sufficient for making the complete tie, including an allowance for gripping with the hands. The extra length should be cut from each end if the tie is completed.
- d. A good tie should
 - (a) Provide a secure binding between line wire insulator and tie wire.
 - (b) Have positive contacts between the line wire and the tie wire so as to avoid any chattering of the contacts.
 - (c) Re-enforce line wire in the vicinity of insulator.
- e. Apply without use of pliers.
- f. Do not use the wire which has been previously used.
- g. Do not use hard drawn wires for typing.

1.20 Conductors At Different Voltages On Same Supports

In urban area, lines are to be erected with provision for forming lines of two different gradients as under

- a) 11 KV Line and LT Lines
- b) 33 KV Line and LT Lines

Where conductors forming parts of systems at different voltages are erected on the same supports, the contractor shall make adequate provision to guard against danger to linesmen and others from the lower voltage system being charged above its normal working voltage by leakage from or contact with the higher voltage system; and the methods of construction and the clearances between the conductors of the two systems shall be as described in the specifications.

The agency shall be intimated by the Project Manager in writing about the locations where such provisions is intended by him. At all such locations, the contractor shall make adequate provision to guard against danger to linesmen and others from the lower voltage system being charged above its normal working voltage by leakage from or contact with the higher voltage system.

1.21 Earthing

Earthing shall generally be carried out in accordance with the requirements of latest CEA regulations (as amended from time to time) and the relevant regulations of the Electricity Supply Authority concerned and as indicated below:

- a) All metallic supports shall be earthed.
- b) For PCC poles the metal cross-arms and insulator pins shall be bonded and earthed at every pole for HT lines.
- c) All special structures on which switches, transformers, fuses, etc., are mounted / likely to mount should be earthed.



- d) The supports on either side of the road, railway or river crossing should be earthed.
- e) All supports (Steel & PCC) HT lines passing through inhabited areas, road crossings and along such other places, where Earthing of all poles is considered desirable from safety considerations should be earthed.
- f) In special locations and special structures, road crossings etc.rod Earthing should be done on either side of the construction.
- g) At other locations the coil Earthing may be adopted. The coil Earthing consists of 10 m length of 8 SWG. G.I. wire compressed into a coil 450 mm length and 50 mm dia and buried 1500 mm deep as per REC standard J-1.

1.22 Anti-Climbing Devices

In order to prevent unauthorized persons from climbing any of the supports of HT lines without the aid of a ladder or special appliance, certain anti-climbing devices are provided to the supports. Barbed wire binding is to be adopted for this purpose at a distance of 30 to 40 cm at a height of 3.5 to 4 m from ground level. The barbed wire shall conform to IS – 278 (Grade A1). The barbed wire shall be given chromatin dip as per procedure laid down in IS: 1340. At-least 3.5 kgs barbed wire is to be used per pole for the purpose.

1.23 Testing And Commissioning

When the line is ready for energisation, it should be thoroughly inspected in respect of the following:-

- a) Poles-Proper alignment, concerting and muffing.
- b) Cross-arms – Proper alignment.
- c) Finishing of fabricated steel items used.
- d) Insulators – Proper finish, cleanliness, insulation resistance.
- e) Binding, clamps and jumpers – To check whether these are in reach.
- f) Conductor and earth wire – Proper sag to check whether there are any cuts, etc.
- g) Guys: To check whether the Guy wire is tight and whether the Guy insulators are in tact.
- h) Earthing System: To check whether the earthing connections of supports and fittings are intact. Measure earth resistance with earth tester.

After the visual inspection is over and satisfied, the conductor is tested for continuity/ground, by means of megger. At the time of testing through megger person should not climb on the pole or touch the guarding, conductor, guy wire etc.

- a. Before charging any new line, it should be ensured that the required inspection fee for the new line is paid to the Electrical Inspector and approval obtained from him for charging the line.
- b. The line should be energized before the officer who has been authorized by the Project Manager in this regard.
- c. Before energizing any new line, the contractor of the line shall notify to the workmen that the line is being energized and that it will no longer be safe to work on line. Acknowledgement of all the workmen in writing should be taken in token of having intimated them.



- d. Wide publicity by Tom-toming should be arranged in all the localities through which the line, that is to be energized passes, intimating the time and date of energizing and warning public against the risk in meddling with the line.
- e. The Officer-in-charge of the line shall personally satisfy himself that the same is in a fit state to be energized.

1.24 River Crossing

No special structures are to be erected for this work. River crossing more than normal span of poles are not considered under the package. For small rivers etc., data for the highest flood-level should be obtained for previous years. The structures should be located at such places that they should be approached under flood condition. Normal DP structures are to be used for such crossings on approval of Project Manager.

In case of river crossing with longer span, special designed structures are to be used for the purpose.

1.25 Guarding

Guarding is to be provided for the lines, so that a live conductor, when accidentally broken, is prevented to come in contact with other electric lines, telephone or telegraph lines, roads, and persons or animals and carriages moving along the road, by providing a sort of cradle below the main electric line.

Guarding is not required for crossings of 66 KV and higher voltage lines where the transmission line is protected by fast acting relay operated circuit breaker of modern design with a tripping time of the order of 0.25 sec. from occurrence of fault to its clearance. For all other crossings, guarding is essential for all telecommunication lines and major road crossing.

The guarding shall consist of GI guard cross arm of length 2.5 mtrs made out of 65x65x6 mm angle & shall be hot dipped galvanized generally conforming to IS : 2633/72. The clamps shall also be hot dipped galvanized generally conforming to IS: 2633/72 & suitable for 13 m 52 kgs/m rail pole & for 8.0 meters long RCC poles. Guarding shall be erected with ground & line clearances as per the I.E. rules. Cradle guard wire should be of 8 SWG GI Wire provided with lashing of 10 SWG GI wire at a distance of 2 m along the length of the guarding. Tension clamps, threaded eye bolts, turn buckles, thimble, tying wires and hardware are as per specified in the specifications. A sketch showing arrangement of guarding at road crossing is enclosed with tender drawing.

The minimum height between any guard wires and live crossing conductor shall not be less than 1.5 m in case of a railway crossing.

1.26 Repair to conductors

The conductor shall be continuously observed for loose or broken strands or any other damage during the running out operations. Repair to conductors, if necessary, shall be carried out with repair sleeves. Repairing of the conductor surface shall be carried out only in case of minor damage, scuff marks, etc. The final conductor surface shall be clean, smooth and free from projections, sharp points, cuts, abrasions, etc. The Contractor shall be entirely responsible for any damage to the poles during stringing.

1.27 LT Lines and Service connection



- 1.27.1. The LT line shall be erected of single phase or three phase arrangements through AB Cable depending on site requirements. Every 6th pole of LT line shall be earthed with GI spike/GI Coil as per specifications.
- 1.27.2. In all those locations where LT AB cable is to be erected on the same support in which 11KV or 33KV line is also erected, proper isolation is to be maintained.
- 1.27.3. All single phase service connections released under the DDUGJY NEW schemes shall be provided with one earth point near the energy meter. This point is connected with the proper earthing system through GI wires. 10mm diameter earth knob in form of bolt and nut is to be installed on energy meter board. This earth point is to be maintained by service providing Distribution Company after installation and energisation. In up-stream network, this earth point is to be connected with earth point.
- 1.27.4. Service connection is to be issued on proper surveying of the location so that excessive erection of LT line or 11 KV line may be avoided. The service wire is to be hanged on supportive GI wire between pole support and the house. Before installing service wires and GI wire, GI pipe on the consumer premises is to be erected using clamps/nails/proper binding etc. In case of hut or poor structure at consumer premises, GI pipe is to clamp on wooden planks/wooden structure existing in the house. The GI pipe should be supported for neutralizing tension by means of GI tie wire support. In pukka/brickwork/cement concrete foundations, house, GI support pipe is to be clamped by means of MS clips.
- 1.27.5. The consumer meter shall be installed at the premises of consumers at suitable height and at place which is not in direct approach of sun-light and rain water. Meters should be installed under the covering shade.

BIDDING DOCUMENT

for

Poat Saubhagya Rural households electrification works in Jodhpur
Discom, Rajasthan under DDUGJY New Scheme



Volume – II

**(PMS, Quality Assurance & Evaluation Mechanism and Bid
Forms)**

Sr. No.	Tender Specification No.
1	JDVVNL/TNTW-581
2	JDVVNL/TNTW-582
3	JDVVNL/TNTW-583
4	JDVVNL/TNTW-584
5	JDVVNL/TNTW-585
6	JDVVNL/TNTW-586
7	JDVVNL/TNTW-587
8	JDVVNL/TNTW-588

Table of Contents

Sl. No	Particulars	Page No.
1	PMS, Quality Assurance & Evaluation Mechanism (QAM), Documentation & PMA	1
2	Bid Forms	37



VOLUME-II: SECTION – I

PROJECT MANAGEMENT SYSTEM (PMS), QUALITY ASSURANCE & EVALUATION MECHANISM (QAM), DOCUMENTATION & PMA

PROJECT MANAGEMENT SYSTEM, QUALITY ASSURANCE AND DOCUMENTATION

This section describes the project management system, quality assurance and documentation requirements for the project.

1. Project Management System

1.1. General

The Contractor shall assign a project manager with the authority to make commitments and decisions that are binding on the Contractor. Employer will designate a project manager to coordinate all employer project related activities. All communications between employer and the Contractor shall be coordinated through the project managers. The project managers shall also be assisting employer in communicating project related information to other stake holders.

Bidder shall submit the manpower deployment plan along with the bids, describing the key roles of each person.

The role and responsibilities of contractor shall be as follows:

- a) To prepare, maintain and update project detailed Work Execution Plan for successful implementation of project like approval of GTP, approval of sub-contractor, approval of drawings, supply of materials, mobilization of men, material and equipment etc. at site for successful completion of works, Compile and up-load physical as well as financial progresses, compile the progress of works at Employer level and to assist in forwarding it to all stake holders.
- b) To actively participate with employer in resolving all issues relating to project implementation including ROW, Forest Clearances, Railway Crossings, and Payments to contractors/vendors and policy matters.
- c) To actively participate in monitoring, reviewing and analysing the physical, financial and quality assurances works' progress of SAUBHAGYA works and also to take suitable measures on compliance of observations being raised during monitoring/review meetings with employer.
- d) To implement and maintain a dedicated centralized bank account for the project, upload and up-date project wise physical progress in SAUBHAGYA web portal. Physical as well as financial progresses shall be uploaded in standard Bill of Material format of the contract. Also, to submit claims as per release SAUBHAGYA guidelines to Employer for release of payments/funds.
- e) To oversee the progress and compliance of the Quality Assurance Mechanism as per SAUBHAGYA guidelines.
- f) **It is to be noted that in case, anywhere in the bidding documents, if DDUGJY / "Deen Dayal Upadhyay Gram Jyoti Yojna" is mentioned, the same is to be noted/treated as "SAUBHAGYA" Scheme**

1.2. Project Schedule

As per the schedule the bidder shall submit a preliminary implementation plan along with the bid. The detailed project implementation schedule shall be submitted by the contractor after the award for employer's approval, which shall include at least the following activities:

- (a) Surveying of site.
- (b) Documents submission and approval schedule
- (c) Type Testing Schedule
- (d) Dispatch Schedule
- (e) Installation & commissioning schedule



(f) Training schedule, if any.

The project schedule shall include the estimated period for completion of project and its linkage with other activities.

1.3. Progress Report

A progress report shall be prepared by the Contractor each month against the activities listed in the project schedule. The report shall be made available to employer on a monthly basis, e.g., the 10th of each month. The progress report shall include all the completed, ongoing and scheduled activities.

1.4. Transmittals

Every document, letter, progress report, change order, and any other written transmissions exchanged between the Contractor and employer shall be assigned a unique transmittal number. The Contractor shall maintain a correspondence index and assign transmittal numbers consecutively for all Contractor documents. Employer will maintain a similar correspondence numbering scheme identifying documents and correspondence that employer initiates.

2. Quality Assurance and Evaluation Mechanism

The Project Implementation Agency (PIA) shall be solely responsible & accountable for assuring quality in SAUBHAGYA works. Project Implementing Agency (PIA) shall formulate a detailed comprehensive Quality Assurance (QA) plan for the works to be carried out under SAUBHAGYA scheme with an objective to create quality infrastructure works. The QA and Inspection Plan shall be integral part of the contract agreement with turnkey contractor or equipment supplier and erection agency as the case may be in case of turnkey/ or departmental execution of works. PIA has to ensure that the quality of materials/equipment supplied at site and execution of works carried out at field under SAUBHAGYA scheme is in accordance to Manufacturing Quality Plan (MQP)/Guaranteed Technical Particulars (GTP) and Field Quality Plan (FQP)/Approved Drawings/Data Sheets respectively.

2.1. Quality checks to be ensured by PIA/Turnkey Contractor:

PIA & Turnkey Contractor shall strictly ensure QA checks during the day to day course of project execution, which are as follows:

- a. 100% pre-dispatch inspections of all materials viz. as per MQP/ Approved Drawings/ Technical Specifications/Datasheet/GTP/applicable national & international standards.
- b. 100% villages with all infrastructures are to be verified for quality as per MQP/Datasheet/GTP/ Approved Drawings/Technical Specifications and FQP.
- c. Deleted 100% of all 66/11 or 33/11 kV sub stations (New & Augmented) for quality of material as per MQP/Approved Drawings/Technical Specifications/Datasheet/GTP and erection works in the field as per FQP/approved survey drawings/layout.
- d. 100% verification of HHs connections released.
- e. 100% verifications feeders created under the scheme.
- f. 100% verification of materials utilised under the scheme.
- g. 100% verification of works done in Metering, SAGY & System Strengthening.

Also, PIA & Turnkey Contractor have to carry out quality assurance of village electrification and substation works as per the checklist provided at Annexure-A.

Contractor shall adhere to Quality Assurance Plan (QAP) which will be issued by REC and details of the same will be provided by the Discom.

- 2.1.1. **Vendor approval:** All the materials procured for SAUBHAGYA works shall be purchased from the authorised vendors approved by their Quality Assurance Department of PIA. Approved vendors list is to be uploaded periodically (monthly) on the PIA web portal.

New vendors/suppliers may be approved by PIAs, provided capability of manufacturer's is assessed suitably by visiting the factory premises and checking the testing facility available before accepting it as approved vendor. If required, State Electricity Board/Power Department/ Distribution Companies may adopt vendors already approved by CPSUs.

- 2.1.2. **Material Inspection:** All six materials of 33/11kV substations and materials required for Village Electrification shall be inspected at manufacturer works/premises before dispatch at site. The materials to be used under the scheme shall be as per Technical Specification attached with Standard Bidding Document of SAUBHAGYA scheme or as per latest relevant Indian Standards/approved Datasheet/drawings/GTP/MQP.

Note: PIA to perform one stage inspection of Power/Distribution transformer for each manufacturer.

- 2.1.3. **FQP for Civil works:** PIA shall prepare a separate FQP for civil works supported with drawings which shall be approved by their competent authority which shall be uploaded at web portal. The turnkey contractor shall adhere to this FQP while carrying out physical works.
- 2.1.4. **FQP for testing & commissioning:** PIA shall prepare a comprehensive FQP for testing & commissioning of ~~33/11kV or 66/11kV~~ substation, Distribution transformer Substation etc. as well as infrastructure created during electrification of villages/habitations. The electrical system shall be energized only after performing all tests as described in the FQP. Proper records in this regard, including tests on earth resistance, insulation resistance of 11 kV line & Distribution Transformer etc. shall be maintained, jointly signed by PIA and turnkey contractor representatives.
- 2.1.5. **QA documentation:** All the quality assurance checks shall be conducted in the field as per approved Field Quality Plan(FQP) and shall be documented properly and signed by the quality engineer of the turnkey contractor & countersigned by PIA's representative and shall be kept for future reference. These documents shall be maintained by PIAs in proper order and shall be made available at site for verification by Quality Monitors during inspection.

2.2. Quality Assurance Mechanism to be envisaged by REC for SAUBHAGYA Projects

SAUBHAGYA Projects shall have a single tier Quality Assurance Mechanism (QAM). The single tier QAM shall exclude the in-house process quality checks followed by the Project Implementation Agency (PIA) during the physical execution of the project.

Rural Electrification Corporation (REC), the nodal agency for the SAUBHAGYA scheme shall operate for Quality Assurance Mechanism. REC shall designate a senior officer (ZM/CPM of the state) as REC State Quality Assurance Coordinator (RSQAC) at its State level Zonal/Project office. REC corporate office shall designate a senior officer not below the level of AGM/GM as RQAC.

Under this mechanism, *RQM shall oversee the compliance of SAUBHAGYA guidelines*, adherence to system procedures etc. shall be verified by an independent inspecting agency.

REC shall outsource independent agency(ies) designated as REC Quality Monitors (RQM) to ensure quality of materials procured and shall also verify quality of works carried out under the SAUBHAGYA scheme. RQM shall carry out pre-dispatch inspection of six materials randomly in a single lot containing minimum 10% materials at manufacturer works. RQM shall also verify quality of works carried out in the Project, which are as follows:

- ~~100% of the Un-electrified and~~ 10% of Intensive Electrified villages where electrification works has been carried out excluding SAGY villages, (*Note: Villages includes Habitations/Dhani/Majra/Tolas/Thandas etc.*)
- 10% of Feeders created under Feeder Separation,
- 1% Consumer Meters & ~~10% of Industrial/Commercial Meters or 3-Phase Distribution Transformer Meters,~~



- 100% works carried out in Sansad Adarsh Gram Yojana (SAGY) ,
- 100% of new substations (66/11 or 33/11kV),
- 25% of augmented substations (66/11 or 33/11kV),

2.2.1. **Material Inspection:** Six important materials of 33/11kV or 66/11kV substation including materials to be used for village electrification shall be inspected at manufacturer premises before dispatch.

~~2.2.1.1. **Inspection of substation materials:** Following materials have been identified as important materials for 33/11 or 66/11kV Substation:~~

- ~~i. Power Transformer,~~
- ~~ii. Circuit Breaker,~~
- ~~iii. Insulators,~~
- ~~iv. Cables~~
- ~~v. Conductor~~
- ~~vi. Control & Relay Panel,~~

2.2.1.2. **Inspection of Village Electrification Materials:** The materials which have been identified for pre-dispatch inspection at manufacture premises is as follows:

- i. Distribution Transformer,
- ii. Overhead Conductor,
- iii. Energy Meter,
- iv. Pole,
- v. Insulators,
- vi. Cables,

At least one type from each of the aforesaid 6 (six) materials to be utilized in substations and villages' electrification shall be inspected by the RQM as per MQP. The inspection/testing/witnessing of acceptance tests shall be as per approved Drawings/Technical Specifications/Datasheet/GTP/ and applicable national & international standard.

2.2.1.3. **Sampling from field:** Any material, including materials listed below, may be picked from site for testing at test laboratory chosen by inspecting official.

- i. Distribution Transformer,
- ii. Overhead Conductor,
- iii. Energy Meter,
- iv. Pole,
- v. Insulators,
- vi. Cables,
- vii. Circuit Breaker

All expenditures that shall incurred towards packing, transport, inspection, testing charges etc. are to be borne by the PIA.

2.2.2. Villages' inspections are to be done as per approved FQP/Drawings/Technical Specifications/Datasheet/survey report. The villages inspection that shall be carried out by REC Quality Monitors, which are as hereunder:

2.2.2.1. 100% Un-Electrified (UE) and 10% of Intensive Electrified (IE) villages are to be inspected in 2 (two) stages including SAGY villages. Stage-I & Stage-II inspections shall cover 50%UE & 5% of IE villages respectively.

2.2.2.2. **Stage-I** inspection of RQM shall commence in a project when 50% of UE & 30% of IE villages are completed in all respect. Five (5) nos. of villages in a project are to be thoroughly inspected at the very beginning when the same is completed in a project. *These villages after rectification of defects will become modal quality village. The findings of inspection of these five villages shall be used as training resource and necessary improvement in Quality Assurance.*

2.2.2.3. **Stage-II** inspection of RQM shall commence and end in a project when 100 % of UE & 70% of IE villages are completed in all respect.

2.2.2.4. (a) Inspection of 100% new (33/11 or 66/11 kV) substation for quality works as per FQP.

(b) ~~Inspection of 25% augmented (33/11 or 66/11 kV) substation for quality works as per FQP.~~

2.2.3. Inspection of 100% works carried out in Sansad Adarsh Gram Yojana(SAGY) including HT Lines, LT lines, Distribution Transformer Substation, HHs connection released or any other works not stated herein but have been carried out under the scheme in that village(s).

2.2.4. In 100% UE & 10% IE villages of the project; 100% verification of connections, 100% of Distribution Transformer Substations, ~~1km (for hilly areas)/2km (for plain areas) of 33kV Lines~~, 100% verification of LT Lines and 100% of the 11KV lines attributed to the village (emanating from cut-point/grid substation) as well as the 11 KV line laid within the village, verification of village energisation & beneficiaries, installation of service connections in public places, hours of supply in the village, time taken by DISCOM to raise first energy bill in favor of beneficiaries.

2.2.5. REC Quality Monitor shall also oversee the Contract Management Part of PIA like adherence to Standard Bidding Document, PMA appointment, adherence to Quality Assurance Mechanism of SAUBHAGYA scheme, Contractual provisions pertaining to defects identification and rectification, resolution of project related issues and action on delayed project. In their visit, RQM would give thrust on adherence on systems and procedures of SAUBHAGYA schemes by PIA and turnkey contractors during project implementation. Also, RQM would ensure availability and awareness of project specific drawings, documents, quality assurance plans among all stake holders in PIA contractor staff/workers.

2.2.6. REC Quality Monitors shall oversee the progress of up-loading of monitoring observations raised by inspectors during inspection and submission of compliance by PIA with supporting site photographs details in SAUBHAGYA web portal.

2.3. GENERAL

2.3.1. To ensure that the equipment and services under the scope of this Contract whether manufactured or performed within the Contractor's Works or at his Sub-contractor's premises or at the Employer's site or at any other place of Work are in accordance with the specifications, the Contractor shall adopt suitable quality assurance programme to control such activities at all points necessary. Such programme shall be broadly outlined by the contractor and finalized after discussions before the award of contract. The detailed programme shall be submitted by contractor after the award of contract and finally accepted by the Employer after discussions. A quality assurance programme of the contractor shall generally cover the following:

- a) His organization structure for the management and implementation of the proposed quality assurance programme :
- b) Documentation control system;
- c) Qualification data for bidder's key personnel;
- d) The procedure for purchases of materials, parts components and selection of sub-Contractor's services including vendor analysis, source inspection, incoming raw material inspection, verification of material purchases etc.
- e) System for shop manufacturing and site erection controls including process controls and fabrication and assembly control;
- f) Control of non-conforming items and system for corrective actions;
- g) Inspection and test procedure both for manufacture and field activities.
- h) Control of calibration and testing of measuring instruments and field activities;
- i) System for indication and appraisal of inspection status;
- j) System for quality audits;
- k) System for authorizing release of manufactured product to the Employer.
- l) System for maintenance of records;
- m) System for handling storage and delivery; and
- n) A manufacturing quality plan detailing out the specific quality control measures and procedures adopted for controlling the quality characteristics relevant to each item of equipment furnished and/or services rendered.
- o) A Field quality Plan covering field activities

2.3.2. The manufacturing & Field quality Plans shall be mutually discussed and approved by the Employer after incorporating necessary corrections by the Contractor as may be required.

2.3.3. The Employer or his duly authorized representative reserves the right to carry out quality audit and quality surveillance of the system and procedure of the Contractor/his vendor's quality management and control activities.

2.3.4. The Contractor would be required to submit all the Quality Assurance documents as stipulated in the Quality Plan at the time of Employer's Inspection of equipment/material.

2.4. TYPE & ACCEPTANCE TESTS

The following type, acceptance and routine tests and tests during manufacture shall be carried-out on the material. For the purpose of this clause:

2.4.1. Contractor shall supply the materials of type & design which has already been Type Tested. Contractor shall provide copy of such tests at site in support of type-tested materials supplied under the contract. No extra payment or time shall be granted for type testing of materials. In exceptional case to case basis, employer will decide to permit type testing of material at contractor's cost.

2.4.1.1. Acceptance Tests shall mean those tests which are to be carried out on samples taken from each lot offered for pre-dispatch inspection, for the purposes of acceptance of that lot.

2.4.1.2. Routine Tests shall mean those tests, which are to be carried out on the material/equipment to check requirements which are likely to vary during production.

2.4.1.3. Tests during Manufacture shall mean those tests, which are to be carried out during the process of manufacture and end inspection by the Contractor to ensure the desired quality of the end product to be supplied by him.



2.4.1.4. The norms and procedure of sampling for these tests will be as per the Quality Assurance Programme to be mutually agreed to by the Contractor and the Owner.

2.4.1.5. The standards and norms to which these tests will be carried out are listed against them. Where a particular test is a specific requirement of this Specification, the norms and procedure of the tests shall be as per IS/IEC Standard this specification or as mutually agreed to between the Contractor and the Owner in the Quality Assurance Programme.

2.4.1.6. For all type test and acceptance tests, the acceptance values shall be the values specified in this Specification, Approved Quality Plan or guaranteed by the Bidder, as applicable.

2.5. TYPE TESTING, INSPECTION, TESTING & INSPECTION CERTIFICATE

2.5.1. All equipment being supplied shall conform to type tests including additional type tests, if any as per technical specification and shall be subject to routine tests in accordance with requirements stipulated under respective sections. Employer reserves the right to witness any or all the type tests. The Contractor shall intimate the Employer the detailed program about the tests at least three (3) weeks in advance in case of domestic supplies & six (6) weeks in advance in case of foreign supplies.

2.5.2. The reports for all type tests and additional type tests as per technical specification shall be furnished by the Contractor alongwith equipment/material drawings. The type tests conducted earlier should have either been conducted in accredited laboratory (accredited based on ISO/IEC Guide 25/17025 or EN 45001 by the national accreditation body of the country where laboratory is located) or witnessed by the representative(s) of Employer or Utility. The test-reports submitted shall be of the tests conducted within last 10 (ten) years prior to the date of bid opening. In case the test reports are of the test conducted earlier than 10 (ten) years prior to the date of bid opening, the contractor shall repeat these test(s) at no extra cost to the Employer

2.5.3. In the event of any discrepancy in the test reports i.e. any test report not acceptable due to any design/manufacturing changes (including substitution of components) or due to non-compliance with the requirement stipulated in the Technical Specification or any/all additional type tests not carried out, same shall be carried out without any additional cost implication to the Employer.

2.5.4. The Employer, his duly authorized representative and/or outside inspection agency acting on behalf of the Employer shall have at all reasonable times free access to the Contractor's/sub-vendors premises or Works and shall have the power at all reasonable times to inspect and examine the materials and workmanship of the Works during its manufacture or erection if part of the Works is being manufactured or assembled at other premises or works, the Contractor shall obtain for the Engineer and for his duly authorized representative permission to inspect as if the works were manufactured or assembled on the Contractor's own premises or works. Inspection may be made at any stage of manufacture, dispatch or at site at the option of the Employer and the equipment if found unsatisfactory due to bad workmanship or quality, material is liable to be rejected.

2.5.5. The Contractor shall give the Employer/Inspector ten (10) days written notice of any material being ready for joint testing including contractor and Employer. Such tests shall be to the Contractor's account except for the expenses of the Inspector. The Employer/Inspector, unless witnessing of the tests is virtually waived, will attend such tests within thirty (30) days of the date of which the equipment is notified as being ready for test /inspection, failing which the Contractor may proceed alone with the test which shall be deemed to have been made in the Inspector's presence and he shall forthwith forward to the Inspector duly certified copies of tests in triplicate.



- 2.5.6. The Employer or Inspector shall, within fifteen (15) days from the date of inspection as defined herein give notice in writing to the Contractor, of any objection to any drawings and all or any equipment and workmanship which in his opinion is not in accordance with the Contract. The Contractor shall give due consideration to such objections and shall either make the modifications that may be necessary to meet the said objections or shall confirm in writing to the Employer/Inspector giving reasons therein, that no modifications are necessary to comply with the Contract. If any modification is made on the equipment on the basis of test results not in conformity with the contract, the modified equipment shall be subject to same sequence of test again without any additional cost to Employer.
- 2.5.7. When the factory tests have been completed at the Contractor's or Sub-Contractor's works, the Employer/Inspector shall issue a certificate to this effect within fifteen (15) days after completion of tests but if the tests are not witnessed by the Employer/Inspector, the certificate shall be issued within fifteen (15) days of receipt of the Contractor's Test certificate by the Engineer/Inspector. Failure of the Employer/Inspector to issue such a certificate shall not prevent the Contractor from proceeding with the Works. The completion of these tests or the issue of the certificate shall not bind the Employer to accept the equipment should, it, on further tests after erection, be found not to comply with the Contract. The equipment shall be dispatched to site only after approval of test reports and issuance of dispatch instruction by the Employer.
- 2.5.8. In all cases where the Contract provides for tests whether at the premises or at the works of the Contractor or of any Sub-Contractor, the Contractor except where otherwise specified shall provide free of charge such items as labour, materials, electricity, fuel, water, stores, apparatus and instruments as may be reasonably demanded by the Employer/Inspector or his authorized representative to carry out effectively such tests of the equipment in accordance with the Contract and shall give facilities to the Employer/Inspector or to his authorized representative to accomplish testing.
- 2.5.9. The inspection by Employer and issue of Inspection Certificate thereon shall in no way limit the liabilities and responsibilities of the Contractor in respect of the agreed quality assurance programme forming a part of the Contract.
- 2.5.10. The Employer will have the right of having at his own expenses any other test(s) of reasonable nature carried out at Contractor's premises or at site or in any other place in addition of aforesaid type and routine tests, to satisfy that the material comply with the specification.
- 2.5.11. The Employer reserves the right for getting any field tests not specified in respective sections of the technical specification conducted on the completely assembled equipment at site. The testing equipment for these tests shall be provided by the Employer.
- 2.5.12. The Employer intends that type tests and additional type tests are conducted on Power/Distribution Transformers, Pin & Disc Insulators, 33 kV/11 kV LT AB cables, Conductors, 66 kV / 33 kV & 11 kV Vacuum circuit breaker, Battery Charger and energy meter. The price of conducting type tests and additional type tests shall be included in Bid price.
- 2.5.13. In case the contractor opts to procure these items from more than one manufacturer, the type test shall be conducted in respect of all the manufactures. No type test / repeat type test charges shall be paid by owner.
- 2.5.14. Purchaser reserves the right to witness any or all the type tests.

2.6. PRE-COMMISSIONING TESTS

On completion of erection of the equipment and before charging, each item of the equipment shall be thoroughly cleaned and then inspected jointly by the Employer and the contractor for correctness and completeness of

installation and acceptability for charging, leading to initial pre-commissioning tests at Site. The list of pre-commissioning tests to be performed is given in respective chapters or as included in the Contractor's quality assurance programme.

2.7. COMMISSIONING TESTS

All required instrumentation and control equipment will be used during such tests and the contractor will use all such measuring equipment and devices duly calibrated as far as practicable. However, the Contractor, for the requirement of these tests, shall take immeasurable parameters into account in a reasonable manner. The tests will be conducted at the specified load points and as near the specified cycle condition as practicable. The contractor will apply proper corrections in calculation, to take into account conditions, which do not correspond to the specified conditions.

2.7.1. Any special equipment, tools and tackles required for the successful completion of the Commissioning tests shall be provided by the contractor, free of cost.

2.8. The specific tests to be conducted on equipment have been brought out in the respective chapters of the technical specification. However where the pre-commissioning tests have not been specified specifically they shall be as per relevant IS code of practice or as mutually agreed.

2.9. The Contractor shall be responsible for obtaining statutory clearances from the concerned authorities for commissioning and operation of the equipment including the Electrical Inspector. Necessary fee to perform these works shall be paid by Employer.

3. Documentation

3.1. GENERAL

3.1.1. To ensure that the proposed systems conform to the specific provisions and general intent of the Specification, the Contractor shall submit documentation describing the systems to employer for review and approval. The contractor shall obtain approval of employer for the relevant document at each stage before proceeding for manufacturing, system development, factory testing, site testing, training etc. The schedule for submission/approval of each document shall be finalised during the discussions before placement of the contract, this schedule shall be in line to overall project schedule.

3.1.2. Each document shall be identified by a Contractor document number, the employer document number, and the employer purchase order number. Where a document is revised for any reason, each revision shall be indicated by a number, date, and description in a revision block along with an indication of official approval by the Contractor's project manager. Each revision of a document shall highlight all changes made since the previous revision.

3.1.3. All technical description, specifications, literature, correspondence, prints, drawings, instruction manuals, test reports(both factory and at site), progress photographs, booklets, schedules and all supplementary data or documents furnished in compliance with the requirements of the Contract, shall become the property of the Employer and the costs shall be considered as included in the Contract price.

3.1.4. The Contractor shall be responsible for any time delay, misinterpretation, error and conflict during design, manufacturing, testing and erection of the Works resulting from non-compliance with the requirements of this Specification.

3.1.5. The Employer shall have the right to make copies of any documents, data, reports, information etc. supplied by the Contractor in connection with the Works. The Employer shall not impart the information of these documents to any other manufacturer or competitor but he shall be free to use these for preparation of technical papers, reports etc.

3.1.6. All documentation shall be in English language.

3.2. REQUIREMENTS FOR SUBMISSION OF DOCUMENTS, INFORMATION AND DATA BY THE CONTRACTOR

3.2.1. The Contractor shall submit to the Employer all documents in accordance with an approved schedule of submissions and shall submit any further information (in the form of drawings, documents, manuals, literature, reports etc.) when asked by the Employer while commenting/approving any drawings/documents etc.

3.2.2. The documents which are subject to the approval of the Employer shall be identified by the Contractor with the stamp "FOR APPROVAL". All other documents shall be submitted to the Employer for information and shall be identified by the Contractor with the stamp "FOR INFORMATION".

3.2.3. The sequence of submission of the documents shall be subject to the approval of the Employer. The sequence of submissions of all documents shall be such that the necessary information is available to enable the Employer to approve or comment the document.

3.2.4. The Contractor shall supply 4 hard copies of all drawings and documents.

3.2.5. In case a "SUBSEQUENT" revision of any document is made due to any reason whatsoever, a revision of the same, highlighting the changes shall be resubmitted for the Employer's specific approval/information.

3.3. DOCUMENTS FOR APPROVAL

3.3.1. The Employer shall be allowed fifteen (15) calendar days to approve the Contractor's submissions. The submissions for approval, shall be returned to the Contractor marked in one of the following ways :

Category I:	Approved
Category II:	Approved with Comments.
Category III:	Returned for correction.
Category IV :	For information

3.3.2. The first notations "I" or "II" shall be deemed to permit the Contractor to proceed with the work shown on the document, except in the case of notation "II" the work shall be done subject to the corrections indicated thereon and/or described in the letter of transmittal. The Contractor shall bear the full responsibility for proceeding with the Works prior to receipt of the release in notation "I" from



the Employer.

- 3.3.3. In case of notation "II", the Contractor shall include the alterations required & resubmit the document within fifteen (15) days from date of Employer's letter of transmittal.
- 3.3.4. In case of notation "III", the Contractor shall include the alterations required and resubmit the document to the Employer, within fifteen (15) days, from date of letter of transmittal, so that such document can be returned with the notation "I" or "II".
- 3.3.5. It may also be noted that the approval/commenting by the Employer does not relieve the Contractor of any of his contractual obligations and his responsibilities for correctness of dimensions, materials, weights quantities or any other information contained therein, as well as the conformity of designs with Indian Statutory Laws and the Technical Specifications as may be applicable. The approval also does not limit the Employer's rights under the Contract.
- 3.3.6. The approved documents shall be considered as the working documents. However the Technical Specification and connected documents shall prevail over these documents in case a decision is required on interpretation.

3.4. DOCUMENTS FOR INFORMATION

The Contractor shall not delay the Works pending the receipt by the Contractor of the comments on documents submitted to the Employer for information. However, the Employer shall have the right to comment on all the documents submitted by the Contractor, when, in the opinion of the Employer the document does not comply with the Contract or otherwise. The Contractor shall satisfactorily demonstrate that the information contained in the aforesaid document does meet the requirements of the Contract or revise the document in order that the information shall comply with the requirements of the Contract.

3.5. BASICREFERENCE DRAWINGS

- 3.5.1. The reference drawings are enclosed with the bid document, which forms a part of the specification. The contractor shall develop a new layout in line with the specification and take the approval of the EMPLOYER. The contractor shall maintain the overall dimensions of the substation, buildings, bay length, bay width, phase to earth clearance, phase to phase clearance and sectional clearances, clearances between buses, bus heights but may alter the locations of equipment to obtain the statutory electrical clearances as required for the substation.
- 3.5.2. All drawings submitted by the Contractor including those submitted at the time of bid shall be in sufficient detail to indicate the type, size, arrangement, material description, Bill of Materials, weight of each component, break-up for packing and shipment, dimensions, internal & the external connections, fixing arrangement required and any other information specifically requested in the specifications.
- 3.5.3. Each drawing submitted by the Contractor shall be clearly marked with the name of the Employer, the unit designation, the specifications title, the specification number and the name of the Project. If standard catalogue pages are submitted, the applicable items shall be indicated therein. All titles, noting, markings and writings on the drawing shall be in English. All the dimensions should be in metric units.

- 3.5.4. Further work by the Contractor shall be in strict accordance with these drawings and no deviation shall be permitted without the written approval of the Employer, if so required.
- 3.5.5. The review of these data by the Employer will cover only general conformance of the data to the specifications and documents interfaces with the equipment provided under the specifications. This review by the Employer may not indicate a thorough review of all dimensions, quantities and details of the equipment, materials, any devices or items indicated or the accuracy of the information submitted. This review and/or approval by the Employer shall not be considered by the Contractor, as limiting any of his responsibilities and liabilities for mistakes and deviations from the requirements, specified under these specifications and documents.
- 3.5.6. All manufacturing and fabrication work in connection with the equipment prior to the approval of the drawings shall be at the Contractor's risk. The Contractor may make any changes in the design which are necessary to make the equipment conform to the provisions and intent of the Contract and such changes will again be subject to approval by the Employer. Approval of Contractor's drawing or work by the Employer shall not relieve the contractor of any of his responsibilities and liabilities under the Contract.
- 3.5.7. All engineering data submitted by the Contractor after final process including review and approval by the Employer shall form part of the Contract Document and the entire works performed under these specifications shall be performed in strict conformity, unless otherwise expressly requested by the Employer in Writing.

3.6. PRE-DISPATCH INSPECTION:

Pre-dispatch inspection shall be performed on various materials at manufacturer's work place for which contractor shall be required to raise requisition giving at least 10-day time. Depending on requirement, inspection shall be witnessed by representatives of Employer, TPIA and/or REC/MoP.

The contractor shall ensure receipt of material at site within 21 days from date of receipt of dispatch instructions. In case materials are not received within 21 days from date of issue of dispatch instruction, the dispatch instruction shall stand cancelled. In the event of delay in receipt of materials beyond 21 days due to reasons not attributed to turnkey contractor/supplier, suitable time extension may be permitted by the Employer. All expenditure incurred by Employer in performance of dispatch instruction shall be recovered from turnkey contractor.

The turnkey contractor shall ensure that pre-dispatch inspection for materials are intimated only when the material is completely ready for inspection. On due date of inspection, if it is found that materials are not ready in required quantities or the inspection could not be carried out due to non-availability of requisite calibrated certificate of instruments with manufacturer, closing of works on scheduled date of inspection, non-availability of sufficient testing/material handling staff at manufacturer works etc, all expenditures incurred on deployment of various inspecting officials along with a fine of Rs 50,000/- shall be recovered from the bills of the agency and re-inspection shall be carried out on expense of contractor. 2nd such situation at same manufacturer/supplier shall result in rejection of name of manufacturer from list of approved vendors/sub-vendors. In case sub-standard materials (old component, re-cycled materials, re-used core material, re-used transformer coil material etc) offered for inspection and are noticed during the inspection, materials shall be rejected and approval of sub-vendor shall also be cancelled for all SAUBHAGYA projects.

4. Project Management Agency (PMA)

Employer shall appoint a Project Management Agency (PMA) to assist them in Project Planning and



Implementation of the project as under:

4.1. Project Planning and Implementation:

- 4.1.1. Assisting Employer in preparation of detailed work implementation schedule in association with turnkey contractor.
- 4.1.2. Coordination & monitoring of project implementation activities.
- 4.1.3. To monitor DPR wise monthly physical & financial progress of the scheme, prepare a consolidated report & submit to utility for onward submission to Nodal Agency.
- 4.1.4. Identification of anticipated bottlenecks in project implementation & preparation of remedial action plan in consultation with Employer & Contractor.
- 4.1.5. To assist Employer in addition of the created assets to their asset register.
- 4.1.6. Recommend the claim of utility for fund release from Nodal Agency. The recommendation is to be supported by a report on expenditure, progress and constraints if any for timely completion of project.
- 4.1.7. Submit a report to Nodal Agency, regarding Project Completion and expenditure incurred along with recommendation in accordance with the guidelines.
- 4.1.8. To assist utility in supervision of flow of funds in dedicated bank account of projects.

4.2. Quality Monitoring:

- 4.2.1. To prepare a Quality Assurance (QA) Plan
- 4.2.2. To carry out field quality inspection of ongoing/ completed works
- 4.2.3. Joint inspection of material at site on sample basis i.e. 10% of major materials (Poles, Conductor, Meters, Transformers, Cable etc).

5. Guidelines for Quality Monitoring Under Pradhan Mantri Sahaj Bijli Har Ghar Yojana (SAUBHAGYA)

The guidelines as provided by REC is attached at Annexure-B Volume II Section I for execution under the Scheme.



**Annexure-A****Checklist for Quality Assurance****Distribution Transformer Substation**

S. No	Description	Status (Yes/No)	Observations	Location	Picture No.
1	Record capacity of DTR transformer used				
2	Record S. No., make and year of manufacturing of DTR transformer				
3	Safe and adequate access to distribution transformer (DTR) substation				
4	Availability of approved survey report				
5	Proper load survey is performed of the locality for perspective consumers while deciding capacity and location of DTR				
6	Expected loading of transformer using 5 years growth is performed in survey report				
7	Proper alignment of substation structure with 11 KV line				
8	Record type of poles/support used for DTR substation				
9	Record type of foundation used				
10	Proper muffing is provided on steel supports of DTR substation				
11	If DTR substation is in water logging area, its foundation is grouted in cement concrete				
12	Proper verticality of substation supports				
13	Proper pole to pole distance of substation supports.				
14	Proper erection of jumpers and connection to DTR transformers without any bent				
15	Proper binding of insulators				
16	Stay plates are properly grouted in cement concrete mixture to support DTR substation structure (if erected)				
17	Proper tensioning is there on stay set				
18	Proper alignment of stay wire with overhead conductor				
19	Proper erection of stay clamp using 12 mm dia nuts and bolts				



S. No	Description	Status (Yes/No)	Observations	Location	Picture No.
20	Proper galvanization of stay wire				
21	Thimble is provided on turn buckle of stay set				
22	Stay set installation is provided with guy insulator				
23	Proper phase to phase and phase to ground clearances maintained on the substation jumpers				
24	Steel overhead structure is properly earthed using 8 SWG wire/G.I. flat?				
25	Each 11 kV overhead equipment including transformer are individually earthed using 8 SWG Earth wire/ GI flat				
26	Danger plate is installed at appropriate height using proper size clamp. Record type and size of clamp				
27	Proper anti-climbing device (barbed wire/spike) installed at appropriate height on individual support. Record quality of wrapping of barbed wire				
28	Substation is numbered				
29	Individual substation pole is imposed/painted with the name of scheme				
30	Surface of the PCC poles is finished and there are no steel wire visible				
31	No physical damages appeared on PCC pole surface				
32	GI flat to GI flat connection using at least 2 sets of GI nut bolts and washers				
33	8 SWG GI wire/GI Flat is properly dressed with support				
34	GI wire to GI wire jointing is provided using 12 SWG GI nut bolts and washers				
35	GI wire connection to earth pit is using GI nut bolt and washer				
36	GI earth pipe is properly inserted inside earth without hammering				
37	Number of earth pit used for substation earthing.				
38	Pit to pit distance in meters. Is it adequate?				
39	Masonry enclosure is provided over individual earth pits				
40	Funnel is provided over earth pit				
41	Proper jumpering using binding practices/PG clamp				



S. No	Description	Status (Yes/No)	Observations	Location	Picture No.
42	Proper clearances to avoid bird fault on conductors of substation supports				
43	Type and size of overhead conductors used in the substation				
44	Cement-concrete grouting foundation of substation supports				
45	Measure quantum of cement concreting in any one sample support				
46	Measure cement concreting foundation in any one sample of stay set pit				
47	Proper painting/galvanizing done on steel structure				
48	Any sign of rusting found on substation structure/hardware				
49	Any broken insulator found in the substation				
50	Disc Insulators installed precariously (loose bolts/ missing cotter pins)				
51	Separate individual earth connection using GI wire/GI flat is used for neutral earthing with separate pit				
52	Dedicated transformer body earthing using GI wire/GI flat				
53	Bimetallic clamps are provided on 11 kV bushing				
54	No gap between busing seat and bimetallic clamp on LT as well as HT bushing while connecting conductor/cable				
55	Proper lugs are provided on termination of cables				
56	Oil is filled in cup of silica gel breather				
57	Silica gel is blue in colour				
58	Oil control valves are open between transformer tank and breather (wherever used)				
59	Oil leakage from the body/gasket of transformer and from conservator tank				
60	Record level of oil in conservator tank				
61	Transformer installed precariously (Nut / bolts / side bracing missing)				
62	Transformer is fitted with 12 mm dia nut bolts on its base channel				
63	Transformer belting is provided				
64	Dimension of transformer base channel				
65	Individual lightening arrestor are earthed with				



S. No	Description	Status (Yes/No)	Observations	Location	Picture No.
	dedicated separate earth pit				
66	LA jumper connections is missing/ not proper				
67	LA is charged/ installed but not meggared				
68	Isolators/AB switch are properly aligned and its operation is smooth				
69	Operating handle (not missing eye bolt) of isolator/AB switch is earthed using flexible cable				
70	No joint in between entire length of operating pipe of isolator/AB switch				
71	Guiding hook is provided for isolator pipe movement				
72	Alignment of male and female contacts of isolators/AB switch and no spark during normal use				
73	Proper fuse wire is used in DO fuse/HG fuse				
74	Arching Horn is missing/ not aligned / not proper				
75	Proper size of LT cable are used between transformer and LTDB				
76	lockability and proper closing of door of LTDB				
77	Gland plate and glands are used for cable entry in LTDB				
76	No unused holes on gland plates				
77	Availability of LTDB equipment as per approved drawing and scope of work like isolator, fuse, switch, bus bar, MCCB, MCB etc.				
78	Installation of DTR as per BIS specification				
79	LTDB earthing at different points using 8 SWG GI wire				
80	Proper painting and No physical damages on LTDB				
81	Suitable loop length of cables in LTDB				
82	3 Nos earthing pit and earth mat /risers using 50X6mm GI Flat are used as under:				
a	a) Earth Pit – 1 for Transformer Neutral,				
b	b) Earth pit - 2 for Lightning Arrester,				
c	c) Earth pit – 3 for Equipment body earthing				
83	Metering of DTR substation				
84	Type of meters used and its healthiness				
85	Quality of painting/galvanizing on substation structure				



S. No	Description	Status (Yes/No)	Observations	Location	Picture No.
86	DTR is newly supplied				
87	PG Clamps are used (wherever needed as per drwg- Jumper etc)				
88	Energy meters (@ 11 kV feeder , DT , consumer) at installed at appropriate height				
89	Earthing Electrodes short/missing				
90	Commissioning Defect: DT charged/installed but not merged				
91	Fasterers (Nuts/ Bolt/ Clamps /Connector) size not as per drawing /specification				
92	Fasteners (Nuts / bolts/ Clamps / connectors) in precarious state				
93	Poles not erected properly (inadequate or missing brick bat/ foundation)				
94	Stay installation is not proper : guy insulator missing ;inadequate depth				
95	Earthing wire diameter undersize				
96	Danger plate missing/improper				
97	Earthing wire not secured / not dressed				
98	Barbed wire missing/improper				
99	DTR ground electrodes far too close				
100	Earth pit to earth pit clearance not maintained				
101	HT Fuse not provided				
102	HT fuse unit jumpering not connected properly				
103	MCCB of lower rating than specified in LOA				
104	MCCB not installed				
105	Inferior quality of Distribution Board used (makeshift, locally fabricated DBs)				

LT Line

S. No	Description	Status (Yes/No)	Observations	Location	Picture No.
1	Availability of approved survey report with Single line diagram				
2	Correct alignment of LT line				
3	Type of poles used as per scope of the work				
4	Type of foundation used as per scope of work				



S. No	Description	Status (Yes/No)	Observations	Location	Picture No.
5	If line is passing through water logging area and its foundation is grouted in cement concrete				
6	Proper verticality of poles				
7	Any deflecting tension on LT pin insulator				
8	Proper tensioning of overhead conductor/LT cable/ABC Cable				
9	Any knot/wrapping of overhead conductor /LT cable /ABC Cable is there during erection				
10	Proper binding of insulators cable both / tension work is done				
11	Stay plates are properly grouted in cement concrete mixture				
12	Proper tensioning is there on stay set				
13	Proper alignment of Stay wire and stay set with overhead conductor is there to nullify tension				
14	Proper erection of stay clamp using 12 mm dia nuts and bolts and 50x6 mm (or more) size clamp				
15	If every 6th pole in a section of line is provided with stay sets to avoid line deflection				
16	Proper galvanization of stay wire/stay set				
17	Thimble is provided on turn buckle of stay set				
18	Proper phase to phase clearances are maintained on the line				
19	Steel overhead structure is properly earthed using 8 SWG wire				
20	Each LT pole individually earthed using 8 SWG Earth wire and separate Earth pit/Earthing coil/Earth spike				
21	Quality and size of danger plates is as per scope of work				
22	Danger plate is installed at appropriate height using proper clamp as per scope of work				
23	Anti-climbing device (barbed wire/spike) are installed at appropriate height on individual support				
24	Individual pole is numbered				
25	Individual pole is imposed/painted with the name of scheme				
26	Surface of the PCC poles is finished and there are no steel wire visible				
27	No physical damages appeared on PCC pole surface				



S. No	Description	Status (Yes/No)	Observations	Location	Picture No.
28	Cradle guard earthing is provided on each road crossing or on each LT line crossing				
29	Proper tensioning of the cradle guard wires				
30	Separate earthing on both the sides of road/line for cradle guarding are there				
31	8 SWG G.I. wire is properly dressed with support for V-Cross arm/Channel/Top clamp earthing				
32	GI wire to GI wire jointing is provided using 12 SWG GI nut bolts and washers				
33	GI wire connection to earth pit is using 12 mm GI nut bolt and washer				
34	Earth pipe is properly inserted inside earth without pipe hammering				
35	Masonry enclosure is provided over individual pipe earth pits				
36	Funnel is provided over pipe earth pit				
37	Jumpering using best binding practices/PG clamp				
38	Proper conductor clearances to ground is there to avoid bird fault on end sectionizer support where disc insulator are used				
39	Average pole to pole span length in the line. It should not be less than 50 m.				
40	If Pole to pole span is less than 50 m, record the reason with pole numbers				
41	Number of poles used per kilometre of the line				
42	Type and size of overhead conductors/ABC cable used in the line				
43	Shuttering is used during casting of cement concrete foundation				
44	Cement-concrete grouting foundation of end supports				
45	Quantum of cement concreting in any one sample support				
46	Cement concreting foundation in any one sample of stay set pit				
47	Proper painting is done on steel structure				
48	Any broken insulator found in the line				
49	Surface finish of painting on Steel tubular pole/RSJ/H Pole/Rail pole about 2 m from bottom and above 2 m				



S. No	Description	Status (Yes/No)	Observations	Location	Picture No.
50	Possible damage on ABC cable surface				
51	Piercing connections are used to take-off connection from ABC cable				
52	Muffing is used in steel steel tubular poles, rail pole, RS joint/H beam Supports				
53	Adequate tree cutting on either side of line done				
54	Pole to pole schedule enclosed with profarma				

11 KV Line

S. No	Description	Status (Yes/No)	Observations	Location	Picture No.
1	Availability of approved survey report with single line diagram				
2	Correct alignment of 11 kV line				
3	Type of poles used as per scope of the work				
4	Type of foundation used as per scope of work				
5	Record whether line is passing through water logging area and its foundation is grouted in cement concrete				
6	Proper verticality of poles				
7	Cross-bracing on Double poles are provided				
8	Conductors are passing through the top groove of the insulator (creepage distance compromised)				
9	More than one joint in one span				
10	Any deflecting tension on 11 KV pin insulator				
11	Proper tensioning of overhead conductor				
12	Any knot/wrapping of overhead conductor is there during erection				
13	Proper binding of insulators is done				
14	Stay plates are properly grouted in cement concrete mixture				
15	Proper tensioning is there on stay set				
16	Proper alignment of Stay wire with overhead conductor is there to nullify tension				
17	Guy insulator, anchor plate/ thimble/ hardware are provided with stay set				
18	Proper erection of stay clamp using 12 mm dia nuts and bolts and 50x6 mm (or more) size clamp				



S. No	Description	Status (Yes/No)	Observations	Location	Picture No.
19	If every 6th pole in a section of line is provided with stay sets to avoid line deflection				
20	Proper galvanization of stay wire and stay set				
21	Thimble is provided on turn buckle of stay set				
22	Proper phase to phase clearances are maintained on the line				
23	Steel overhead structure is properly earthed using 8 SWG wire				
24	Each 11 kV pole individually earthed using 8 SWG Earth wire and separate Earth pit/Earthing coil/Earth spike				
25	Quality and size of danger plates is as per scope of work				
26	Danger plate is installed at appropriate height using proper clamp as per scope of work				
27	Anti-climbing device (barbed wire/spike) are installed at appropriate height on individual support				
28	Individual pole is numbered				
29	Individual pole is imposed/painted with the name of scheme				
30	Surface of the PCC poles is finished and there are no steel wire visible				
31	No physical damages appeared on PCC pole surface				
32	Cradle guard earthing is provided on each road crossing or on each LT line crossing				
33	Proper tensioning of the cradle guard wires				
34	Proper Guard wires are provided in case of Road crossing as per drawing specification				
35	8 SWG G.I. wire is properly dressed with support for V-Cross arm/Channel/Top clamp earthing				
36	GI wire to GI wire jointing is provided using 12 SWG GI nut bolts and washers				
37	GI wire connection to earth pit is using 12 mm GI nut bolt and washer				
38	Earth pipe is properly inserted inside earth without pipe hammering				
39	Masonry enclosure is provided over individual pipe earth pits				
40	Funnel is provided over pipe earth pit				



S. No	Description	Status (Yes/No)	Observations	Location	Picture No.
41	Proper jumpering using binding practices/PG clamp				
42	If under sized conductor used				
43	Proper conductor clearances to ground is there to avoid bird fault on end sectionizer support where disc insulator are used				
44	Proper pole to pole span length in the line. It should not be less than 50 m.				
45	If Pole to pole span is less than 50 m, record the reason with pole numbers				
46	Number of poles used per km of the line				
47	Record type and size of overhead conductors used in the line				
48	Shuttering is used during casting of cement concrete foundation				
49	Cement-concrete grouting foundation of end supports				
50	Measure quantum of cement concreting in any one sample support				
51	Measure cement concreting foundation in any one sample of stay set pit				
52	Proper painting is done on steel structure				
53	Disc Insulators are installed precariously (loose bolts/ missing cotter pins)				
54	D -shaped loop for jumpers are maintained				
55	Any broken insulator found in the line				
56	Surface finish and painting on Steel tubular pole/RSJ/H Pole/Rail pole				
57	Adequate tree cutting on either side of line done				
58	Pole to pole schedule enclosed with proforma				
59	Pole numbering with "SAUBHAGYA " inscription not done (properly)				
60	Engraving of poles (Name of Manufacturer, SL Nos etc.) not done				
61	Line Spacers not used				
62	Guy insulator not used in stay wire				
63	Inadequate length of barbed wire				



S. No	Description	Status (Yes/No)	Observations	Location	Picture No.
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LT Domestic Service connection to Household

S. No	Description	Status (Yes/No)	Observations	Location	Picture No.
1	Approximate length of service line taken from nearby LT pole/Distribution Board/Distribution box				
2	Following materials are provided in the premises of consumer:				
A	Energy meter				
B	Metal meter box				
C	Double pole miniature circuit breaker				
D	Meter board				
E	Earthing point				
F	LED lamp				
3	The consumer meter has been tested at distribution licensee's test laboratory,				
4	The size of service cable is 2.5 mm ² twin core (unarmoured) PVC insulated cables with aluminium conductors				
5	Service cable is free of joints				
6	The size of the bearer wire is 3.15 mm (10 SWG) GI wire (55-95 kg. quality)				
7	Suitable meter board has been installed as per specification				
8	Suitable Switch Board has been installed (as per specification)				
9	Single phase Energy meter is installed as per specification with acrylic cover				
10	Type and size of PVC pipe/GI pipe support as per specification				
11	Proper ground clearance of service line as per the guidelines				
12	GI pipe/MS angle (35mmx35mmx5mm) clamped firmly using 40x3mm MS flat clamps at at-least two locations				
13	Use of GI Medium Class pipe as per specification				



S. No	Description	Status (Yes/No)	Observations	Location	Picture No.
14	Use of double pole miniature circuit breaker as per specification				
15	Meter box for single phase meter made provided for meter protection of the specified dimensions				
16	Reel Insulator are provided as per requirements				
17	Egg Insulator as per requirements				
18	Protection and Earthing as per specification and CEA regulations has been provided at consumer premises				
19	Each Household has been provided with internal house wiring and accessories between switch board and Angle Holder as per specifications				
20	All the construction activities related to power supply in the households have been performed as per REC construction standards.				
21	Wattage of LED lamp provided at consumer premises				
22	Type of holder used for LED lamp				
23	Following ISI marked internal electrification material in consumer premises:				
a	5A socket				
b	5A 3 pin piano type switch				
c	5A pendant holders				
24	Type and size of following boards:				
a	Switch board				
b	Meter board				
25	Height of switch board in consumer premises				
26	Protection from direct sunlight and rain water to meter box at consumer premises				
27	Proper tensioning of service cable at consumer premises				

Checklist for inspection of REDB (Substation)

S.N.	Description	Status (Yes/No)	Observation	Picture No.	Location as per SLD

1	Major Materials (CT/PT/CB/X'mer/Battery/ Panels /Structures/Conductor) as per specifications—				
2	Record S. No., make and year of manufacturing of Power transformer				
3	Major Materials dispatched without inspection				
4	Construction as per Approved Drawing				
5	Civil works FQP documentation maintained during construction				
6	Equipment (name it) provided in the BOQ/ drawing but not installed				
7	Verification of pre-commissioning and commissioning testes of substation equipment i.e. Circuit Breaker, CT, PT, transformer, Charger, Battery, Relays, Control Panels, Switchgear, 11 KV cable etc				
8	Present condition of main equipment				
9	Functional Status of Transformer: WTI, OTI etc, Relays, Battery Charger, Battery, CB, CT, PT, Energy Meter, Control & Relay panel				
10	Transformer oil tested				
11	Transformer Relays, CT, PT, CB, Switchgears, battery sets, etc charged after test				
12	Equipment charged after commissioning test				
13	Gravel size proper				
14	Earthing of main equipment, fence etc done properly				
15	Sub Station fencing provided				
16	Cable trench made with cable trays or cables lying on trench floor				
17	Whether Cable trenches have suitable slope to ensure automatic draining of rainwater				
18	Proper storage of equipment				
19	Cables tied on cable trays				
20	Glands, lugs used (wherever need at cable entries)				
21	Dead end marking for cables is done				
22	Earth mat provided				
23	Undersized conductor/ cables used				
24	Correct size of earthing conductor – flats, GI wires etc used				
25	Acid proof floor used in battery room				



26	Fasteners (nut, bolts, clamps-connectors, hardware etc) as per specification —				
27	Switchgear rubber mats, chequer plates not provided				
28	FQP for material receipt and storage maintained by PIA —				
29	Name of Feeder on Control Panel.				
30	Name of Feeder on Outgoing DP structure				
31	Working platform on 33 KV and 11 KV outdoor VCB				
32	Name of Substation board on the entrances				
33	Painting of control room, water supply position in Substation				
34	General sanitation arrangement in the control room building				
35	Internal Lighting in the substation control room				
36	Closed fencing of the substation yard				
37	Approach road to Power Transformer foundation				
38	Water logging/ Earth filling in the yard trench				
39	Partition wall between two Power Transformers				
40	Availability of Earthing Rod in the substation				
41	Availability of Permit & Work Book				
42	Tracing of Earth connection of Power/ Distribution Transformer up to Earth Pit				
43	Connection at Earth Pit				
44	Jointing & Clamping of Earth Conductors				
45	All Terminal Blocks at CTs/PTs/Breaker/Panels/Junction Box				
46	Earthing & Fencing is as per specification				
47	Cable trench cover inside the control room and in the yard.				
48	Exhaust Fan in the Battery Room				
49	Inter Battery connections				
50	Battery Charger connection				
51	Earthing of Control Panel				
52	Termination of power cables at 11 KV sides/LT sides of Power and Station Transformer.				
53	Inside pic of distribution board of station transformer				



54	Take-Overall picture of station transformer				
55	Connection of Lightning arrester				
56	Approximate clearance of live part in the substation				
57	Oil leakage in Power/Station Transformer				
58	Area lighting in the substation				
59	Material diagram of substation in the control room				
60	List of authorized operational personnel in the substation				
61	Connection at the bus-bar jumpers				
62	Loop cables LT/HT/Control				
63	Tagging on cable terminals				
64	Work clearance on control panels and sufficient lightening on the control panel				

Annexure-B**Guidelines For Quality Monitoring Under
Pradhan Mantri Sahaj Bijli Har Ghar Yojana (SAUBHAGYA)**GOVERNMENT OF INDIA
MINISTRY OF POWERREC
REC**Guidelines for Quality Monitoring under
Pradhan Mantri Sahaj Bijli Har Ghar Yojana (SAUBHAGYA)**

State Power Utility shall be solely responsible & accountable for assuring quality works under **Pradhan Mantri Sahaj Bijli Har Ghar Yojana (SAUBHAGYA)**. State Power Utility shall formulate a comprehensive Quality Assurance (QA) plan with an objective to build Quality Infrastructure under Saubhagya. The QA and Inspection Plan shall be integral part of the contract agreement with turnkey contractor or equipment supplier/vendor and erection agency as the case may be in case of partial turnkey and departmental execution of works. Documentation with regard to Quality Assurance & Inspection plan shall be maintained by the utility and kept in proper order for scrutiny during the course of project execution and for future reference. The utility has to ensure that the quality of material/equipment supplied at site and field execution of works under the project is in accordance with Quality Assurance & Inspection plan.

Quality checks to be ensured by State Power Utility: State Power Utility shall strictly ensure QA checks during day to day course of project execution, which are as follows:

- Pre-dispatch inspection of all the materials to be utilised under Saubhagya as approved Technical Specification/GTP/Drawings/Data Sheet etc. and as per latest national & international standards.
- Verification of infrastructures created in villages under Saubhagya as per approved Quality Plan/Drawings/Data Sheet etc.
- 100% verification of HHs connections released under Saubhagya.

Saubhagya scheme shall have a single tier Quality Assurance Monitoring (QAM) in addition to in-house process quality checks followed by the State Power Utility/Project Implementing Agency during the execution of the project.

Rural Electrification Corporation (REC), the nodal agency for the *Saubhagya* scheme shall operate the Quality Assurance Mechanism. REC shall designate CPM/Sr. CPMs of the respective state(s) as State Quality Assurance Coordinator (SQAC) at its state office and REC corporate office shall designate an officer not below the level of GM/AGM/DGM as REC Quality Assurance Coordinator (RQAC).

REC shall outsource independent third party agency(ies) designated as REC Quality Monitors (RQM) to ensure quality of materials procured and shall also verify quality of works executed under the *Saubhagya* scheme. RQM shall carry out pre-dispatch inspection of major materials like Poles, Conductor, Cables, Transformers, and Energy Meters etc. randomly in any single lot at the works of manufacturer. RQM shall verify quality of works in five (5) percent villages where infrastructure works has been carried out with 100% verification of HHs connections released under *Saubhagya*.

(Note: Villages includes Habitations/Dhani/Majra/Tolas/Thandus etc.)

Draft Guidelines for Quality Monitoring under SAUBHAGYA Scheme

Material Inspection:

At least one type of important materials shall be inspected. The inspection/testing/witnessing of acceptance tests of materials shall be carried out by RQM as per approved Technical Specifications/Datasheet/GTP/ Drawings as per latest applicable national & international standards. The important materials which have been identified for pre-dispatch inspection at manufacture premises are Distribution Transformer, Conductor, Energy Meter (3-Phase & 1-Phase), Pole, Insulators and Cables etc.

Sampling of materials from field: During the execution of scheme, if at any point of time, it is found that inferior quality of materials has been used by State Power Utility under *Saubhagaya* without adhering to quality guidelines, REC inspector/officials shall identify the materials for testing at CPRI/ERDA testing laboratories across the country from site. *All expenditures that shall incurred towards packing, transport, inspection, testing charges etc. are to be borne by the State Power Utility or the executing agency.*

Villages/Household Inspection:

Villages'/Households connections released are to be inspected as per approved FQP/Drawings/Technical Specifications/Datasheet/survey report. The villages'/Households inspection that shall be carried out by RQM is as hereunder:

100% verification of household connections released shall be carried out in 5% villages where infrastructure has been created under Saubhagaya in two stages. Stage-I & Stage-II inspections shall cover 2.5% villages respectively based on actual progress reported by State Power Utility. Stage-I inspection shall be issued and completed when physical progress of 40% and 50% is achieved whereas Stage-II inspection shall be issued and completed when physical progress of 80% and 90% is achieved in a project/district.

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Abbreviations:

MoP	-	Ministry of Power
REC	-	Rural Electrification Corporation Ltd
PIA	-	Project Implementation Agency
QAM	-	Quality Assurance Mechanism
UE	-	Un-Electrified
IE	-	Intensive Electrified
HH	-	Households
QM	-	Quality Monitor
QA	-	Quality Assurance
FQP	-	Field Quality Plan
MQP	-	Manufacturing Quality Plan
PQAC	-	PIA Quality Assurance Coordinator
RQAC	-	REC Quality Assurance Coordinator
GTP	-	Guaranteed Technical Particulars
CPSU	-	Central Public Sector Undertaking
SQAC	-	State Quality Assurance Coordinator
RSQAC	-	REC State Quality Assurance Coordinator
CPM	-	Chief Program Manager
RO	-	Regional Office
SO	-	State Office
BPL	-	Below Poverty Line
BOQ	-	Bill of Quantity
Village	-	Village means village with all associated Hamlets/Mauza/Dhani/Thanda etc.

Format for Material Inspection requisition under SAUBHAGYA

1	Name of Scheme	
2	Name of State	
3	PIA (Project Implementing Agency)	
4	Scheme Code	
5	District/Project Name	
6	Mode of Execution	Departmental Execution/ Turn-key Contractor
7	No. of Packages in the project	
8	Name of Turn-key Contractor	
	Address	
	Contact person	
	Tel.No.	
	Email	
9	Name of Material(s)	
	Total Qty. of the project	
	Quantity offered for inspection	
	Quantity already inspected	
10	Proposed date of inspection	Confirmed by PIA
11	Whether approved MQP/GTP/TS/Data Sheets/Drawings available ?	Yes/No(To be enclosed)
12	Reference Letter of contractor/ Supplier offering material for inspection	
13	Manufacturer Name	
	Address	
	Contact person	
	Tel.No.	
	Email	
14	PMA	
	Address	
	Contact person	
	Tel.No.	
	Email	
15	PQCC Name & Designation	
	Tel.No. & Mobile	
	Email	

(Signature of authorized official)
Name of authorized official
Designation

Annexure-II

Assets Identification under SAUBHAGYA Scheme

(As per Clause 8.8, Page 16 of Saubhagya Scheme Guidelines)



Asset identification of following items shall be performed as per Clause 8.8, Page 16 of Saubhagya Scheme Guidelines:

1. **Energy Meter:** All types and sizes of Energy Meter shall have engraved/embossed of SAUBHAGYA official logo, Serial number, month & year of manufacturing and other details as per technical specification of DDUGJY scheme. Meter Cover shall also have engraved/embossed/painted with SAUBHAGYA official logo.
2. **Cable:** All types and sizes of Power Cables shall be sequentially marked through embossing the official logo of Saubhagya scheme at each meter length in addition to length in meter, name of manufacturer, name of purchaser and other details as per of technical specifications of DDUGJY scheme.
3. **LED Lamp:** All types of LED lamp shall have engraving/embossing/painted SAUBHAGYA logo either on base cap or on glass.
4. **Distribution Transformer:** All types and sizes of Distribution Transformer shall be marked as under:
 - a. Oil tank shall have painted through stencil SAUBHAGYA official logo on its body clearly visible from ground. The front size shall not be less than 25mm.
 - b. Transformer body shall be painted with dark maroon colour (shade no 541 as per IS 5, 1949)
 - c. Transformer name plate shall be as per IS 1180 (Part-I): 2014 engraved/embossed with SAUBHAGYA official logo and other details as per standard technical specifications of DDUGJY scheme.
5. **PCC Pole:** All types of PCC Poles shall have engraving/embossing of SAUBHAGYA official logo of size 200x250mm or painted with post-office red colour enamel paint on yellow base of 200x250 mm surface. The specimen is enclosed as *Annexure*.
6. **RS Joist / Steel Tubular Poles:** All types of RS Joist or Steel Tubular poles shall have engraving/embossing of SAUBHAGYA official logo of size 200x250mm or painted with post-office red colour enamel paint on yellow base of 200x250 mm surface. The specimen is enclosed as *Annexure*.

Guidelines for Asset Identification under SAUBHAGYA scheme.

Note: If any DISCOM/PIA is using pole from its own store which has already been procured by them, then the Pole shall be painted SAUBHAGYA with post-office red colour paint over yellow colour background as per Annexure.

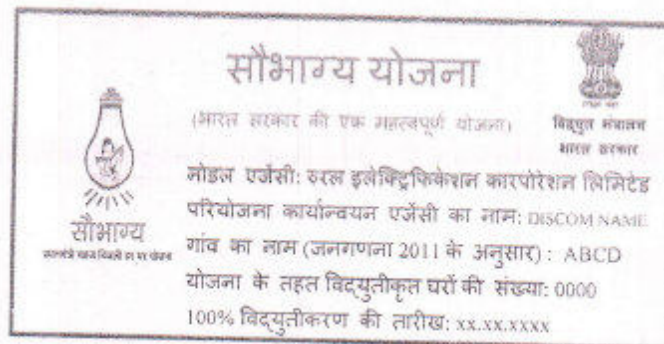
Specification of Sign Board for villages/Habitation:

The SAUBHAGYA sign boards shall be provided in villages where households' connections have been released under the scheme. The board shall be erected at a suitable location preferably near the office of Sarpanch/Gram Panchayat/or any other prominent location.

Specifications of sign board as indicated below:

S. No.	Components	Desired Specification
1	Iron sheet	MS sheet 14 Gauge (1.6mm thickness)
2	Size of Iron sheet	3 Feet x 4 Feet (Length x Breadth)
4	Painting on Board	Enamel paint with red oxide base coat
5	Printing on Board	Colour printing by Screen printing method
6	Height of Board from ground level (Between ground level and bottom part of board)	5 feet
7	Support L type angle	3" X 3", 6 mm thickness
8	Length of angle to be buried in the ground	1.50 Feet with 1 Feet hole pass inside

- The name of village should be included on the sign board.
- The sample copy of signboard for Un-electrified villages is hereunder:



Guidelines for Asset Identification under SAUBHAGYA scheme.



VOLUME-II: Section-II Bid Forms (Bid Envelope)



BID Forms (Bid Envelope)

Bid Proposal Ref. No.:.....

Date:

To,

**Jodhpur Vidyut Vitran Nigam Limited
Office of the SE (CSS), New power house premises,
Heavy Industrial Area, Jodhpur 342001 (Rajasthan),
Phone: 0291-2742336
Fax: 0291-2745259,
E - Mail: secssjodhpur@gmail.com**

Name of Contract: **Rural household electrification works of XXXXXXXX (name of district/
circle) under Jodhpur Discom in Rajasthan under SAUBHAGYA Scheme
(Specification No.:XXXXXXXXXXXXXXXXXXXX).**

Dear Sir/ or Madam,

1.0 Having examined the Bidding Documents, including Amendment Nos. (*Insert Numbers*) dated the receipt of which is hereby acknowledged, we the undersigned, offer to design, manufacture, test, deliver, install and commission (including carrying out Trial operation, Performance & Guarantee Test as per the provision of Technical Specification) the Facilities under the above-named Project in full conformity with the said Bidding Documents. In accordance with ITB Clause 9.1 of the Bidding Documents, as per which the bid shall be submitted by the bidder under "Single Stage - Bid Envelope" procedure of bidding. Accordingly, we hereby submit our Bid, in Bid envelope i.e. Techno – Commercial Part. Price Part i.e. Price is uploaded. We have submitted and uploaded on-line price bid through e-mode to be opened subsequently.

2.0 Attachments to the Bid Form (Bid Envelope)

In line with the requirement of the Bidding Documents, we enclose herewith the following Attachments:

(a) Attachment 1 Deleted

(b) Attachment 2: A power of attorney duly authorized by a Notary Public indicating that the person(s) signing the bid have the authority to sign the bid and thus that the bid is binding upon us during the full period of its validity in accordance with the ITB Clause 14.

(c) Attachment 3: The documentary evidence that we are eligible to bid in accordance with ITB Clause 2. Further, in terms of ITB Clause 9.3 (c) & (e), the qualification data has been furnished as per your format enclosed with



the bidding documents [Attachment-3(QR)]. * Further, the required Joint Venture Agreement signed by us and our Partners has also been furnished as per your format [Attachment-3(JV)].

* Delete if not applicable

- (d) Attachment 4: The documentary evidence establishing in accordance with ITB Clause 3, Vol.-I of the Bidding Documents that the facilities offered by us are eligible facilities and conform to the Bidding Documents has been furnished as Attachment 4. A list of Special Tools & Tackles to be used by us for erection, testing & Commissioning and to be handed over to Employer, the cost of which is included in our Bid Price, is also enclosed as per your format as Attachment 4A. A list of Special Tools & Tackles to be brought by the contractor for erection, testing & Commissioning and to be taken back after completion of work, whose cost is not included in our bid price, is enclosed as per your format as Attachment 4B.
- (e) Attachment 5: The details of all major items of services or supply which we propose subletting in case of award, giving details of the name and nationality of the proposed subcontractor/sub-vendor for each item.
- (f) Attachment 6: The variation and deviations from the requirements of the Conditions of Contract, Technical Specification and Drawings (excluding critical provisions as mentioned at clause 6.0 below) in your format enclosed with the Bidding Documents, including, inter alia, the cost of withdrawal of the variations and deviations indicated therein.
- (g) Attachment 7: **[Not Applicable]**
- (h) Attachment 8: Manufacturer's Authorisation Forms - registered/notarized
- (i) Attachment 9: Work Completion Schedule.
- (j) Attachment 10: Guarantee Declaration.
- (k) Attachment 11: Information regarding ex-employees of Employer in our firm.
- (l) Attachment 12: Filled up information regarding Price Adjustment Data as per the format enclosed in the bidding documents
- (m) Attachment 13: **[Not Applicable]**
- (n) Attachment 14: Integrity Pact, in a separate envelope, duly signed on each page by the person signing the bid.
- (o) Attachment 15: Option for Interest bearing Initial Advance payment and Information for E-payment, PF details and declaration regarding Micro/Small & Medium Enterprises
- (p) Attachment 16: Additional Information



- (q) Attachment 17: Declaration for tax exemptions, reductions, allowances or benefits
- (r) Attachment 18: Declaration
- (s) Attachment 19: Bank Guarantee verification checklist
- 3.0 We are aware that, in line with Clause No. 27.1 (ITB), our online price bid is liable to be rejected in case the same contains any deviation/omission from the contractual and commercial conditions and technical Specifications other than those identified in this Bid Envelope.
- 3.1 We are aware that the Price Schedules do not generally give a full description of the Work to be performed under each item and we shall be deemed to have read the technical specifications, scope of works and other sections of the Bidding Documents and Drawings to ascertain the full scope of Work included in each item while filling-in the rates and prices in price schedule quoted and uploaded in e-procurement web-portal.
- 3.2 We declare that as specified in Clause 11.5, Section –II: ITB, Vol.-I of the Bidding Documents, prices quoted by us in the Price Schedules shall be fixed and firm during the execution of Contract except for the permitted items for which Price Adjustment is applicable, as mentioned in Appendix-2 (Price Adjustment) to the Contract Agreement of Volume-I : Section-VI (Sample Forms and Procedures).
- 4.0 We confirm that except as otherwise specifically provided our Bid Prices quoted and uploaded in e-procurement web portal include all taxes, duties, levies and charges as may be assessed on us, our Sub-Contractor/Sub-Vendor or their employees by all municipal, state or national government authorities in connection with the Facilities, in and outside of India.
- 4.1 100% of applicable Taxes and Duties, which are payable by the Employer under the Contract, shall be reimbursed by the Employer after dispatch of equipment on production of satisfactory documentary evidence by the Contractor in accordance with the provisions of the Bidding Documents.
- 4.2 Deleted
- 4.3 Deleted
- 4.4 We confirm that we shall also get registered with the concerned GST Authorities, wherever required.
- 4.5 Deleted
- 5.0 **Construction of the Contract**
- 5.1 We declare that we have studied Clause GCC 2.1 relating to mode of contracting for Domestic Bidders and we are making this proposal with a stipulation that you shall award us two separate Contracts viz 'First Contract' for supply of all equipment and materials including mandatory spares and 'Second Contract' for providing all the services i.e. inland transportation for delivery at site, insurance, unloading, storage, handling at site, installation, testing and commissioning including Trial operation in respect of all the equipment supplied under the 'First Contract' and other services specified in the Contract Documents. We declare that the award of two contracts, will not, in any way, dilute our responsibility for successful operation of plant/equipment and fulfillment of all obligations as per Bidding Documents



and that both the Contracts will have a cross-fall breach clause i.e. a breach in one Contract will automatically be classified as a breach of the other contract which will confer on you the right to terminate the other contract at our risk and cost.

6.0 We have read the provisions of following clauses and confirm that the specified stipulations of these clauses are acceptable to us:

- | | | |
|-----|--|---------------------------|
| (a) | ITB 13 | Bid Security |
| (b) | GCC 2.14 | Governing Law |
| (c) | GCC 8 | Terms of Payment |
| (d) | GCC 9.3 | Performance Security |
| (e) | GCC 10 | Taxes and Duties |
| (f) | GCC 21.2 | Completion Time Guarantee |
| (g) | GCC 22 | Defect Liability |
| (h) | GCC 23 | Functional Guarantee |
| (i) | GCC 25 | Patent Indemnity |
| (j) | GCC 26 | Limitation of Liability |
| (k) | GCC 38 | Settlement of Disputes |
| (l) | GCC 39 | Arbitration |
| (m) | Appendix 2 to Form of Contract Agreement | Price Adjustment |

Further we understand that deviation taken in any of the above clauses by us may make our bid non-responsive as per provision of bidding documents and be rejected by you.

7.0 We undertake, if our bid is accepted, to commence the work immediately upon your Notification of Award to us, and to achieve the delivery of goods and related services within the time stated in the Bidding Documents.

8.0 If our bid is accepted, we undertake to provide a Performance Security(ies) in the form and amounts, and within the times specified in the Bidding Documents.

9.0 We agree to abide by this bid for a period of six (06) months from the date fixed for opening of bids as stipulated in the Bidding Documents, and it shall remain binding upon us and may be accepted by you at any time before the expiration of that period.

10.0 Until a formal Contract is prepared and executed between us, this bid, together with your written acceptance thereof in the form of your Notification of Award shall constitute a binding contract between us.



- 11.0 We understand that you are not bound to accept the lowest or any bid you may receive.
- *12.0 **(For Joint Venture only)** We, the partners of Joint Venture submitting this bid, do agree and confirm that in case of Award of Contract on the Joint Venture, we shall be jointly and severally liable and responsible for the execution of the Contract in accordance with Contract terms and conditions.
- 13.0 We, hereby, declare that only the persons or firms interested in this proposal as principals are named here and that no other persons or firms other than those mentioned herein have any interest in this proposal or in the Contract to be entered into, if the award is made on us, that this proposal is made without any connection with any other person, firm or party likewise submitting a proposal is in all respects for and in good faith, without collusion or fraud.

Dated this ____ day of _____ 20__

Thanking you, we remain,

Yours Sincerely,

For and on behalf of the [Name of the Bidder#]

(Signature).....

(Printed Name).....

(Designation).....

(Common Seal).....

Date:

Place:

Business Address:

Country of Incorporation:

(State or Province to be indicated)

Name of the Principal Officer:

Address of the Principal Officer:

*Applicable in case of a bid from Joint Venture of firms.

#In case the bid is submitted by a Joint Venture, the name of the Joint Venture should be indicated



Note: Bidders may note that no prescribed proforma has been enclosed for:

(a) Attachment 2: Power of Attorney.

(For Attachments 2 Bidders may use their own proforma for furnishing the required information with the bid).



List of Attachments

Attachment-3(JV)	45
Attachment-3 (QR)	46
Attachment-4	52
Attachment-4A	53
Attachment-4B	54
Attachment-5	55
Attachment-6	56
Attachment-8	58
Attachment-9	60
Attachment-10	62
Attachment-11	63
Attachment-12	65
Attachment-14	66
Attachment-15	73
Attachment-16	77
Attachment- 17	81
Attachment-18	82
Attachment-19	83



Attachment-3(JV)

Rural households electrification works of XXXXXXXX (name of district) district in XXXXX (Name of State) under SAUBHAGYA Scheme

(Joint Venture Agreement and Power of Attorney for Joint Venture*)

Bidder's Name and Address:

To: <Name and Address of Employer>

Dear Sir,

The Joint Venture Agreement (as per the proforma attached at no. 15 in Section-VI, Sample Forms and Procedures, Conditions of Contract, Vol.-I of the Bidding Documents) and Power of Attorney for Joint Venture (as per the proforma attached at no. 14 in Section-VI, Sample Forms and Procedures, Conditions of Contract, Vol.-I of the Bidding Documents) are enclosed herewith.

* Applicable for Joint Venture.

Date:.....

(Signature).....

Place:.....

(Printed Name).....

(Designation).....

(Common Seal).....



Attachment-3 (QR)

Rural households electrification works of XXXXXXXX (name of district) district in XXXXX (Name of State) under SAUBHAGYA Scheme

(Qualifying Requirement Data)

Bidders Name & Address:

To

<Name and Address of the Employer>

Dear Ladies and/or Gentlemen,

In support of the Qualification Requirements (QR) for bidders, stipulated in BDS of the Section - III, Volume-I & additional information required as per **ITB clause 9.3(c)** of the Bidding Documents, we furnish herewith our QR data/details/documents etc., alongwith other information, as follows (The QR stipulations have been reproduced in italics for ready reference, however, in case of any discrepancy the QR as given in BDS shall prevail).

* We have submitted bid as individual firm.

* We have submitted bid as joint venture of following firms:

(i)

(ii)

(iii)

(* ***Strike-off whichever is not applicable***)

[For details regarding Qualification Requirements of a Joint Venture, please refer para 4.0 below.]

We are furnishing the following details/document in support of Qualifying requirement for the subject project.

A. Attached copies of original documents defining:

- a) The constitution or legal status;
- b) The principal place of business;
- c) The place of incorporation (for bidders who are corporations); or the place of registration and the nationality of the Owners (for applicants who are partnerships or individually-owned firms).

B. Attached original & copies of the following documents.

- a) Written power of attorney of the signatory of the Bid to commit the bidder.



b)** Joint Venture Agreement

[** To be submitted only in case of Joint Ventures. Strike off in case of individual firms.]

1.0 Pre-qualification criteria – Part A:

1.01 Technical:

PART I, II and III are deleted

1.01.1 DELETED

1.01.2 The bidder should possess "A" Class license issued by the Electrical inspectorate of Govt of Rajasthan/Central Inspectorial organization of Govt. of India/ other state Govt. In case bid submitted by joint venture firm, any of the partner should possess "A" class electrical license.

In case bidder is a distribution Licensee under Electricity Act 2003, contractor License is not required. If case bidder is a Distribution Franchisee under Electricity Act 2003 it should possess "A" Class license issued by Electrical inspectorate of Govt of Rajasthan/Central Inspectorial organization of Govt. of India/ other state Govt or avail it within a month from the date of award of contract

1.02 Commercial

The detailed criteria is mentioned at 1.02 of BDS at Volume-I : Section-III.

Format C: Format for the Bidder (Single Firm / Partner(s) in case of Joint Venture) for commercial experience in compliance to para 1.02.1 (i) of BDS at Volume-I : Section-III [In case of Joint Venture bidder, the QR data of each of the partner (in support of meeting the requirement of para 1.02.5 of BDS at Volume-I : Section-III] is also is to furnished, as applicable, using this format. The bidder (Single Firm / Partner(s) in case of Joint Venture) who is willing to qualify in compliance to para 1.02.1 {(ii) or (iii)} of BDS at Volume-I: Section-III shall fill below format for two or all three contracts.

A1.	Name of Bidder/Lead Partner of JV/other partner(s) of JV	
A2.	Name of Contract (executed during the last 5 years up to 31.03.2018):	
A3.	Contract Reference No. & Date of Award	
A4	Name and Address of the Employer/Utility by whom the Contract was awarded E-mail ID Telephone No. Fax No.	 _____ _____ _____ _____



A5 (i)	Name of completed work of project execution in electrical Transmission or sub-transmission & distribution sector	_____
(ii)	Cost of the project	_____
(iii)	% of cost w.r.t. estimated cost of this bid (in %)	_____
A6(i)	Date of successful execution of the Contract/Date of commissioning	_____
A7.	Capacity in which the Contract was undertaken (Check One)	<input type="checkbox"/> Prime Contractor <input type="checkbox"/> Partner of JV <input type="checkbox"/> Subcontractor <i>(Tick whichever is applicable)</i>
A8.	Details/documentary evidence submitted in support of stated experience/Contract	

(Documentary evidence, such as copies of utility certificates etc., in support of its experience shall be attached with the filled-up format for each experience/Contract)



Sl No.	Name of Package for which bidder is bidding	Name of completed work of project	Cost of the completed work of project (Rs. Cr.)	Details of cost of execution of works (Rs. Cr.)	
				11 kV & LT (Or Higher Voltage) Execution Works	
				Substation/DT execution (Rs. Cr.)	Lines execution (Rs. Cr.)



Format D: Format for the Bidder (Single Firm / Partner(s) in case of Joint Venture) for commercial experience in compliance to para 1.02.2, 1.02.3 & 1.02.4 of BDS at Volume-I : Section-III [In case of Joint Venture bidder, the QR data of each of the partner (in support of meeting the requirement of para 1.02.5 of BDS at Volume-I : Section-III) is also to furnished, as applicable, using this format.

A1.	Name of Bidder/Lead Partner of JV/other partner(s) of JV	
A2.	Net-worth in last three years 1. Financial Year 2015-16 2. Financial Year 2016-17 3. Financial Year 2017-18	: Rs. ----- lakhs : Rs. ----- lakhs : Rs. ----- lakhs
A3.	Minimum Annual Turnover (MAT) 1. Financial Year 2013-14 2. Financial Year 2014-15 3. Financial Year 2015-16 4. Financial Year 2016-17 5. Financial Year 2017-18	: Rs. ----- lakhs : Rs. ----- lakhs : Rs. ----- lakhs : Rs. ----- lakhs : Rs. ----- lakhs
A4	Liquid assets (LA) and/ or evidence of access to or availability of credit facilities	: Rs. ----- lakh
A4.	Details/documentary evidence submitted in support of stated experience/Contract	

(Documentary evidence, such as copies of utility certificates etc., in support of its experience shall be attached with the filled-up format for each experience/Contract)

1.02.1 Failure to comply with this requirement will result in rejection of the joint venture's bid. Sub contractors' experience and resources shall not be taken into account in determining the bidder's compliance with qualifying criteria.

1.02.2 One of the partners shall be nominated as lead partner, and the lead partner shall be authorized to incur liabilities and receive instruction for and on behalf of any and all partners of the joint venture and the entire execution of the contract including receipt of payment shall be done exclusively through the lead partner. This authorization shall be evidenced by submitting a power of attorney signed by legally authorized signatories of all the partners as per proforma Form 14 Volume – I Section IV.

1.02.3 All partner of the joint venture shall be liable jointly and severally for the execution of the contract in accordance with the contract terms and a copy of the agreement entered into by the joint venture partners having such a provision shall be submitted with the bid.



2.0 Pre-qualification criteria – Part B:

The Bidder shall also furnish following documents/details with its bid:

- 2.01.1 A certificate from banker (as per format) indicating various fund based/non fund based limits sanctioned to the bidder and the extent of utilization as on date Such certificate should have been issued not earlier than three months prior to the date of bid opening. Wherever necessary Employer may make queries with the Bidders' bankers.
- 2.01.2 The complete annual reports together with Audited statement of accounts of the company for last five years of its own (separate) immediately preceding the date of submission of bid.
- 2.01.3 Note:
- 2.01.3.1 In the event the bidder is not able to furnish the information of its own (i.e. separate), being a subsidiary company and its accounts are being consolidated with its group/holding/parent company, the bidder should submit the audited balance sheets, income statements, other information pertaining to it only (not of its group/Holding/Parent Company) duly certified by any one of the authority [(i) Statutory Auditor of the bidder /(ii) Company Secretary of the bidder or (iii) A certified Public Accountant] certifying that such information/documents are based on the audited accounts as the case may be.
- 2.01.3.2 Similarly, if the bidder happens to be a Group/Holding/Parent Company, the bidder should submit the above documents/information of its own (i.e. exclusive of its subsidiaries) duly certified by any one of the authority mentioned in Note - 2.01.3.1 above certifying that these information/ documents are based on the audited accounts, as the case may be.
- 2.01.4 Litigation History:
- 2.01.4.1 The bidder should provide detailed information on any litigation or arbitration arising out of contracts completed or under execution by it over the last five years. A consistent history of awards involving litigation against the Bidder or any partner of JV may result in rejection of Bid.
- 2.01.4.2 Notwithstanding anything stated hereinabove, the Employer reserves the right to assess the capacity and capability of the bidder, should the circumstances warrant such assessment in an overall interest of the Employer. The Employer reserves the right to waive minor deviations if they do not materially affect the capability of the Bidder to perform the contract.



Attachment-4

Rural households electrification works of XXXXXXXX (name of district/ circle) under Jodhpur Discom in Rajasthan under SAUBHAGYA Scheme

(Form of Certificate of Origin and Eligibility)

Bidder's Name and Address:

To,

**Jodhpur Vidyut Vitran Nigam Limited
Office of the SE (CSS), New power house premises,
Heavy Industrial Area, Jodhpur 342001 (Rajasthan),
Phone: 0291-2742336
Fax: 0291-2745259,
E - Mail: secssjodhpur@gmail.com**

We hereby certify that equipment and materials to be supplied are produced in, an eligible source country.

We hereby certify that our company is incorporated and registered in, an eligible source country.

Date:..... (Signature).....

Place:..... (Printed Name).....

(Designation).....

(Common Seal).....



Attachment-4A

Rural households electrification works of XXXXXXXX (name of district/ circle) under Jodhpur Discom in Rajasthan under SAUBHAGYA Scheme

(List of Special Maintenance Tools & Tackles)

Bidder's Name and Address:

To,

**Jodhpur Vidyut Vitran Nigam Limited
Office of the SE (CSS), New power house premises,
Heavy Industrial Area, Jodhpur 342001 (Rajasthan),
Phone: 0291-2742336
Fax: 0291-2745259,
E - Mail: secssjodhpur@gmail.com**

Dear Sir,

We are furnishing below the list of special maintenance tools & tackles for various equipment under the subject project. The prices for these tools & tackles are included in our lumpsum bid price. We further confirm that the list of special maintenance tools & tackles includes all the items specifically identified in your bidding documents as brought out below:

S.No.	For Equipment	Item Description	Unit	Quantity

Notwithstanding what is stated above, we further confirm that any additional special maintenance tools and tackles, required for the equipment under this project shall be furnished by us at no extra cost to the employer.

Date:.....

(Signature).....

Place:.....

(Printed Name).....

(Designation).....

(Common Seal).....



Attachment-4B

Rural households electrificationworks of XXXXXXXX (name of district/ circle) under Jodhpur Discom in Rajasthan under SAUBHAGYA Scheme

(List of Special Maintenance Tools & Tackles)

Bidder's Name and Address:

To,

**Jodhpur Vidyut Vitran Nigam Limited
Office of the SE (CSS), New power house premises,
Heavy Industrial Area, Jodhpur 342001 (Rajasthan),
Phone: 0291-2742336
Fax: 0291-2745259,
E - Mail: secssjodhpur@gmail.com**

Dear Sir,

We are furnishing below the list of special maintenance tools & tackles for various equipment under the subject Project. The prices for these tools & tackles which are to be taken back after the completion of the work by us are not included in our lumpsum bid price. We further confirm that the list of special maintenance tools & tackles includes all the items specifically identified in your bidding documents as brought out below:

(a)

(b)

Date:.....

(Signature).....

Place:.....

(Printed Name).....

(Designation).....

(Common Seal).....

**Attachment-5**

Rural households electrification works of XXXXXXXX (name of district/ circle) under Jodhpur Discom in Rajasthan SAUBHAGYA Scheme

(Bought-out & Sub-contracted Items)

Bidder's Name and Address:

To: XXXXX (Name and Address of Employer)

Dear Sir,

1.0 We hereby furnish the details of the items/ sub-assemblies; we propose to buy for the purpose of furnishing and installation of the subject Project:

Sl. No.	Item Description	Quantity proposed to be bought/sub-contracted	Details of the proposed sub-contractor/sub-vendor	
			Name	Nationality
1.				
2.				
3.				
4.				
5.				
6.				

2.0 We **hereby declare that, we would not subcontract the erection portion of the contract without the prior approval of Employer.**

Date:.....

(Signature).....

Place:.....

(Printed Name).....

(Designation).....

(Common Seal).....



Attachment-6

Rural households electrification works of XXXXXXXX (name of district/ circle) under Jodhpur Discom in Rajasthan under SAUBHAGYA Scheme

(Alternative, Deviations and Exceptions to the Provisions)

Bidder's Name and Address:

To,

**Jodhpur Vidyut Vitran Nigam Limited
Office of the SE (CSS), New power house premises,
Heavy Industrial Area, Jodhpur 342001 (Rajasthan),
Phone: 0291-2742336
Fax: 0291-2745259,
E - Mail: secssjodhpur@gmail.com**

Dear Sir,

The bidder shall itemize any deviation from the Specifications included in his bid. Each item shall be listed (separate sheets may be used and enclosed with this Attachment) with the following information:

Sl. No.	Reference clause in the Specifications	Deviation	Cost of withdrawal of the deviation

The above deviations and variations are exhaustive. We confirm that we shall withdraw the deviations proposed by us at the cost of withdrawal indicated in this attachment, failing which our bid may be rejected and Bid Security forfeited.

Except for the above deviations and variations, the entire work shall be performed as per your specifications and documents. Further, we agree that any deviations, conditionality or reservation introduced in this Attachment-6 and/or in the Bid form, Price schedules & Technical Data Sheets and covering letter, or in any other part of the bid will be reviewed to conduct a determination of the substantial responsiveness of the bid.

Date:.....

(Signature).....

Place:.....

(Printed Name).....

(Designation).....

(Common Seal).....





Attachment-8

Rural households electrification works of XXXXXXXX (name of district/ circle) under Jodhpur Discom in Rajasthan under SAUBHAGYA Scheme

(Manufacturer's Authorization Form)

(On Manufacturer's Letterhead, see Clause 9.3(c) of the ITB)

To: *[Insert: name of Employer]*

Dear Ladies and/or Gentlemen,

WE *[insert: name of Manufacturer]* who are established and reputable manufacturers of *[insert: name and/or description of the plant & equipment]* having production facilities at *[insert: address of factory]* do hereby authorize *[insert: name & address of Bidder]* (hereinafter, the "Bidder") to submit a bid, and subsequently negotiate and sign the Contract with you against IFB *[insert: title and reference number of Invitation for Bids]* including the above plant & equipment or other goods produced by us.

We hereby extend our full guarantee and warranty for the above specified plant & equipment materials or other goods offered supporting the supply, installation and achieving of Operational Acceptance of the plant by the Bidder against these Bidding Documents, and duly authorize said Bidder to act on our behalf in fulfilling these guarantee and warranty obligations. We also hereby declare that we and, *[insert: name of the Bidder]* have entered into a formal relationship in which, during the duration of the Contract (including warranty / defects liability) we, the Manufacturer or Producer, will make our technical and engineering staff fully available to the technical and engineering staff of the successful Bidder to assist that Bidder, on a reasonable and best effort basis, in the performance of all its obligations to the Purchaser under the Contract.

For and on behalf of the Manufacturer

Signed: _____

Date: _____

In the capacity of *[insert: title of position or other appropriate designation]* and this should be signed by a person having the power of attorney to legal bind the manufacturer.



Date:.....

Place:.....

(Signature).....

(Printed Name).....

(Designation).....

(Common Seal).....

Note 1. The letter of Undertaking should be on the letterhead of the Manufacturer and should be signed by a person competent and having Power of Attorney to legally bind the Manufacturer. It shall be included by the bidder in its bid.

2. Above undertaking shall be registered or notarized so as to be legally enforceable.



Attachment-9

Rural households electrification works of XXXXXXXX (name of district/ circle) under Jodhpur Discom in Rajasthan under SAUBHAGYA Scheme
(Specification No.:XXXXXXXXXXXXXXXXXXXXXXX).

(Work Completion Schedule)

Bidder's Name and Address:

To,

**Jodhpur Vidyut Vitran Nigam Limited
Office of the SE (CSS), New power house premises,
Heavy Industrial Area, Jodhpur 342001 (Rajasthan),
Phone: 0291-2742336
Fax: 0291-2745259,
E - Mail: secssjodhpur@gmail.com**

Dear Sir,

We hereby declare that the following Work Completion Schedule shall be followed by us in furnishing and installation of the subject Project for the period commencing from the effective date of Contract to us:

Sl. No.	Description of Work	Period in days from the effective date of Contract
1.	Detailed Engineering and drawing submission a) commencement b) completion	
2.	Procurement of equipment/ components & assembly a) commencement b) completion	
3.	Type Tests a) commencement b) completion	
4.	Manufacturing a) commencement	



Sl. No.	Description of Work	Period in days from the effective date of Contract
	b) completion	
5.	Shipments & Delivery a) commencement b) completion	
6.	Establishment of site office	
7.	Installation at Site a) commencement b) completion	
8.	Testing & Pre-commissioning a) commencement b) completion	
9.	Trial Operation a) commencement b) completion	

Date:..... (Signature).....

Place:..... (Printed Name).....

(Designation).....

(Common Seal).....

Note: Bidders to enclose a detailed network covering all the activities to be undertaken for completion of the project indicating key dates for various milestones for each phase constituent-wise.



Attachment-10

Rural households electrificationworks of XXXXXXXX (name of district/ circle) under Jodhpur Discom in Rajasthan under SAUBHAGYA Scheme

(Specification No.:XXXXXXXXXXXXXXXXXXXXXX).

(Guarantee Declaration)

Bidder's Name and Address:

To,

To,

**Jodhpur Vidyut Vitran Nigam Limited
Office of the SE (CSS), New power house premises,
Heavy Industrial Area, Jodhpur 342001 (Rajasthan),
Phone: 0291-2742336
Fax: 0291-2745259,
E - Mail: secssjodhpur@gmail.com**

Dear Sir,

We hereby declare that this Attachment of "Guarantee Declaration" is furnished by us in Packet-I of Inner Envelope-2 of bid envelope.

Date:.....

(Signature).....

Place:.....

(Printed Name).....

(Designation).....

(Common Seal).....



Attachment-11

Rural households electrificationworks of XXXXXXXX (name of district/ circle) under Jodhpur Discom in Rajasthan under SAUBHAGYA Scheme
(Specification No.:XXXXXXXXXXXXXXXXXXXXXXXXXX)

(Information regarding Ex-employees of Jodhpur Vidyut Vitran Nigam Limited in our Organisation)

Bidder's Name and Address:

To,

To,

Jodhpur Vidyut Vitran Nigam Limited
Office of the SE (CSS), New power house premises,
Heavy Industrial Area, Jodhpur 342001 (Rajasthan),
Phone: 0291-2742336
Fax: 0291-2745259,
E - Mail: secssjodhpur@gmail.com

Dear Sir,

We hereby furnish the details of ex-employees of **XXXXX (Name of Employer)** who had retired/ resigned at the level of **XXXXXX (Define suitable post)** from **XXXXX (Name of Employer)**and subsequently have been employed by us:

Sl. No.	Name of the person with designation in XXXXX (Name of Employer)	Date of Retirement/ resignation from XXXXX (Name of Employer)	Date of joining and designation in our Organisation
1.
2.
3.
4.



5.

Date:.....

(Signature).....

Place:.....

(Printed Name).....

(Designation).....

(Common Seal).....

Note: The information in similar format should be furnished for each partner of joint venture in case of joint venture bid.



Attachment-12

Rural households electrificationworks of XXXXXXXX (name of district/ circle) under Jodhpur Discom in Rajasthan under SAUBHAGYA Scheme (Specification No.:XXXXXXXXXXXXXXXXXXXXXX).

(Price Adjustment Data as per Appendix-2 of section-VI: Sample forms and procedures)

Bidder's Name and Address:

To,

**Jodhpur Vidyut Vitran Nigam Limited
Office of the SE (CSS), New power house premises,
Heavy Industrial Area, Jodhpur 342001 (Rajasthan),
Phone: 0291-2742336
Fax: 0291-2745259,
E - Mail: secssjodhpur@gmail.com**

Dear Sir,

We hereby furnish the details of Price Adjustments:

Name of Material	Price as on 30 days prior to date of bid opening*	Price as on 60 days prior to date of shipment*	Variation*
ACSR conductor			
Power / Station / Distribution Transformer (Aluminium wound)			
Cables			

*Detailed calculations as per appendix-2 of section-VI : sample forms and procedures to be enclosed

Date:.....

(Signature).....

Place:.....

(Printed Name).....

(Designation).....

(Common Seal).....



Attachment-14

(PRECONTRACT INTEGRITY PACT)

On non-judicial stamp paper of Rs. 500/- duly notarised in two sets

General

This pre-bid pre-contract Agreement (herein after called the Integrity Pact) is made onday of the month of _____, between, on one hand, the (Name of Owner) acting through Shri..... (Name and designation of Project Manager) (herein after called the "BUYER", which expression shall mean and include, unless *the* context otherwise requires, his successors in office and assigns) of the First Part and M/s..... (Name of Bidder) represented by Shri____, Chief Executive Officer (herein after called the "BIDDER/Seller" which expression shall mean and include, unless the context otherwise requires, his successors and permitted assigns) of the Second Part.

WHEREAS the BUYER proposes to procure (Name of the Stores/Equipment/Item) and the BIDDER/Seller is willing to offer/has offered the stores and

WHEREAS the BIDDER is a private company/public company/Government undertaking/partnership/registered export agency, constituted in accordance with the relevant law in the matter and the BUYER is a PSU/Utility/Department of State Govt. performing its functions on behalf of the (Name of owner).

NOW, THEREFORE,

To avoid all forms of corruption by following a system that is fair, transparent and free from any influence/prejudiced dealings prior to, during and subsequent to the currency of the contract to be entered in to with a view to:-

Enabling the BUYER to obtain the desired said stores/equipment at a competitive price in conformity with the defined specifications by avoiding the high cost and the distortionary impact of corruption on public procurement, and

Enabling BIDDERs to abstain from bribing or indulging in any corrupt practice in order to secure the contract by providing assurance to them that their competitors will also abstain from bribing and other corrupt practices and the BUYER will commit to prevent corruption, in any form, by its officials by following transparent procedures.

The parties hereto hereby agree to enter in to this Integrity Pact and agree as follows:

Commitments of the BUYER

- 1.1 The BUYER undertakes that no official of the BUYER, connected directly or indirectly with the contract, will demand, take a promise for or accept, directly or through intermediaries, any bribe, consideration, gift, reward, favour or any material or immaterial benefit to any other advantage from the BIDDER,



either for themselves or for any person, organisation or third party related to the contract in exchange for an advantage in the bidding process, bid evaluation, contracting or implementation process related to the contract.

1.2 The BUYER will, during the pre-contract stage, treat all BIDDERS alike and will provide to all BIDDERS the same information and will not provide any such information to any particular BIDDER which could afford an advantage to that particular BIDDER in comparison to other BIDDERS.

1.3 All the officials of the BUYER will report to the appropriate Government office any attempted or completed breaches of the above commitments as well as any substantial suspicion of such a breach.

2.0 In case any such preceding misconduct on the part of such official(s) is reported by the BIDDER to the BUYER with full and verifiable facts and the same is prima facie found to be correct by the BUYER, necessary disciplinary proceedings, or any other action as deemed fit, including criminal proceedings may be initiated by the BUYER and such persons shall be debarred from further dealings related to the contract process. In such a case while an enquiry is being conducted by the BUYER the proceedings under the contract would not be stalled.

Commitments of BIDDERS

3.0 The BIDDER commits itself to take all measures necessary to prevent corrupt practices, unfair means and illegal activities during any stage of its bid or during any pre-contract or post-contract stage in order to secure the contract or in furtherance to secure it and in particular commits itself to the following:-

3.1 The BIDDER will not offer, directly or through intermediaries, any bribe, gift, consideration, reward, favour, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of the BUYER, connected directly or indirectly with the bidding process, or to any person, organisation or third party related to the contract in exchange for any advantage in the bidding, evaluation, contracting and implementation of the contract.

3.2 The BIDDER further undertakes that it has not given, offered or promised to give, directly or indirectly any bribe, gift, consideration, reward, favour, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of the BUYER or otherwise in procuring the Contractor for bearing to door having done any act in relation to the obtaining or execution of the contract or any other contract with the Government for showing or for bearing to show favour or disfavour to any person in relation to the contract or any other contract with Government.

3.3 BIDDERS shall disclose the name and address of agents and representatives and Indian BIDDERS shall disclose their foreign principals or associates.

3.4 BIDDERS shall disclose the payments to be made by them to agents/brokers or any other intermediary, in connection with this bid/contract.



3.5 The BIDDER further confirms and declares to the BUYER that the BIDDER is the original manufacturer/integrator/authorised government sponsored export entity of the defense stores and has not engaged any individual or firm or company whether Indian or foreign to intercede, facilitate or in any way to recommend to the BUYER or any of its functionaries, whether officially or unofficially to the award of the contract to the BIDDER, nor has any amount been paid, promised or intended to be paid to any such individual, firm or company in respect of any such intercession, facilitation or recommendation.

3.6 The BIDDER, either while presenting the bid or during pre-contract negotiations or before signing the contract, shall disclose any payments he has made, is committed to or intend to make to officials of the BUYER or their family members, agents, brokers or any other intermediaries in connection with the contract and the details of services agreed upon for such payments.

3.7 The BIDDER will not collude with other parties interested in the contract to impair the transparency, fairness and progress of the bidding process, bid evaluation, contracting and implementation of the contract.

3.8 The BIDDER will not accept any advantage in exchange for any corrupt practice, unfair means and illegal activities.

3.9 The BIDDER shall not use improperly, for purposes of competition or personal gain, or pass on to others, any information provided by the BUYER as part of the business relationship, regarding plans, technical proposals and business details, including information contained in any electronic data carrier. The BIDDER also undertakes to exercise due and adequate care lest any such information is divulged.

3.10 The BIDDER commits to refrain from giving any complaint directly or through any other manner without supporting it with full and verifiable facts.

3.11 The BIDDER shall not instigate or cause to instigate any third person to commit any of the actions mentioned above.

3.12 If the BIDDER or any employee of the BIDDER or any person acting on behalf of the BIDDER, either directly or indirectly, is a relative of any of the officers of the BUYER, or alternatively, if any relative of an officer of the BUYER has financial interest/stake in the BIDDER's firm, the same shall be disclosed by the BIDDER at the time of filing of tender.

The term 'relative' for this purpose would be as defined in Section 6 of the Companies Act 1956.

3.13 The BIDDER shall not lend to or borrow any money from or enter into any monetary dealings or transactions, directly or indirectly, with any employee of the BUYER.

4. **Previous Transgression**

4.1 The BIDDER declares that no previous transgression occurred in the last three years immediately before signing of this Integrity Pact, with any other company in any country in respect of any corrupt practices envisaged hereunder or with any Public Sector Enterprise in India or



any Government Department in India that could justify BIDDER's exclusion from the tender process.

- 4.2 The BIDDER agrees that if it makes an incorrect statement on this subject, BIDDER can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

5. Earnest Money/ Bid Security (Security Deposit)

5.1 While submitting commercial bid, the BIDDER shall deposit an amount..... (to be specified in RFP) as Earnest Money/ Bid Security/ Security Deposit, with the BUYER through any of the following instruments:

(i) Bank Draft or a Pay Order in favour of

(ii) A confirmed guarantee by from a reputed **(i) Public Sector Bank located in India; or (ii) Scheduled Commercial Indian Private Bank as per the attached list only [List is placed at BDS]**, promising payment of the guaranteed sum to the BUYER on demand within three working days without any demur whatsoever and without seeking any reasons whatsoever. The demand for payment by the BUYER shall be treated as conclusive proof of payment.

(iii) Any other mode or through any other instrument (to be specified in the RFP).

5.2 The Earnest Money/ Bid Security/ Security Deposit shall be valid up to a period of.... years or the complete conclusion of the contractual obligations to the complete satisfaction of both the BIDDER and the BUYER, including warranty period, whichever is later.

5.3 In case of the successful BIDDER a clause would also be incorporated in the Article pertaining to Performance Bond in the 'Purchase Contract' that the provisions of Sanctions for Violation shall be applicable for forfeiture of Performance Bond in case of a decision by the BUYER to forfeit the same without assigning any reason for imposing sanction for violation of this Pact.

5.4 No interest shall be payable by the BUYER to the BIDDER on Earnest Money/ Security Deposit/ Bid Security for the period of its currency.

6. Sanctions for Violations

6.1 Any breach of the aforesaid provisions by the BIDDER or anyone employed by it acting on its behalf (whether with or without the knowledge of the BIDDER) shall entitle the BUYER to take all or any one of the following ~~as~~ wherever required:-

(i) To immediately call off the pre contract negotiations without assigning any reason or giving any compensation to the BIDDER. However, the proceedings with the other BIDDER(s) would continue.

(ii) The Earnest Money Deposit (in pre-contract stage) and/or Bid Security and/or Security Deposit/ Performance Bond (after the contract is signed) shall stand forfeited either fully or partially, as decided by the BUYER and the BUYER shall not be required to assign any reason therefore.

(iii) To immediately cancel the contract, if already signed, without giving any compensation to the BIDDER.



- (iv) To recover all sums already paid by the BUYER, and in case of an Indian BIDDER with interest thereon at 2% higher than the prevailing Prime Lending Rate of State Bank of India, while in case of a BIDDER from a country other than India with interest thereon at 2% higher than the UBOR. If any outstanding payment is due to the BIDDER from the BUYER in connection with any other contract for any other stores, such outstanding payment could also be utilized to recover the aforesaid sum and interest.
- (v) To encash the advance bank guarantee and performance bond/warranty bond, if furnished by the BIDDER, in order to recover the payments, already made by the BUYER, along with interest.
- (vi) To cancel all or any other Contracts with the BIDDER. The BIDDER shall be liable to pay compensation for any loss or damage to the BUYER resulting from such cancellation/rescission and the BUYER shall be entitled to deduct the amount so payable from the money(s) due to the BIDDER
- (vii) To debar the BIDDER from participating in future bidding processes of the Government of India for a minimum period of five years, which may be further extended at the discretion of the BUYER.
- (viii) To recover all sums paid in violation of this Pact by BIDDER(s) to any middleman or agent or broker with a view to securing the contract.
- (ix) In cases where irrevocable Letters of Credit have been received in respect of any contract signed by the BUYER with the BIDDER, the same shall not be opened.
- (X) Forfeiture of Performance Bond in case of a decision by the BUYER to forfeit the same without assigning any reason for imposing sanction for violation of this Pact.

6.2 The BUYER will be entitled to take all or any of the actions mentioned at para 6.1(i) to (x) of this Pact also on the Commission by the BIDDER or anyone employed by it or acting on its behalf (whether with or without the knowledge of the BIDDER), of an offence as defined in Chapter IX of the Indian Penal code, 1860 or Prevention of Corruption Act, 1988 or any other statute enacted for prevention of corruption.

6.3 The decision of the BUYER to the effect that a breach of the provisions of this Pact has been committed by the BIDDER shall be final and conclusive on the BIDDER. However, the BIDDER can approach the Independent Monitor(s) appointed for the purposes of this Pact.

7. Fall Clause

7.1 The BIDDER undertakes that it has not supplied/is not supplying similar product/systems or subsystems at a price lower than that offered in the present bid in respect of any other Ministry/Department of the Government of India or PSU and if it is found at any stage that similar product/systems or sub systems was supplied by the BIDDER to any other Ministry/Department of the Government of India or a PSU at a lower price, then that very price, with due allowance for elapsed time, will be applicable to the present case and the difference in the cost would be refunded by the BIDDER to the BUYER, if the contract has already been concluded.

8. Independent Monitors

8.1 The BUYER has appointed Independent Monitors (hereinafter referred to as Monitors) for this Pact in consultation with the Central Vigilance Commission (Names and Addresses of the Monitors to be given).



- 8.2 The task of the Monitors shall be to review independently and objectively, whether and to what extent the parties comply with the obligations under this Pact.
- 8.3 The Monitors shall not be subject to instructions by the representatives of the parties and perform their functions neutrally and independently.
- 8.4 Both the parties accept that the Monitors have the right to access all the documents relating to the project/procurement, including minutes of meetings.
- 8.5 As soon as the Monitor notices, or has reason to believe, a violation of this Pact, he will so inform the Authority designated by the BUYER.
- 8.6 The BIDDER(s) accepts that the Monitor has the right to access without restriction to all Project documentation of the BUYER including that provided by the BIDDER. The BIDDER will also grant the Monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his project documentation. The same is applicable to Subcontractors. The Monitor shall be under contractual obligation to treat the information and documents of the BIDDER/Subcontractor(s) with confidentiality.
- 8.7 The BUYER will provide to the Monitor sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual relations between the parties. The parties will offer to the Monitor the option to participate in such meetings.
- 8.8 The Monitor will submit a written report to the designated Authority of BUYER/Secretary in the Department/ within 8 to 10 weeks from the date of reference or intimation to him by the BUYER / BIDDER and, should the occasion arise, submit proposals for correcting problematic situations.

9. Facilitation of Investigation

In case of any allegation of violation of any provisions of this Pact or payment of commission, the BUYER or its agencies shall be entitled to examine all the documents including the Books of Accounts of the BIDDER and the BIDDER shall provide necessary information and documents in English and shall extend all possible help for the purpose of such examination.

10. Law and Place of Jurisdiction

This Pact is subject to Indian Law. The place of performance and jurisdiction is the seat of the BUYER.

11. Other Legal Actions

The actions stipulated in this Integrity Pact are without prejudice to any other legal action that may follow in accordance with the provisions of the extant law in force relating to any civil or criminal proceedings

12. Validity

- 12.1 The validity of this Integrity Pact shall be from date of its signing and extend upto 5 years or the complete execution of the contract to the satisfaction of both the BUYER and the BIDDER/Seller, including warranty period, whichever is later. In case BIDDER is unsuccessful, this Integrity Pact shall expire after six months from the date of the signing of the contract.
- 12.2 Should one or several provisions of this Pact turn out to be invalid; the remainder of this Pact shall remain



valid. In this case, the parties will strive to come to an agreement to their original intentions.

13. The parties hereby sign this Integrity Pact aton.....

BUYER

BIDDER

Name of the Officer

CHIEF EXECUTIVE OFFICER

Designation

Deptt./PSU

Witness

Witness

1.....

2.....

2.....

3.....

* Provisions of these clauses would need to be amended/ deleted in line with the policy of the BUYER in regard to involvement of Indian agents of foreign suppliers



Attachment-15

**Rural households electrification works of XXXXXXXX (name of district/ circle) under Jodhpur Discom in Rajasthan under SAUBHAGYA Scheme
(Specification No.:XXXXXXXXXXXXXXXXXXXXXX)**

(Option for Initial Advance (either Interest Bearing Initial Advance or No Initial Advance) and Information for E-payment, PF details and declaration regarding Micro/Small & Medium Enterprises)

Bidder's Name and Address:

To,

**Jodhpur Vidyut Vitran Nigam Limited
Office of the SE (CSS), New power house premises,
Heavy Industrial Area, Jodhpur 342001 (Rajasthan),
Phone: 0291-2742336
Fax: 0291-2745259,
E - Mail: secssjodhpur@gmail.com**

Dear Sir,

I. We have read the provisions in the Bidding Documents regarding furnishing the option for advance payment. Accordingly, as per ITB Clause 9.3 as provided in Appendix-I, Section VI, Vol.-I of the Bidding Documents, we hereby confirm to opt the following:

Interest Bearing Initial Advance

Supply Portion : Yes* [] No* []

Installation Portion : Yes^ [] No^ []

(*^ tick ONLY ONE of the selected options)

II. We are furnishing the following details of Statutory Registration Numbers and details of Bank for electronic payment.

1.	Name of the Supplier/ Contractor in whose favour payment is to be made	
2.	Address with PIN Code and State	Registered Office:



		Branch Office: Correspondence Address:
3.	Status – Company/others [Declaration of Micro/ Small/ Medium Enterprise under Micro/ Small & Medium Enterprises Development Act 2006, if applicable]	
4.	Permanent Account (PAN) No.	
5.	GSTIN No.	
6.	Deleted	
7.	Deleted	
8.	Deleted	
9.	PF Registration No. of the Company	
10.	PF Regional Office covered (with Address)	
11.	Name of Contact Person	
12.	Telephone No(s).	Landline(s):



	Email	Mobile(s): Email ID :
13.	Bank Details for Electronic Payment	Name of the Bank: Address of Branch: Account No.: Type of Account: <input type="checkbox"/> Saving <input type="checkbox"/> Current
14.	9 digit MICR code printed at bottom in middle, next to cheque no.	
15.	IFSC (for RTGS)/NEFT Code (<i>to be obtained from the Bank</i>) <i>Sample Cancelled Cheque to be enclosed</i>	

We hereby declare that the above information is true and correct and we agree that the payment on account of this Contract, in the event of award, be made in the above account maintained in the above mentioned Bank.

Date:.....

(Signature).....

Place:.....

(Printed Name).....

(Designation).....

(Common Seal).....





Attachment-16

**Rural households electrification works of XXXXXXXX (name of district/ circle) under Jodhpur Discom in Rajasthan under SAUBHAGYA Scheme
(Specification No.:XXXXXXXXXXXXXXXXXXXXXXX)**

(Additional Information)

Bidder's Name and Address:

To,

**Jodhpur Vidyut Vitran Nigam Limited
Office of the SE (CSS), New power house premises,
Heavy Industrial Area, Jodhpur 342001 (Rajasthan),
Phone: 0291-2742336
Fax: 0291-2745259,
E - Mail: secssjodhpur@gmail.com**

Dear Sir,

In support of the additional information required as per ITB Sub-Clause 9.3 (p) of the Bidding Documents, we furnish herewith our data/details/documents etc., alongwith other information, as follows (the stipulations have been reproduced in italics for ready reference):

1.0 *The Bidder shall furnish*

A certificate from their Banker(s) (as per prescribed formats in Form 16, Volume-I:Section-VI: Sample Forms and Procedures) indicating various fund based/non fund based limits sanctioned to the Bidder and the extent of utilization as on date. Such certificate should have been issued not earlier than three months prior to the date of bid opening. Wherever necessary the Employer may make queries with the Bidders' Bankers.[Reference ITB clause 9.3(p)(i)]

1.1 In accordance with 1.0, certificate(s) from banker as per requisite format, indicating various fund based/non fund based limits sanctioned to the bidder or each member of the joint venture and the extent of utilization as on date is/are enclosed, as per the following details:

Name of the Bidder/partner of Joint Venture	
Name of the Banker by whom certificate issued	
Date of certificate (should not be earlier than 3 months prior to date of bid opening)	
Whether fund based/non fund based limits are indicated in the certificate	
Whether extent of utilization is indicated in the certificate	



1.2 The Bidder should accordingly also provide the following information/documents (**In case of JV bidders, information should be provided separately for all the Partners of JV in the given format**):

(i) Details of Banker:

Name of Banker	
Address of Banker	_____ _____ _____
Telephone No.	_____
Contact Name and Title	_____
Fax No.	_____
E-mail ID	_____

(ii) As per para 1.0, Authorization Letter(s) from the bidder (in case of JV bidder, from all the partners) addressed to the Banker(s), authorizing **XXXXX (Name of Employer)** to seek queries about the bidder with the Banker(s) and advising the Banker(s) to reply the same promptly, is/are enclosed as per following details:

Sl. No.	Letter Ref.	Date	Addressed to (name of the Bank)

2.0 Litigation History

The bidder should provide detailed information on any litigation or arbitration arising out of contracts completed or under execution by it over the last five years. A consistent history of awards involving litigation against the Bidder or any partner of JV may result in rejection of Bid. [Reference ITB clause 9.3(p)(ii)]



2.1 Details of litigation history resulting from Contracts completed or under execution by the bidder over the last five years

Year	Name of client, cause of litigation/arbitration and matter in dispute	Details of Contract and date	Award for or against the bidder	Disputed amount

3.0 OTHER INFORMATION

3.1 Current Contract Commitments of works in progress

Bidders (individual firms or each partners of JV) should provide information on their current commitments on all contracts that have been awarded, or for which a letter of intent or acceptance has been received, or for contracts approaching completion, but for which an unqualified, full completion certificate has yet to be issued.

Details of Contract	Value of outstanding work (Rs.)	Estimated completion date

3.2 Financial Data :

(In Rs. Millions)



	Actual					Projection for next five years				
	(previous five years)									
1. Total Assets										
2. Current Assets										
3. Total Liability										
4. Current Liability										
5. Profit before taxes										
6. Profit after taxes										

4. The information/documentation in support of Bidder's design infrastructure and erection facilities and capacity and procedures including quality control related to the work, are enclosed at _____ herewith.

5. The CV and experience details of a project manager with 15 years experience in executing such contract of comparable nature including not less than five years as manager and the CVs of other employees to be deputed for the subject work, are enclosed at ____ herewith.

Date:.....

(Signature)

Place:.....

(Printed Name)

(Designation)

(Common Seal)



Attachment- 17

**Rural households electrificationworks of XXXXXXXX (name of district/ circle) under Jodhpur Discom in Rajasthan under SAUBHAGYA Scheme
 (Specification No.:XXXXXXXXXXXXXXXXXXXXXXX)
 (Declaration for tax exemptions, reductions, allowances or benefits)**

Bidder's Name and Address:

To,

**Jodhpur Vidyut Vitran Nigam Limited
 Office of the SE (CSS), New power house premises,
 Heavy Industrial Area, Jodhpur 342001 (Rajasthan),
 Phone: 0291-2742336
 Fax: 0291-2745259,
 E - Mail: secssjodhpur@gmail.com**

Dear Sirs,

1. We confirm that we are solely responsible for obtaining following tax exemptions, reductions, allowances or benefits in respect of supplies under the subject Project, in case of award. We further confirm that we have considered the same in our bid thereby passing on the benefit to **XXXXX (Name of Employer)** while quoting our prices. In case of our failure to receive such benefits, partly or fully, for any reason whatsoever, the Employer will not compensate us.
2. We are furnishing the following information required by the Employer for issue of requisite certificate if and as permitted in terms of the applicable Govt. of India policies/procedures(in case of award):

Applicable Notification Clause Ref. No.	Act, No. and	Sl. No.	Description of item on which applicable	Country of origin	Remarks, if any

(The requirements listed above are as per current Notification of Govt. of India indicated above. These may be modified, if necessary, in terms of the Notifications.)

Date:.....

Signature).....

Place:.....

(Printed Name).....

(Designation).....

(Common Seal).....



Attachment-18

**Rural households electrificationworks of XXXXXXXX (name of district/ circle) under Jodhpur Discom in Rajasthan under SAUBHAGYA Scheme
(Specification No.:XXXXXXXXXXXXXXXXXXXXXXXXXX)**

(Declaration)

Bidder's Name and Address:

To,

**Jodhpur Vidyut Vitran Nigam Limited
Office of the SE (CSS), New power house premises,
Heavy Industrial Area, Jodhpur 342001 (Rajasthan),
Phone: 0291-2742336
Fax: 0291-2745259,
E - Mail: secssjodhpur@gmail.com**

Dear Sir,

We confirm that Bid Form have been filled up by us as per the provisions of the Instruction to Bidders. We have also uploaded price bid electronically as per the provisions of the Instruction to Bidders. Further, we have noted that the same shall be evaluated as per the provisions of the Bidding Documents.

Further, we hereby confirm that except as mentioned in the Attachment – 6 (Alternative, Deviations and Exceptions to the Provisions) hereof and/or the Covering Letter, forming part of our Bid Envelope:

- (i) there are no discrepancies/inconsistencies and deviations/omissions/ reservations to the Bidding Documents, in the price bid;
- (ii) the description of items and the unit thereof in the price schedules are in conformity with those indicated in the price schedule of the Bidding Documents without any deviation to the specified scope of work.

We also confirm that in case any discrepancies/ inconsistencies and deviations/ omissions/ reservations, as referred to in para (i) and (ii) above, is observed in the online price bid, the same shall be deemed as withdrawn/rectified without any financial implication, whatsoever to **XXXXX (Name of Employer)**. However, in case of any arithmetical errors, the same shall be governed as per the provision of ITB Sub-Clause 27.2.

Date:..... (Signature).....

Place:..... (Printed Name).....

(Designation).....

(Common Seal).....



Attachment-19

**Rural households electrification works of XXXXXXXX (name of district/ circle) under Jodhpur Discom in Rajasthan under SAUBHAGYA Scheme
(Specification No.:XXXXXXXXXXXXXXXXXXXXXXX)
(Bank Guarantee verification Check list)**

Bidder's Name and Address:

To,

**Jodhpur Vidyut Vitran Nigam Limited
Office of the SE (CSS), New power house premises,
Heavy Industrial Area, Jodhpur 342001 (Rajasthan),
Phone: 0291-2742336
Fax: 0291-2745259,
E - Mail: secssjodhpur@gmail.com**

S. No.	Checklist	Yes	No
1	Does the bank guarantee compare verbatim with standard proforma for BG?		
2(a)	Has the executing Officer of BG indicated his name designation & Power of Attorney No. / Signing power Number etc. on BG?		
2(b)	Is each page of BG duly Signed/ initialed by the executants and last page is signed with full particulars as required in the standard proforma of BG and under the seal of the bank?		
2(c)	Does the last page of the BG carry the signatures of two witnesses alongside the signature of the executing Bank Manager?		
3(a)	Is the BG on non-judicial stamp paper of appropriate value?		
3(b)	Is the date of sale of non-judicial stamp paper shown on the BG and the stamp paper is issued not more than Six months prior to the date of execution of BG?		
4(a)	Are the factual details such as Bid specification No., LOA No. contract price, etc, correct?		
4(b)	Whether Overwriting /cutting, if any on the BG, authenticated under signature & seal of executants?		
5	Is the amount and validity of BG is inline with contract provisions?		
6	Whether the BG has been issued by a reputed (i) Public Sector Bank located in India; or (ii) Scheduled Commercial Indian Private Bank as per the attached list only [List is placed at BDS] (the applicability of the bank should be in line with the provisions of bidding documents)?		

Date:..... (Signature).....

Place:..... (Printed Name).....

(Designation).....

(Common Seal).....

BIDDING DOCUMENT

for

Poat Saubhagya Rural households electrification works in Jodhpur Discom, Rajasthan under DDUGJY New Scheme



Volume – III **Setion-I** **(Technical Specifications)**

Specification Numbers:

Sr. No.	Tender Specification No.
1	JDVVNL/TNTW-581
2	JDVVNL/TNTW-582
3	JDVVNL/TNTW-583
4	JDVVNL/TNTW-584
5	JDVVNL/TNTW-585
6	JDVVNL/TNTW-586
7	JDVVNL/TNTW-587
8	JDVVNL/TNTW-588

PREFACE- TECHNICAL SPECIFICATION

- 1.0 It is not the intent to specify completely herein all details of the design and construction of equipments. However, the equipment shall conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation upto the Bidder's guarantee in a manner acceptable to the Purchaser, who will interpret the meanings of drawings and specifications and shall have the power to reject any work or material which in his judgment is not in accordance therewith. The offered equipment shall be complete with all components necessary for its effective and trouble free operation along with associated equipments, interlocks, protection schemes etc. Such components shall be deemed to be within the scope of supply, irrespective of whether those are specifically brought out in this specification and/or the commercial order or not.

The plant/ equipment/ material offered shall be complete with all parts necessary for their effective and trouble free operation. Such parts will be deemed to be within the scope irrespective of whether they are specifically indicated in the Bid document or not.

Bidder must establish that a proper quality assurance program is being followed by them for manufacture of plant / equipment. Quality assurance Program must have a structure as detailed in following paragraphs.

Quality assurance and failure prevention starts with careful study and scrutiny of our technical specifications & requirements. Bidder / manufacture shall carefully study all the technical parameters and other particulars and the Bidder /manufacture shall categorically give his confirmation that these requirements shall be met in a satisfactory manner.

Bidder/manufacture shall furnish the checks exercised in design calculations The salient features of design shall be made available to the Employer.

Bidder/manufacture shall indicate the various sources of the items being procured. Type of checks, quantum of checks and acceptance norms shall be intimated and random test and check results should be made available for inspection whenever so desired.

It is to be noted that in case, anywhere in the bidding documents, if DDUGJY / "Deen Dayal Upadhyay Gram Jyoti Yojna" is mentioned, the same is to be noted/treated as "SAUBHAGYA" Scheme.

The Bidders shall invariably furnish following information.

- i. Statement giving list of important raw materials, names if sub-Bidder/manufactures for the raw material, list of standards according to which the raw material is purchased & copies of test certificates thereof.
- ii. Information & copies of test certificates as in (i) above in respect of bought out items.

- iii. List of machines & manufacturing facilities available.
- iv. Levels of automation achieved and list of areas where manual processing exists.
- v. List of areas in manufacturing process, where stage inspections are normally carried out for quality control & details of such tests and inspections.
- vi. List of testing equipments available with the bidder for testing of materials specified & test plant limitation, if any, vis-a-vis type, special, acceptance and routine tests specified in the relevant standards. These limitations shall be very clearly brought out in schedule of deviations from specified test equipments.

2. Pre-dispatch Inspection:

- 2.1 Pre-dispatch inspection shall be performed on various materials at manufacturer's work place for which contractor shall be required to raise requisition giving at least 15-day time. Depending on requirement, inspection shall be witnessed by representatives of Employer, PMA/TPIA and/or REC/MoP or any appointed agency.
- 2.2 The contractor shall ensure receipt of material at site within 21 days from date of receipt of dispatch instructions. In case materials are not received within 21 days from date of issue of dispatch instruction, the dispatch instruction shall stand cancelled. All expenditure incurred by Employer in performance of dispatch instruction shall be recovered from partial turnkey contractor.
- 2.3 The Employer's representative may carry out stage inspection of the plant/ equipment during manufacturing/ assembling stage. The Employer shall have absolute right to reject the raw material/component/sub assemblies or complete equipment not found to be conforming to the specification or being of poor quality/ workmanship. The stage inspection will particularly include tests specified for any particular plant or equipment in the technical specification, general routine tests and physical measurements to be conducted during manufacturing stages as per manufacturer's standard practice.
- 2.4 The date of receipt of the letter /call for inspection of material in the office of the work order placing authority shall be deemed as the date of call for inspection and not the date mentioned in the letter or the date of dispatch. The turnkey contractor shall ensure that pre-dispatch inspection for materials are intimated only when the material is completely ready for inspection. On due date of inspection, if it is found that materials are not ready in required quantities or the inspection could not be carried out due to non-availability of requisite calibrated certificate of instruments with manufacturer, closing of

works on scheduled date of inspection, non-availability of sufficient testing/material handling staff at manufacturer works etc, all expenditures incurred on deployment of various inspecting officials along with a fine of Rs 50,000/- shall be recovered from the bills of the agency and re-inspection shall be carried out on expense of contractor. 2nd such situation at same manufacturer/supplier shall result in rejection of name of manufacturer from list of approved vendors/sub-vendors. In case sub-standard materials (old component, re-cycled materials, re-used core material, re-used transformer coil material etc) offered for inspection and are noticed during the inspection, materials shall be rejected and approval of vendors/ sub-vendor shall also be cancelled for all DDUGJY projects.

- 2.5 In case material is failed in testing at works or at CTL lab , then re inspection of material shall be done after depositing of amount of Rs.7500/- only for the works located in the State of Rajasthan and an amount of Rs.15,000/- for the works located outside the State of Rajasthan which shall be paid by the contractor as re- inspection charges to the Sr. Account Officer (CPC), JDVVNL, Jodhpur. Further, in cases where traveling by air is involved the inspection charges will be recovered on actual basis. The contractor will deposit the amount with the Sr. Account Officer (CPC), JDVVNL, Jaipur under intimation to the work order placing authority, failing which the subsequent call for inspection shall not be entertained.
- 2.6 The contractor shall also furnish the latest calibration certificate(s) of the testing instruments / equipments used for the testing of the materials / equipments as covered in the owner order, to the inspecting Officer. The testing instruments / machines should be got calibrated by the contractor from time to time from the Manufacturer of the testing instruments or any Govt. recognized testing laboratory/NABL accredited laboratories. The calibration certificate(s) should not, in any case, be older than one year at the time of presenting the same to the inspecting Officer. In case the contractor fails to comply with the conditions as aforesaid, a certificate in writing of the inspector / representative of the Owner that the contractor has failed to provide the facilities shall be conclusive.

3.TYPE TEST

- 3.1 The type test certificate for any item shall not be more than five (5) years old from the date of submission of the bid.
- 3.2 The Employer may get the Type test or routine tests of any equipment done at Accredited Laboratory by NABL in the country. The type test may be done even after receipt of materials at contractor's site store but not after the guarantee period for the equipment as described elsewhere. The results of such tests will be decided on pass fail basis. In case the equipment fails to pass the Type test , the cost of such test shall be borne by the Contractor.
- 3.3 The Bidder /manufacturing programme shall not be interrupted merely because the plant/equipment has been offered for inspection.

- 3.4 Specification for individual plant /equipment is subject to the conditions mentioned above.
- 3.5 The bidder shall prior to use any material in execution of the work for which technical specification have not been mentioned will use any material after obtaining necessary approval of GTP & Drawing from SE(CSS),JDVVNL,Jodhpur.
- 3.6 If bidder intend to use any material with superior specification then that as specified in the bid document. The prior approval of SE(CSS),JDVVNL,Jodhpur shall be obtained before use and the rates for such substitution will be limited to as per the awarded rates.
- 4 PROCUREMENT FROM MANUFACTURERS / VENDORS:

The Contractor shall be permitted to procure materials from the manufactures / vendors who have following qualified requirements:

- (i) The vendor should be a established / reputed manufacture / supplier who should have supplied the material to erstwhile RSEB or any present distribution company, RVVPL or any other power utility and the contractor / bidder are required to indicate the names & address of the manufactures of various items from which he proposes to buy the same.
- (ii) The manufacturing units shall have all facilities for conducting acceptance & routine tests of equipment / materials.
- (iii) The vendor must have supplied materials as per specifications laid down in the bid- documents of erstwhile RSEB / NIGAMS and have arranged their type testing not before last five years,
- (iv) The vendors approvals shall be obtained for supply of the equipment / materials from the Engineer well in advance.
- (v) All steel items shall be supplied galvanized as per ISS

Note:-

- 1. Latest Technical specifications, Drawings and guaranteed technical particulars of MM wing of Jodhpur/Jaipur/Ajmer Discoms/RRVPL will prevail for all the items incorporated in this project. However Technical Specifications of some of the major items are given hereunder for ready reference.**
- 2. All steel structure should be galvanized as per relevant IS.**
- 3. Although it is mentioned in bidding documents but again to clarify that all steel fabricated items shall be galvanized complying relevant IS**
- 4. The Bidder shall guarantee individually the no Load loss and Load loss without any positive tolerance. The bidder shall also guarantee the total losses (No Load + Load Losses at 75°C) at the 50% of rated load and total losses at 100% of rated shall not exceed the maximum total loss values given in table-3 & 9 of IS1180 (Part-I):2014. The maximum allowable losses at rated voltage and rated frequency permitted at 75 degree centigrade for Distribution Transformers should be as per table No. 3 (for three phase 11/0.4 KV) and table No. 9(for 11/√3 KV / 240 V) as per energy efficiency Level-2 specified in IS 1180(Part-I):2014. The supply shall be availed after getting BIS Certification received from Bureau of -Indian Standard as per Gazette notification of India Published on dated 27 Jan. 2014 as and when applicable. The above losses are maximum allowable and there would not be any positive tolerance. Bids with higher losses than the**

above specified values would be treated as non-responsive. However, the manufacturer can offer losses less than above stated values.

Technical specification for the various items

TECHNICAL SPECIFICATION FOR SUPPLY OF 9 M. LONG PCC POLES OF 400 KG WORKING LOAD WITH FACTOR OF SAFTY 2.0,

1. SCOPE :

This specification covers the design, manufacture, inspection, testing and delivery of finished 9 metre long- 400 Kg. rectangular shaped, solid prestressed cement Concrete poles, witnessing of tests before dispatch and its transportation from the firm's works to consignee's head quarters. These poles are to be used for erection of 33 KV /11 KV over head lines and installation of transformers.

2. CLIMATIC CONDITIONS

I. Peak ambient temperature	50 Degree C
II. Maximum average ambient temperature	40 Degree C
III. Maximum temperature attainable	60 Degree C
IV. Maximum relative humidity	100 %
V. Minimum relative humidity	50 %
VI. Average number of thunder storm days per annum	40
VII. Average number of rainy days per annum	100
VIII. Average annual rainfall	10-100 cm
IX. Maximum wind pressure	100 Kg/sq.m
X. Altitudes not exceeding	1000 mtrs.

3. DETAILS OF APPLICABLE STANDARDS/SPECIFICATION/MANUALS :

The pole shall comply with the relevant provisions made in the following Indian Standards Specification (now BIS) with latest amendments / REC specifications.

1	REC manual No.13/1977 (part-I)	Manual on manufacturing of solid poles part-I design aspects.
2	REC manual No.13/1977 (Part.II)	Manual on manufacturing of solid PCC poles part.II manufacturing aspects.

3	REC specification No.15/1979 (amended upto 1983 & thereafter)	Prestressed cement concrete poles (FOS/2.5) for 11 KV and LT lines.
4	IS:1678/1978 (Latest amended)	Specification for PCC poles for overhead power traction & telecommunication lines.
5	IS:2905/1989 (Latest amended)	Method of test for PCC poles for overhead power and telecommunication lines.
6	IS:7321/1974 (Latest amended)	Code of practice for selection handling and erection of concrete poles for overhead power and telecommunication lines.
7	IS:1343/1980(Latest amended)	Code of practice for prestressed concrete
8	IS: 456/1978 (Latest amended)	Code of practice for plain and reinforced concrete
9	IS: 1785(Latest amended)	For HT steel wires for prestressed concrete

4. MATERIAL

The following quality of material should be used for manufacturing of PCC poles.

(i) CEMENT : The cement used in manufacture of prestressed concrete poles shall be ordinary or rapid hardening portland cement conforming to IS:269/1976 (specification for ordinary and low heat portland cement) or IS:8041-E-1978 (specification for rapid hardening portland cement) or portland cement conforming to IS:8112/1976.

(ii) AGGREGATES : Aggregates used for the manufacture of prestressed concrete poles shall conform to IS:383/1970 (specification for coarse and fine aggregates from natural sources for concrete). The nominal maximum size of fine aggregates shall not exceed 10 mm.

(iii) WATER :Water should be free from chlorides, sulphates other salts and organic matter. Potable water is generally suitable.

(iv) ADMIXTURES : These admixtures should not contain calcium chloride or other chlorides and salts which are likely to promote corrosion of pre-stressing steel.

(v) PRE-STRESSING STEEL : The prestressing steel wires including those used as untentioned wires should conform to IS:1785 –1966 Part.I (Specification for plain hard drawn steel wire) or IS:"6003/1970 (Specification for indented wire for prestressed concrete). The type design for plain wires of 4 mm diameter are with a guaranteed ultimate strength of 175 Kg./sq.mm.

(vi) CONCRETE MIX : The concrete mix. shall be designed to the requirements laid down for controlled concrete (also called design requirement laid down/mix. concrete) in IS:1343/1980 (Code of practice for prestressed concrete) and IS:456/1978

(code of practice for plain and reinforced concrete) subject to the following special conditions :

- a) Min. working cube strength at 28th day should be at least 420 Kg. / cm.²
- b) The mix. should contain at least 380 Kg. cement per cubic metre of concrete.
- c) The concrete strength at transfer should be at least 210 Kg. / cm.²
- d) The mix. should contain as low water content as is consistent with adequate workability. If it becomes necessary to add water to increase the workability the cement content should also be raised in such a way that the original value of water cement ratio is maintained.

(vii) REINFORCEMENT : The reinforcing bars and wires used for manufacturing of prestressed cement concrete poles shall conform to the following Indian standards.

- i) Mild steel bars conforming to IS:432/1966.
- ii) High tensile steel wires conforming to IS:1785/1966.

(viii) WELDING AND LAPPING OF STEEL: The high tensile steel wire shall be continuous over the entire length of the tendon. Welding shall not be allowed in any case. However, jointing or coupling be permitted provided the strength of the joint or coupling is not less than the strength of each individual wire.

5. DESIGN REQUIREMENT :

The poles shall be designed to meet the following requirements.

- a) The poles shall be planted directly in the ground with a planting depth of 1.5 metres.
- b) The working load on the poles shall be 400 Kg. applied at 0.6 Mtr. from top.
- c) The factor of safety shall not be less than 2.0.
- d) The average permanent load should be 40% of the working load.
- e) The Factor of safety against first crack load shall be 1.0
- f) The ultimate moment capacity in the longitudinal direction should be atleast one fourth of that in the transverse direction.
- g) The max. compressive stress in concrete at the time of transfer of prestress should not exceed 0.8 times the cube strength.
- h) The concrete strength at transfer shall not be less than half of the 28th day strength ensured in the design i.e. : $420 \times 0.5 = 210 \text{ KG./SQ.MM.}$
- i) The cover concrete measured from outside of prestressing tendon shall be normally 20 mm.
- j) At the design value of first crack load the modules of rupture shall not exceed 55.2 Kg./cm for M-42 concrete.

6. OPTIMUM DESIGN DIMENSIONS :

Bottom depth.	:	395 mm
Top depth.	:	225 mm
Breadth.	:	100 mm
No. of tensioned wire	:	20 Nos. wires of 4 mm dia.
Configuration type.	:	JDVVNL specification

7. OTHER TECHNICAL REQUIREMENT :

A) EARTHING : Earthing shall be provided, by having continuous length of 4 mm dia G.I.wire embeded in concrete during manufacture and the ends of G.I. wire left projected from the transverse face of the poles to a length of 100 mm at 250 mm from top and 150 mm below ground level (Planting depth to be 1.5 M) The tolerance of 25 mm shall be allowed in position of earth wire. The earth wire shall not be allowed to entangle with prestressing wires.

B) EYE HOOKS : The eye hooks shall be provided on the middle of transverse face of the pole as per IS: 7321/1974 at a distance of about 2.25 metre from top and about 1.8 metre from the bottom, to facilitate the handling. The eye hooks shall be of 12 mm dia MS round and shall have an internal dia of 40 mm. The tolerance of minus 5 mm and plus 20mm in internal dia of eye hooks shall be allowed. the eye hooks in question shall be securely embeded in the pole to ensure safe handling.

C) REINFORCEMENT : The poles offered should have 8 Nos. rings of 4 mm dia HT wires rings on top side of the pole and 8 Nos. rings of 4 mm dia HT wire rings on the bottom side of the pole thus total HT wire rings should be 16 in all or 4 Nos. of 6 mm dia MS round rings on top side and 4 Nos. of 6 mm dia MS round rings on bottom side are to be provided. The minimum inter spacing of 20 mm in case of 4 mm dia HT wire rings and 30 mm in case of 6 mm dia MS round rings is to be maintained. These rings should be complete and rectangular in shape with minimum over lapping of 20 mm. No rings are to be bunched together.

D) HOLES : The poles offered should have two holes of 18 mm dia on longitudinal face of pole (broad face) to fix top hamper. The top hole shall be at the distance of 60 mm from top of pole and second hole will be at 160 mm from top of pole.

8. WORKMANSHIP :

(i)All materials used in the finished PCC poles and workmanship shall be of required quality. No deviation with technical particulars required as per this tender specification shall be allowed.

(ii) Apart from the requirements regarding the design, material, process of manufacture, dimensions shape, workmanship finishing etc., acceptability of PCC poles shall be determined by the results of various tests to evaluate their properties as stipulated in the relevant IS/specification.

9. DRAWINGS :

The tenderer shall furnish alongwith the tender the detailed dimensional drawing based on the JDVVNL drawing (enclosed) showing the plan, elevation and end cross sectional views clearly indicating the configuration of HT wire size and No. of HT-wires, eye-hook's

position & projection of earth wire marking & reinforcement. The drawing is also required to be got approved before commencement of supply.

10. MARKING :

(A) The poles shall be clearly & indelibly marked with the following particulars by engraving properly at a height of 3 metres from the bottom end so as to be easily readable after erection. Marking should not be painted.

1. S.No. of pole.
2. Date, month and year of manufacture.
3. Name/mark of manufacturer.

It should be distinct and should not resemble with mark of other manufacturers and if it resembles with marking of other manufacturers then you should change your marking.

4. DDUGJY/TWTW/JDVVNL
5. Length and working load 9 M/400 Kg.

(B) RED STRIP PAINTING: A strip of 30-40 mm shall be painted on one side (transverse face) of the pole at a planting depth (1.5 Metre from bottom) with oil paint of red color in such a manner that the red strip shall be visible above the ground. Poles without marking of red strip will not be accepted and considered as rejected.

11. INSPECTION, TESTING & CHECKING :

The inspection and testing shall be carried out at supplier's works as per relevant ISS: GTP before dispatch.

The supplier shall incorporate the following certificate in his offer letter which should indicate Sr. No. & total No. of poles casted on different dates, as offered for the present inspection :

- a) That all the PCC poles included in the lot under the present inspection conform to the design, strength and workmanship required as per the purchase order, GTP of the specification and contract drawing under the TN-4469.
- b) That none of the PCC poles offered for the present inspection was previously rejected / not considered for inspection or tested for transverse load strength by any other inspecting officer.

The supplier shall furnish the following certificates / tests results to our Inspecting Officer at the time of inspection, if desired.

- a) The supplier shall furnish test results from the manufacturer to substantiate that HT steel wire of required quality was used in the manufacture of PCC poles under the present inspection.

b) The supplier shall certify that cement, prestressed steel wires, M.S. Bars, aggregates and other material had been used as per the required specifications, to manufacture the PCC Poles under the present inspection.

The supplier shall arrange the required number of PCC Poles out of the offered lots as per the sampling plan under this specification for witnessing the various tests by Inspecting Officer. The poles so tested in presence of the Inspecting Officer shall be preserved for atleast 30 days from the date of inspection for subsequent checking by any other representative for the purchaser if needed. The supplier shall intimate in writing name and address of purchaser of tested poles otherwise the PBG will not be released.

The supplier shall provide the following documents to Inspecting Officer, to facilitate and authenticate the process of inspection, checking and testing.

- a) One set of copies of P.O., relevant IS and specification of TN (with the latest amendment, if any)
- b) Copy of approved Drawing.
- c) Details of all meters/ instruments /equipments to be used in the process of checking and testing of the material alongwith the details for their last calibration (original) certificates of calibration indicating that calibration had been done to full range on all the scales to verify that the last calibration and sealing was got done from the manufacturer or an independent test house approved by Government within one year prior to the date of inspection.

Inspection shall not be carried out further, if the above requirements are not fulfilled satisfactorily.

A. SAMPLING:

a) Randomness is the pre requisite for sample checking and testing. Starting from any random serial number or PCC poles in the offered lot (arranged serial number wise and sub-divided sub-lots each not exceeding 500 Nos. of poles) every pole shall be included in the sample "r" being the next higher integral part of N/n where N is the size of the lot or sub-lot and "n" is the sample size as per the table below:-

Sample size and criterion for conformity :

Size of lot or sub-lot in numbers (N)	Dimensional requirement		No.of poles for transverse strength test (n)
	sample size (n)	Permissible No. of defective samples	
1	2	3	4
Upto 100	10	1	1
101 to 200	15	1	3
201 to 300	20	2	4
301 to 500	30	3	5

The minimum size of lot which can be offered for inspection is 100 Nos. of pole except in case of last lot which may be for left out balance quantity. Further lot size once offered for inspection can't be reduced subsequently under the re-inspection unless re-inspection charges for each sub-lot out of the original lot is deposited.

b) Deviation in selection of samples may be effected by the Inspecting Officer only if he thinks that the purpose of checking/testing will be better served by such deviation.

c) The number of poles, in every lot/sub lot, which does not satisfy, the requirement of overall length, cross section and uprightness shall not exceed the corresponding number given in Col.3 of the above Table. If the number of such poles exceeds the corresponding number, supplier shall segregate the pole not confirming the requirement of specification and shall submit the remaining poles for checking. Fresh poles as per sample size indicating in Col.2 will be drawn from the remaining poles of the offered lot or sub lot and subject to similar checking. If the number of effective poles in the second sample of poles also exceeds the permissible number indicated in Col.3 the then the subject lot or sub lot under inspection will be rejected without further checking. Result of all such checking shall be recorded.

d) PCC poles, in every lot/sub lot sampled for transverse load strength test shall satisfy the requirement of the test. Initially selection of sample and inspection and testing of poles will be undertaken as usual as is being done according to IS:1678/1998 and IS:2905/1989 with latest amendments. In case the samples selected satisfied the dimensional requirements and also withstand transverse load test, the lot stands cleared.

In case of one or more poles fail during transverse load test, then twice the number of poles from the sub-lots representative poles from which failed will be taken for transverse load test. If these poles withstand the transverse load test the entire lot will be deemed to have passed the tests and will be cleared, but if one or more pole fails during double sampling, then leaving aside the sub-lots for which double sampling was done and where samples could not withstand transverse load test, the remaining sub-lots representing poles from which have withstood transverse load test will be accepted provided they satisfy clause No. 9.3.2 of IS:1678/1978. However, the destruction test from the sub-lots will be done by the inspecting officer on the poles on which transverse load was performed and the acceptance of these sub-lots will be on the basis of the test results observed by the inspecting officer during destruction test on the respective representative poles.

e) All the poles subject to transverse load strength test shall be reserved for atleast 30 days from the date of inspection for any subsequent checking by any other representative of the purchaser, if required. These poles shall not be dispatched /supplied to the purchaser.

f) One pole from the poles subject to transverse load strength test, from every lot/sub lot, shall be destructed for following measurement/checking.

i) To measure clear thickness of concrete cover at three points one within 1.8 metre from the bottom end of the pole, the second within 0.6 metre from the top end of the pole and the third at an inter-mediate point. The mean value shall be compared with the specified value.

ii) To check Nos., size & configuration of steel reinforcement and GI earth wire.

The destructed poles shall also be preserved for atleast thirty days from the date of inspection for subsequent checking by any other representative of the purchaser if required.

B) INSPECTION :

Inspection shall comprise of :

- a) Verification of offered quantity as per packing list
- b) Visual inspection for shape, workmanship and finishing of the PCC poles.
- c) Checking of dimensions/quantity as per the GTP/specification
- d) Verification of marking and red / black strip as per GTP

C) WITNESS OF TESTS :

- i) On PCC poles for its transverse load strength test .
- ii) On one PCC pole from every lot/sub lot by destruction to ascertain the No., size and configuration of steel reinforcement and GI earth wire etc.

The supplier should have transverse load testing arrangements of its own. Testing arrangement shall be preferably as specified in the relevant specification i.e. IS:1678/1978 & IS:2905/1989 (both latest amended). As per provision of Clause No.6.2.3 of IS:2905/1989 the load shall be applied at a point stipulated in the relevant IS by means of a suitable device such as a wire rope and winch placed in a direction normal to the direction of the length of the pole so that the minimum length of the straight rope under pull is not less than the length of the pole.

As per provision of Clause No.6.2.5 "load measurement" of IS:2905/1989. The dynamometer or any other satisfactory method of load measurement shall be calibrated at regular intervals (not more than one year) and capable of measuring load to the accuracy of 50 N may be adopted.

The transverse strength test on poles shall be conducted in accordance with IS:2905. A prestressed concrete pole shall be deemed not to have passed the test if cracks wider than 0.1 mm appear at a stage prior to the application of the designed transverse load at first crack and the observed ultimate transverse load is less than the designed ultimate transverse load.

The following facilities are to be provided by the supplier at his own cost to the inspecting officer of JDVVNL.

- (a) Suitable accommodation.
- (b) Local conveyance between arrival point, place of stay, works and departure point.
- (c) The supplier shall assist in arranging return ticket and reservation on the request of the inspecting officer for which the payment shall be made by the inspecting officer. In case of joint inspection, single or shared double room accommodation shall be provided.

12. TEST AT SITE :

The purchaser reserves the right to get the material tested after receipt of inspected poles at sites/ stores and claiming any compensation or rejecting the poles if not found

according to specification. All charges consequent to rejection, rectification and replacement shall be borne by the supplier.

13. TOLERANCE :

The following tolerances shall be allowed :

i)	Over all length of PCC poles.	±15 mm
ii)	Top and bottom dimension. (Breadth and depth of PCC poles)	± 3 mm
iii)	Clear concrete cover over HT steel wires (Average of measurements at three sections).	- 2 mm
iv)	Uprightness of the PCC poles.	0.5 %
v)	Internal dia of eye hook	+ 20 mm and – 5 mm
vi)	Dia of holes	± 1 mm
vii)	Diameter of HT wires as per IS: 280/1979	± 0.05 %
viii)	Diameter of GI wire as per IS:280/1979	± 2.5%
ix)	Diameter of MS rod for eye hook as per 1786/1966	± 4%

Higher dimensions of poles shall attract no penalty / deduction as it will not be considered as deviation.

14. GUARANTEED TECHNICAL PARTICULARS :

The tenderer shall furnish the guaranteed technical particulars of the PCC poles as required in the schedule-A by mentioning specific figures therein. Any item of the GTP left unfilled or simply written as per ISS etc. shall be considered as incomplete GTP.

15. TRANSPORTATION ARRANGEMENTS :

The tenderer must furnish the location of the factory and road distances from their factory site to various destinations (sub-divisional headquarters of JDVVNL) through shortest route.

The tenderers should also furnish the particulars of transportation vehicles owned by them.

16. CRITERIA FOR ACCEPTANCE:

The inspected PCC poles should be strictly in accordance to the GTP of the specification otherwise the material shall be treated as rejected and shall not be accepted. However, the poles with some minor deviations may be accepted with deductions as per rates prescribed and in force.

Higher dimensions of poles shall not attract any penalty / deduction, as it will not be considered as deviation.

SCHEDULE-A

GUARANTEED TECHNICAL AND OTHER PARTICULARS OF 9 METRE PCC POLES HAVING WORKING LOAD 400 KG. WITH FACTOR OF SAFETY 2.0

S.No.	Particulars	Requirement as per GTP
1	MANUFACTURER'S NAME	
2	OFFICE ADDRESS	
3	WORKS ADDRESS	
4	STANDARDS TO WHICH THE MATERIAL SHALL CONFORM	As per specification
5	OVER ALL LENGTH	9 metre
6	PLANTING DEPTH	1.5 metre
7	TOP DIMENSIONS IN MM	225x100 mm
8	BOTTOM DIMENSIONS IN MM	395x100 mm
9	APPROXIMATE WEIGHT	675 Kg.
10	WORKING LOAD	400 Kg.
11	FACTOR OF SAFETY (F.O.S.)	2.0
12	NO. & DIA OF HT WIRE (TENSIONED)	20 (4 mm dia)
13	CONFIGURATION OF HT WIRE	As per approved drawing
14	POSITION OF EARTH WIRE LENGTH AND SIZE OF WIRE	G.I. wire of 4 mm dia having continuous length with a projection of 100 mm at 250 mm from top and 150 mm from below ground level.
15	DIMENSIONS AND POSITION OF EYE HOOKS	2 Nos. of Eye hook of 12 mm dia M.S. round having internal dia of 40 mm at 2.25 metre from top and 1.8 metre from bottom
16	REINFORCEMENT (SIZE AND NO. OF RINGS)	8 Nos. of rings of 4 mm dia HT wires on top and 8 Nos. of rings on bottom (both ends) with minimum inter spacing of 20 mm.
17	CONCRETE COVER	20 mm
18	MARKING ON THE POLES	Marking should be engraved on transverse face
19	RED STRIP	A strip of 30-40 mm shall be painted with oil paint of red colour, on one side(transverse face) of the pole at a planting depth (1.5 Metre from bottom)
20	HOLES POSITION	2 holes of 18 mm dia at 60 mm and 160 mm from top on longitudinal face of the pole(broad face).
21	CONCRETE QUANTITY PER POLE	0.279 M ³
22	CONCRETE GRADE	M-42

Note:- Max. tension in wire should not exceed 80% of its ultimate tensile strength.

Signature of the Bidder
Name _____
Designation _____
Common authorized seal of bidder

TECHNICAL SPECIFICATION FOR SUPPLY OF 9 M. LONG PCC POLES OF 200 KG WORKING LOAD WITH FACTOR OF SAFTY 2.5,

1. SCOPE :

This specification covers the design, manufacture, inspection and testing 9 metre long-200 Kg. rectangular shaped, solid prestressed cement Concrete poles, witnessing of tests before dispatch and its transportation from the firm's works to consignee's head quarters. These poles are to be used for erection of 11 KV & LT over head lines and installation of 11/.4 KV distribution transformers.

2. CLIMATIC CONDITIONS

XI. Peak ambient temperature	50 Degree C
XII. Maximum average ambient temperature	40 Degree C
XIII. Maximum temperature attainable	60 Degree C
XIV. Maximum relative humidity	100 %
XV. Minimum relative humidity	50 %
XVI. Average number of thunder storm days per annum	40
XVII. Average number of rainy days per annum	100
XVIII. Average annual rainfall	10-100 cm
XIX. Maximum wind pressure	100 Kg/sq.m
XX. Altitudes not exceeding	1000 mtrs.

3. DETAILS OF APPLICABLE STANDARDS/SPECIFICATION/MANUALS :

The pole shall comply with the relevant provisions made in the following Indian Standards Specification (now BIS) with latest amendments / REC specifications.

1	REC manual No.13/1977 (part-I)	Manual on manufacturing of solid poles part-I design aspects.
2	REC manual No.13/1977 (Part.II)	Manual on manufacturing of solid PCC poles part.II manufacturing aspects.
3	REC specification No.15/1979 (amended upto 1983 & thereafter	Prestressed cement concrete poles (FOS/2.5) for 11 KV and LT lines.
4	IS:1678/1978 (Latest amended)	Specification for PCC poles for overhead power traction & telecommunication lines.
5	IS:2905/1989 (Latest amended)	Method of test for PCC poles for overhead power and telecommunication lines.
6	IS:7321/1974 (Latest amended)	Code of practice for selection handling and erection of concrete poles for overhead power and telecommunication lines.
7	IS:1343/1980(Latest amended)	Code of practice for prestressed concrete
8	IS: 456/1978 (Latest amended)	Code of practice for plain and reinforced

		concrete
9	IS: 1785(Latest amended)	For HT steel wires for prestressed concrete

4. MATERIAL

The following quality of material should be used for manufacturing of PCC poles.

(i) CEMENT : The cement used in manufacture of prestressed concrete poles shall be ordinary or rapid hardening portland cement conforming to IS:269/1976 (specification for ordinary and low heat portland cement) or IS:8041-E-1978 (specification for rapid hardening portland cement) or portland cement conforming to IS:8112/1976.

(ii) AGGREGATES : Aggregates used for the manufacture of prestressed concrete poles shall conform to IS:383/1970 (specification for coarse and fine aggregates from natural sources for concrete). The nominal maximum size of fine aggregates shall not exceed 10 mm.

(iii) WATER :Water should be free from chlorides, sulphates other salts and organic matter. Potable water is generally suitable.

(iv) ADMIXTURES :These admixtures should not contain calcium chloride or other chlorides and salts which are likely to promote corrosion of pre-stressing steel.

(v) PRE-STRESSING STEEL : The prestressing steel wires including those used as unintentioned wires should conform to IS:1785 –1966 Part.I (Specification for plain hard drawn steel wire) or IS:"6003/1970 (Specification for indented wire for prestressed concrete). The type design for plain wires of 4 mm diameter are with a guaranteed ultimate strength of 175 Kg./sq.mm.

(vi) CONCRETE MIX :The concrete mix. shall be designed to the requirements laid down for controlled concrete (also called design requirement laid down/mix. concrete) in IS:1343/1980 (Code of practice for prestressed concrete) and IS:456/1978 (code of practice for plain and reinforced concrete) subject to the following special conditions :

- a) Min. working cube strength at 28th day should be at least 450 Kg. / cm.²
- b) The mix. should contain at least 380 Kg. cement per cubic metre of concrete.
- c) The concrete strength at transfer should be at least 225Kg. / cm.²
- d) The mix. should contain as low water content as is consistent with adequate workability. If it becomes necessary to add water to increase the workability the cement content should also be raised in such a way that the original value of water cement ratio is maintained.

(vii) REINFORCEMENT :The reinforcing bars and wires used for manufacturing of prestressed cement concrete poles shall conform to the following Indian standards.

- i) Mild steel bars conforming to IS:432/1966.
- ii) High tensile steel wires conforming to IS:1785/1966.

(viii) **WELDING AND LAPPING OF STEEL:** The high tensile steel wire shall be continuous over the entire length of the tendon. Welding shall not be allowed in any case. However, jointing or coupling be permitted provided the strength of the joint or coupling is not less than the strength of each individual wire.

5. DESIGN REQUIREMENT :

The poles shall be designed to meet the following requirements.

- a) The poles shall be planted directly in the ground with a planting depth of 1.5metres.
- b) The working load on the poles shall be 200 Kg. applied at 0.6 Mtr. from top.
- c) The factor of safety shall not be less than 2.5.
- d) The average permanent load should be 40% of the working load.
- e) The Factor of safety against first crack load shall be 1.0
- f) The ultimate moment capacity in the longitudinal direction should be atleast one fourth of that in the transverse direction.
- g) The max. compressive stress in concrete at the time of transfer of prestress should not exceed 0.8 times the cube strength.
- h) The concrete strength at transfer shall not be less than half of the 28th day strength ensured in the design i.e. : $450 \times 0.5 = 225 \text{ KG./SQ.MM.}$
- i) The concrete cover measured from outside of prestressing tendon shall be 30 mm.
- j) At the design value the first crack load the modulus of rupture shall not exceed 55.2 Kg. / cm for M-45 concrete

6. OPTIMUM DESIGN DIMENSIONS :

Bottom depth.	:	300 mm
Top depth.	:	145 mm
Breadth.	:	114 mm
No. of tensioned wire	:	16Nos. wires of 4 mm dia.
Configuration type.	:	JDVVNL specification

7. OTHER TECHNICAL REQUIREMENT :

A) EARTHING : Earthing shall be provided, by having continuous length of 4 mm dia G.I. wire embedded in concrete during manufacture and the ends of G.I. wire left projected from the transverse face of the poles to a length of 100 mm at 250 mm from top and 150 mm below ground level (Planting depth to be 1.5 M) The tolerance of 25 mm shall be allowed in position of earth wire. The earth wire shall not be allowed to entangle with prestressing wires.

B) EYE HOOKS : The eye hooks shall be provided on the middle of transverse face of the pole as per IS: 7321/1974 at a distance of about 2.25metre from top and about 1.8metre from the bottom, to facilitate the handling. The eye hooks shall be of 12 mm dia MS round and shall have an internal dia of 40 mm. The tolerance of minus 5 mm and plus 20mm in internal dia of eye hooks shall be allowed. the eye hooks in question shall be securely embedded in the pole to ensure safe handling.

C) REINFORCEMENT : The poles offered should have 8 Nos. rings of 4 mm dia HT wires rings on top side of the pole and 8 Nos. rings of 4 mm dia HT wire rings on the

bottom side of the pole thus total HT wire rings should be 16 in all or 4 Nos. of 6 mm dia MS round rings on top side and 4 Nos. of 6 mm dia MS round rings on bottom side are to be provided. The minimum inter spacing of 20 mm in case of 4 mm dia HT wire rings and 30 mm in case of 6 mm dia MS round rings is to be maintained. These rings should be complete and rectangular in shape with minimum over lapping of 20 mm. No rings are to be bunched together.

D) HOLES : The poles offered should have two holes of 18 mm dia on longitudinal face of pole (broad face) to fix top hamper. The top hole shall be at the distance of 60 mm from top of pole and second hole will be at 160 mm from top of pole.

8. WORKMANSHIP :

(i) All materials used in the finished PCC poles and workmanship shall be of required quality. No deviation with technical particulars required as per this tender specification shall be allowed.

(ii) Apart from the requirements regarding the design, material, process of manufacture, dimensions shape, workmanship finishing etc., acceptability of PCC poles shall be determined by the results of various tests to evaluate their properties as stipulated in the relevant IS/specification.

9. DRAWINGS :

The tenderer shall furnish alongwith the tender the detailed dimensional drawing based on the JDVVNL drawing (enclosed) showing the plan, elevation and end cross sectional views clearly indicating the configuration of HT wire size and No. of HT-wire, eye-hook's position & projection of earth wire marking & reinforcement. The drawing is also required to be got approved before commencement of supply.

10. MARKING :

(A) The poles shall be clearly & indelibly marked with the following particulars by engraving properly at a height of 3 metres from the bottom end so as to be easily readable after erection. Marking should not be painted.

1. S.No. of pole.
2. Date, month and year of manufacturing
3. Name/mark of manufacturer.

It should be distinct and should not resemble with mark of other manufacturers and if it resembles with marking of other manufacturers then you should change your marking.

3. Length and working load 9 M/200 Kg.
4. SAUBHAGYA/TNTW

(B) BLACK STRIP PAINTING: A strip of 30-40 mm shall be painted on one side (transverse face) of the pole at a planting depth (1.5Metre from bottom) with oil paint of

blackcolour in such a manner that the black strip shall be visible above the ground. Poles without marking of blackstrip will not be accepted and considered as rejected.

11. INSPECTION, TESTING & CHECKING :

The inspection and testing shall be carried out at supplier's works as per relevant ISS:
GTP

The supplier shall incorporate the following certificate in his offer letter which should indicate Sr. No. & total No. of poles casted on different dates, as offered for the present inspection :

a) That all the PCC poles included in the lot under the present inspection conform to the design, strength and workmanship required as per the purchase order, GTP of the specification and contract drawing under the TN-

b) That none of the PCC poles offered for the present inspection was previously rejected / not considered for inspection or tested for transverse load strength by any other inspecting officer.

The supplier shall furnish the following certificates / tests results to our Inspecting Officer at the time of inspection, if desired.

a) The supplier shall furnish test results from the manufacturer to substantiate that HT steel wire of required quality was used in the manufacture of PCC poles under the present inspection.

b) The supplier shall certify that cement, prestressed steel wires, M.S. Bars, aggregates and other material had been used as per the required specifications, to manufacture the PCC Poles under the present inspection.

The supplier shall arrange the required number of PCC Poles out of the offered lots as per the sampling plan under this specification for witnessing the various tests by Inspecting Officer. The poles so tested in presence of the Inspecting Officer shall be preserved for atleast 30 days from the date of inspection for subsequent checking by any other representative for the purchaser if needed. The supplier shall intimate in writing name and address of purchaser of tested poles otherwise the PBG will not be released.

The supplier shall provide the following documents to Inspecting Officer, to facilitate and authenticate the process of inspection, checking and testing.

a) One set of copies of P.O., relevant IS and specification of TN (with the latest amendment, if any)

b) Copy of approved Drawing.

c) Details of all meters/ instruments /equipments to be used in the process of checking and testing of the material alongwith the details for their last calibration (original) certificates of calibration indicating that calibration had been done to full range on all the scales to verify that the last calibration and sealing was got done from the manufacturer or an independent test house approved by Government within one year prior to the date of inspection.

Inspection shall not be carried out further, if the above requirements are not fulfilled satisfactorily.

A. SAMPLING:

a) In a consignment, 500 poles or a part thereof of the same overall length, same dimensions and belonging to the same batch of manufacturer shall be grouped together to constitute a lot.

For ascertaining the conformity of the materials in the lot to the requirements of the specification, samples shall be tested from each lot separately.

The number of poles to be selected from the lot shall depend on the size of the lot and shall be according to table as under:-

Sample size and criterion for conformity :

Size of lot or sub-lot in numbers (N)	Dimensional requirement		No. of poles for transverse strength test (n)
	sample size (n)	Permissible No. of defective samples	
1	2	3	4
Upto 100	10	1	1
101 to 200	15	1	3
201 to 300	20	2	4
301 to 500	30	3	5

The minimum size of lot which can be offered for inspection is 200 Nos. of pole except in case of last lot which may be for left out balance quantity. Lot size once offered for inspection can not be reduced subsequently under the re-inspection, unless re-inspection charges for each lot / sub-lot out of the original lot is deposited.

b) Deviation in selection of samples may be effected by the Inspecting Officer only if he thinks that the purpose of checking/testing will be better served by such deviation.

c) The number of poles, in every lot/sub lot, which does not satisfy, the requirement of overall length, cross section and uprightness shall not exceed the corresponding number given in Col.3 of the above Table. If the number of such poles exceeds the corresponding number, supplier shall segregate the pole not confirming the requirement of specification and shall submit the remaining poles for checking. Fresh poles as per sample size indicating in Col.2 will be drawn from the remaining poles of the offered lot or sub lot and subject to similar checking. If the number of effective poles in the second sample of poles also exceeds the permissible number indicated in Col.3 the then the subject lot or sub lot under inspection will be rejected without further checking. Result of all such checking shall be recorded.

d) PCC poles, in every lot/sub lot sampled for transverse load strength test shall satisfy the requirement of the test. Initially selection of sample and inspection and testing of poles will be undertaken as usual as is being done according to IS:1678/1998 and

IS:2905/1989 with latest amendments. In case the samples selected satisfied the dimensional requirements and also withstand transverse load test, the lot stands cleared. In case of one or more poles fail during transverse load test, then twice the number of originally tested shall be selected from those already selected and subjected to the tests. If these poles withstand the transverse load test the entire lot will be deemed to have passed the tests and will be cleared, but if one or more pole fails during double sampling, then leaving aside the sub-lots for which double sampling was done and where samples could not withstand transverse load test, the remaining sub-lots representing poles from which have withstood transverse load test will be accepted provided they satisfy clause No. 9.3.2 of IS:1678/1978. However, the destruction test from the sub-lots will be done by the inspecting officer on the poles on which transverse load was performed and the acceptance of these sub-lots will be on the basis of the test results observed by the inspecting officer during destruction test on the respective representative poles.

e) All the poles subject to transverse load strength test shall be reserved for atleast 30 days from the date of inspection for any subsequent checking by any other representative of the purchaser, if required. These poles shall not be dispatched /supplied to the purchaser.

f) One pole from the poles subject to transverse load strength test, from every lot/sub lot, shall be destructed for following measurement/checking.

i) To measure clear thickness of concrete cover at three points one within 1.8 metre from the bottom end of the pole, the second within 0.6 metre from the top end of the pole and the third at an inter-mediate point. The mean value shall be compared with the specified value.

ii) To check Nos., size & configuration of steel reinforcement and GI earth wire.

The destructed poles shall also be preserved for atleast thirty days from the date of inspection for subsequent checking by any other representative of the purchaser if required.

B) INSPECTION :

Inspection shall comprise of :

- a) Verification of offered quantity as per packing list
- b) Visual inspection for shape, workmanship and finishing of the PCC poles.
- c) Checking of dimensions as per the GTP/specification

C) WITNESS OF TESTS :

- iii) On PCC poles selected for transverse load strength test as per sampling plan.
- iv) On one PCC pole from every lot/sub lot be destructed to ascertain the No., size and configuration of steel reinforcement and GI earth wire etc.

The supplier should have transverse load testing arrangements of its own. Testing arrangement shall be preferably as specified in the relevant specification i.e. IS:1678/1978 & IS:2905/1989 (both latest amended). As per provision of Clause No.6.2.3

of IS:2905/1989 the load shall be applied at a point stipulated in the relevant IS by means of a suitable device such as a wire rope and winch placed in a direction normal to the direction of the length of the pole so that the minimum length of the straight rope under pull is not less than the length of the pole.

As per provision of Clause No.6.2.5 "load measurement" of IS: 2905/1989. The dynamometer or any other satisfactory method of load measurement shall be calibrated at regular intervals and capable of measuring load to the accuracy of 50 N may be adopted.

The transverse strength test on poles shall be conducted in accordance with IS 2905. A prestressed concrete pole shall be deemed not to have passed the test if cracks wider than 0.1 mm appear at a stage prior to the application of the designed transverse load at first crack and the observed ultimate transverse load is less than the designed ultimate transverse load.

12. TEST AT SITE :

The purchaser reserves the right to get the material tested after receipt of inspected poles at sites/stores and claiming any compensation or rejecting the poles if not found according to specification. All charges consequent to rejection, rectification and replacement shall be borne by the supplier.

13. TOLERANCE :

The following tolerances shall be allowed :

- | | | |
|-------|---|--------------------|
| i) | Over all length of PCC poles. | ±15 mm |
| ii) | Top and bottom dimension. (Breadth and depth of PCC poles) | ± 3 mm |
| iii) | Clear concrete cover over HT steel wires (Average of measurements at three sections). | - 2 mm |
| iv) | Uprightness or straightness of the PCC poles. | 0.5 % |
| v) | Internal dia of eye hook | + 20 mm and – 5 mm |
| vi) | Dia of holes | ± 1 mm |
| vii) | Diameter of HT wires as per IS: 280/1979 | ± 0.05 % |
| viii) | Diameter of GI wire as per IS:280/1979 | ± 2.5% |
| ix) | Diameter of MS rod for eye hook as per 1786/1966 | ± 4% |

Higher dimensions of poles shall attract no penalty / deduction as it will not be considered as deviation.

154. GUARANTEED TECHNICAL PARTICULARS :

The tenderer shall furnish the guaranteed technical particulars of the PCC poles as required in the schedule-A by mentioning specific figures therein. Any item of the GTP left unfilled or simply written as per ISS etc. shall be considered as incomplete GTP

15. TRANSPORTATION ARRANGEMENTS :

The tenderer must furnish the location of the factory and road distances from their factory site to various destinations (sub-divisional headquarters of JDVVNL) through shortest route.

The tenderers should also furnish the particulars of transportation vehicles owned by them..

16. CRITERIA FOR ACCEPTANCE:

The inspected PCC poles should be strictly in accordance to the GTP of the specification otherwise the material shall be treated as rejected and shall not be accepted. However, the poles with some minor deviations may be accepted with deductions as per rates prescribed and in force.

Higher dimensions of poles shall not attract any penalty / deduction, as it will not be considered as deviation.

SCHEDULE-A**GUARANTEED TECHNICAL AND OTHER PARTICULARS OF 9 METRE PCC POLES HAVING WORKING LOAD 200 KG. WITH FACTOR OF SAFETY 2.5**

S.No.	Particulars	Requirement as per GTP
1	MANUFACTURER'S NAME	
2	OFFICE ADDRESS	
3	WORKS ADDRESS	
4	STANDARDS TO WHICH THE MATERIAL SHALL CONFORM	As per specification
5	OVER ALL LENGTH	9 metre
6	PLANTING DEPTH	1.5metre
7	TOP DIMENSIONS IN MM	145 x114 mm
8	BOTTOM DIMENSIONS IN MM	300 x114 mm
9	APPROXIMATE WEIGHT	545 Kg.
10	WORKING LOAD	200 Kg.
11	FACTOR OF SAFETY (F.O.S.)	2.5
12	NO. & DIA OF HT WIRE (TENSIONED)	16(4 mm dia)
13	CONFIGURATION OF HT WIRE	As per approved drawings
14	POSITION OF EARTH WIRE LENGTH AND SIZE OF WIRE	G.I. wire of 4 mm dia having continuous length with a projection of 100 mm at 250 mm from top and 150 mm from below ground level.
15	DIMENSIONS AND POSITION OF EYE HOOKS	2 Nos. of Eye hook of 12 mm dia M.S. round having internal dia of 40 mm at 2.25metre from top and 1.8metre from bottom
16	REINFORCEMENT (SIZE AND NO. OF RINGS)	8 Nos. of rings of 4 mm dia HT wires on top and 8 Nos. of rings on bottom (both ends) with minimum inter spacing of 20 mm.
17	CONCRETE COVER	30 mm
18	MARKING ON THE POLES	Marking should be engraved on transverse face
19	BLACK STRIP	A strip of 30-40 mm shall be painted with oil paint of Black colour, on one side (transverse face) of the pole at a planting depth of 1.5 Metre from bottom.
20	HOLES POSITION	2 holes of 18 mm dia at 60 mm and 160 mm from top on longitudinal face of the pole (broad face).
21	ULTIMATE TENSILE STRENGTH	17500 Kg./ sq.cm
22	CONCRETE QUANTITY PER POLE	0.228M ³
23	CONCRETE GRADE	M-45

Note:- Max. tension in wire should not exceed 80% of its ultimate tensile strength.

Signature of the Bidder
Name _____
Designation _____
Common authorized seal of bidder

TECHNICAL SPECIFICATION FOR SUPPLY OF 8 M. LONG PCC POLES OF 200 KG WORKING LOAD WITH FACTOR OF SAFTY 2.5, .

1. SCOPE :

This specification covers the design, manufacture, inspection and testing of finished 8 Metre long- 200 Kg. rectangular shaped, solid prestressed cement Concrete poles, witnessing of tests before despatch and its transportation from the firm's works to consignee's head quarters. These poles are to be used for erection of 11 KV & LT over head lines.

2. CLIMATIC CONDITIONS

I. Peak ambient temperature	50 Degree C
II. Maximum average ambient temperature	40 Degree C
III. Maximum temperature attainable	60 Degree C
IV. Maximum relative humidity	100 %
V. Minimum relative humidity	50 %
VI. Average number of thunder storm days per annum	40
VII. Average number of rainy days per annum	100
VIII. Average annual rainfall	10-100 cm
IX. Maximum wind pressure	100 Kg/sq.m
X. Altitudes not exceeding	1000 mtrs.

3. DETAILS OF APPLICABLE STANDARDS/SPECIFICATION/MANUALS :

The pole shall comply with the relevant provisions made in the following Indian Standards Specification (now BIS) with latest amendments / REC specifications.

1	REC manual No.13/1977 (part-I)	Manual on manufacturing of solid poles part-I design aspects.
2	REC manual No.13/1977 (Part.II)	Manual on manufacturing of solid PCC poles part.II manufacturing aspects.
3	REC specification No.15/1979 (amended upto 1983 & thereafter	Prestressed cement concrete poles (FOS/2.5) for 11 KV and LT lines.
4	IS:1678/1978 (Latest amended)	Specification for PCC poles for overhead power traction & telecommunication lines.

5	IS:2905/1989 (Latest amended)	Method of test for PCC poles for overhead power and telecommunication lines.
6	IS:7321/1974 (Latest amended)	Code of practice for selection handling and erection of concrete poles for overhead power and telecommunication lines.
7	IS:1343/1980(Latest amended)	Code of practice for prestressed concrete
8	IS: 456/1978 (Latest amended)	Code of practice for plain and reinforced concrete
9	IS: 1785(Latest amended)	For HT steel wires for prestressed concrete

4. MATERIAL

The following quality of material should be used for manufacturing of PCC poles.

(i) CEMENT : The cement used in manufacture of prestressed concrete poles shall be ordinary or rapid hardening portland cement conforming to IS:269/1976 (specification for ordinary and low heat portland cement) or IS:8041-E-1978 (specification for rapid hardening portland cement) or portland cement conforming to IS:8112/1976.

(ii) AGGREGATES : Aggregates used for the manufacture of prestressed concrete poles shall conform to IS:383/1970 (specification for coarse and fine aggregates from natural sources for concrete). The nominal maximum size of fine aggregates shall not exceed 10 mm.

(iii) WATER :Water should be free from chlorides, sulphates, other salts and organic matter. Potable water is generally suitable.

(iv) ADMIXTURES : These admixtures should not contain calcium chloride or other chlorides and salts which are likely to promote corrosion of pre-stressing steel.

(v) PRE-STRESSING STEEL : The prestressing steel wires including those used as unintentioned wires should conform to IS:1785 –1966 Part.I (Specification for plain hard drawn steel wire) or IS:"6003/1970 (Specification for indented wire for prestressed concrete). The type design for plain wires of 4 mm diameter are with a guaranteed ultimate strength of 175 Kg./sq.mm.

(vi) CONCRETE MIX : The concrete mix. shall be designed to the requirements laid down for controlled concrete (also called design requirement laid down/mix. concrete) in IS:1343/1980 (Code of practice for prestressed concrete) and IS:456/1978 (code of practice for plain and reinforced concrete) subject to the following special conditions :

- a) Min. working cube strength at 28th day should be at least 420 Kg. / cm.²
- b) The mix. should contain at least 380 Kg. cement per cubic metre of concrete.

- c) The concrete strength at transfer should be at least 210Kg. / cm.²
- d) The mix. should contain as low water content as is consistent with adequate workability. If it becomes necessary to add water to increase the workability the cement content should also be raised in such a way that the original value of water cement ratio is maintained.

(vii) REINFORCEMENT : The reinforcing bars and wires used for manufacturing of prestressed cement concrete poles shall conform to the following Indian standards.

- i) Mild steel bars conforming to IS:432/1966.
- ii) High tensile steel wires conforming to IS:1785/1966.

(viii) WELDING AND LAPPING OF STEEL: The high tensile steel wire shall be continuous over the entire length of the tendon. Welding shall not be allowed in any case. However, jointing or coupling be permitted provided the strength of the joint or coupling is not less than the strength of each individual wire.

5. DESIGN REQUIREMENT :

The poles shall be designed to meet the following requirements.

- a) The poles shall be planted directly in the ground with a planting depth of 1.5 metres.
- b) The working load on the poles shall be 200 Kg. applied at 0.6 Mtr. from top.
- c) The factor of safety shall not be less than 2.5.
- d) The average permanent load should be 40% of the working load.
- e) The Factor of safety against first crack load shall be 1.0
- f) The ultimate moment capacity in the longitudinal direction should be atleast one fourth of that in the transverse direction.
- g) The max. compressive stress in concrete at the time of transfer of prestress should not exceed 0.8 times the cube strength.
- h) The concrete strength at transfer shall not be less than half of the 28th day strength ensured in the design i.e. : $420 \times 0.5 = 210 \text{ KG./SQ.MM.}$
- i) The concrete cover, measured from outside of prestressing tendon shall be 20 mm.
- j) At the design value, of first crack load the modulus of rupture shall not exceed 55.2 Kg./cm for M-42 concrete.

6. OPTIMUM DESIGN DIMENSIONS :

Bottom depth.	:	290 mm
Top depth.	:	145 mm
Breadth.	:	90mm
No. of tensioned wire	:	12Nos. wires of 4 mm dia.
No. of untensioned wire	:	2Nos. wires of 4 mm dia
Length. of untensioned wire	:	3.95 metre from bottom end
Configuration type.	:	JDVVNL specification

If any practical difficulty is experienced in using part length of untensioned wires, full length wires may be used but the tension in these wires, should not exceed 5% of their Ultimate tensile strength.

7. OTHER TECHNICAL REQUIREMENT :

A) EARTHING : Earthing shall be provided, by having continuous length of 4 mm dia G.I.wire embedded in concrete during manufacture and the ends of G.I. wire left projected from the transverse face of the poles to a length of 100 mm at 250 mm from top and 150 mm below ground level (Planting depth to be 1.5 M) The tolerance of 25 mm shall be allowed in position of earth wire. The earth wire shall not be allowed to entangle with prestressing wires.

B) EYE HOOKS : The eye hooks shall be provided on the middle of transverse face of the pole as per IS: 7321/1974 at a distance of about 1.70 metre from top and about 1.60 metre from the bottom, to facilitate the handling. The eye hooks shall be of 10 mm dia MS round and shall have an internal dia of 40 mm. The tolerance of minus 5 mm and plus 20mm in internal dia of eye hooks shall be allowed. the eye hooks in question shall be securely embedded in the pole to ensure safe handling/ loading unloading of poles.

C) REINFORCEMENT : The poles offered should have 8 Nos. rings of 4 mm dia HT wires rings on top side of the pole and 8 Nos. rings of 4 mm dia HT wire rings on the bottom side of the pole thus total HT wire rings should be 16 in all or 4 Nos. of 6 mm dia MS round rings on top side and 4 Nos. of 6 mm dia MS round rings on bottom side are to be provided. The minimum inter spacing of 20 mm in case of 4 mm dia HT wire rings and 30 mm in case of 6 mm dia MS round rings is to be maintained. These rings should be complete and rectangular in shape with minimum over lapping of 20 mm. No rings are to be bunched together.

D) HOLES : The poles offered should have two holes of 18 mm dia on longitudinal face of pole (broad face) to fix top hamper. The top hole shall be at the distance of 60 mm from top of pole and second hole will be at 160 mm from top of pole.

8. WORKMANSHIP :

(i)All materials used in the finished PCC poles and workmanship shall be of required quality. No deviation with technical particulars required as per this tender specification shall be allowed.

(ii) Apart from the requirements regarding the design, material, process of manufacture, dimensions shape, workmanship finishing etc., acceptability of PCC poles shall be determined by the results of various tests to evaluate their properties as stipulated in the relevant IS/specification.

9. DRAWINGS :

The tenderer shall furnish alongwith the tender the detailed dimensional drawing based on the JDVVNL drawing (enclosed) showing the plan, elevation and end cross sectional views clearly indicating the configuration of HT wire size and No. of HT wire, eye -hook's position & projection of earth wire marking & reinforcement. The drawing is also required to be got approved before commencement of supply.

10. MARKING :

The poles shall be clearly & indelibly marked with the following particulars by engraving properly at a height of 3 metres from the bottom end so as to be easily readable after erection. Marking should not be painted.

1. S.No. of pole.
2. Date, month and year of manufacturing
3. Name/mark of manufacturer.

It should be distinct and should not resemble with mark of other manufacturers and if it resembles with marking of other manufacturers then you should change your marking.

4. Length and working load 8 M/200 Kg.

5. SAUBHAGYA/TNTW / JDVVNL

RED STRIP PAINTING: A strip of 30-40 mm shall be painted on one side (transverse face) of the pole at a planting depth (1.5 Metre from bottom) with oil paint of red colour in such a manner that the red strip shall be visible above the ground. Poles without marking of red strip will not be accepted and considered as rejected.

11. INSPECTION, TESTING & CHECKING :

The inspection and testing shall be carried out at supplier's works as per relevant ISS: GTP/ Spec. before dispatch in accordance with the clause No.1.27 of GCC

The supplier shall incorporate the following certificate in his offer letter which should indicate Sr. No. & total No. of poles casted on different dates, as offered for the present inspection:

- a) That all the PCC poles included in the lot under the present inspection conform to the design, strength and workmanship required as per the purchase order, GTP of the specification and contract drawing under the TN.
- b) That none of the PCC poles offered for the present inspection was previously rejected / not considered for inspection or tested for transverse load strength by any other inspecting officer.

The supplier shall furnish the following certificates / tests results to our Inspecting Officer at the time of inspection, if desired.

- a) The supplier shall furnish test results from the manufacturer to substantiate that HT steel wire of required quality was used in the manufacture of PCC poles under the present inspection.
- b) The supplier shall certify that cement, prestressed steel wires, M.S. Bars, aggregates and other material had been used as per the required specifications, to manufacture the PCC Poles under the present inspection.

The supplier shall arrange the required number of PCC Poles out of the offered lots as per the sampling plan under this specification for witnessing the various tests by Inspecting Officer. The poles so tested in presence of the Inspecting Officer shall be preserved for atleast 30 days from the date of inspection for subsequent checking by any other representative for the purchaser if needed. The supplier shall intimate in writing name and address of purchaser of these tested poles.

The supplier shall provide the following documents to Inspecting Officer, to facilitate and authenticate the process of inspection, checking and testing.

- a) One set of copies of P.O., relevant IS and specification of TN (with the latest amendment, if any)
- b) Copy of approved Drawing.
- c) Details of all meters/ instruments /equipments to be used in the process of checking and testing of the material alongwith the details for their last calibration (original) certificates of calibration indicating that calibration had been done to full range on all the scales to verify that the last calibration and sealing was got done from the manufacturer or an independent test house approved by NABL /Government within one year prior to the date of inspection.

Inspection shall not be carried out further, if the above requirements are not fulfilled satisfactorily.

A. SAMPLING:

- b) In a consignment, 500 poles or a part thereof of the same overall length, same dimensions and belonging to the same batch of manufacturer shall be grouped together to constitute a lot.

For ascertaining the conformity of the materials in the lot to the requirements of the specification, samples shall be tested from each lot separately.

The number of poles to be selected from the lot shall depend on the size of the lot and shall be according to table as under:-

Sample size and criterion for conformity :

Size of lot or sub-lot in numbers (N)	Dimensional requirement		No.of poles for transverse strength test (n)
	sample size (n)	Permissible No. of defective samples	
1	2	3	4
Upto 100	10	1	1
101 to 200	15	1	3
201 to 300	20	2	4
301 to 500	30	3	5

The minimum size of lot which can be offered for inspection is 300 Nos. of pole except in case of last lot which may be for left out balance quantity. Lot size once offered for inspection, can not be reduced subsequently under the re-inspection, unless re-inspection charges for each lot/ sub-lot out of the original lot is deposited.

b) Deviation in selection of samples may be effected by the Inspecting Officer only if he thinks that the purpose of checking/testing will be better served by such deviation.

c) The number of poles, in every lot/sub lot, which does not satisfy, the requirement of overall length, cross section and uprightness shall not exceed the corresponding number given in Col.3 of the above Table. If the number of such poles exceeds the corresponding number, supplier shall segregate the pole not confirming the requirement of specification and shall submit the remaining poles for checking. Fresh poles as per sample size indicating in Col.2 will be drawn from the remaining poles of the offered lot or sub lot and subject to similar checking. If the number of effective poles in the second sample of poles also exceeds the permissible number indicated in Col.3 the then the subject lot or sub lot under inspection will be rejected without further checking. Result of all such checking shall be recorded.

d) PCC poles, in every lot/sub lot sampled for transverse load strength test shall satisfy the requirement of the test. Initially, selection of sample and inspection and testing of poles will be undertaken as usual as is being done according to IS:1678/1998 and IS:2905/1989 with latest amendments. In case the samples selected satisfied the dimensional requirements and also withstand transverse load test, the lot stands cleared.

In case of one or more poles fail during transverse load test, then twice the number of originally tested shall be selected from those already selected and subjected to the tests. If these poles withstand the transverse load test the entire lot will be deemed to have passed the tests and will be cleared, but if one or more pole fails during double sampling, then leaving aside the sub-lots for which double sampling was done and where samples could not withstand transverse load test, the remaining sub-lots representing poles from which have withstood transverse load test will be accepted provided they satisfy clause No. 9.3.2 of IS:1678/1978. However, the destruction test from the sub-lots will be done by the inspecting officer on the poles on which transverse load was performed and the acceptance of these sub-lots will be on the basis of the test results observed by the inspecting officer during destruction test on the respective representative poles.

e) All the poles subject to transverse load strength test shall be preserved for atleast 30 days from the date of inspection for any subsequent checking by any other representative of the purchaser, if required. These poles shall not be dispatched /supplied to the purchaser.

f) One pole from the poles subject to transverse load strength test, from every lot/sub lot, shall be destructed for following measurement/checking.

i) To measure clear thickness of concrete cover at three points one within 1.8 metre from the bottom end of the pole, the second within 0.6 metre from the top end of the pole and the third at an inter-mediate point. The mean value shall be compared with the specified value.

ii) To check Nos., size & configuration of steel reinforcement and GI earth wire.

The destructed poles shall also be preserved for atleast thirty days from the date of inspection for subsequent checking by any other representative of the purchaser if required.

B) INSPECTION :

Inspection shall comprise of :

- a) Verification of offered quantity as per packing list.
- b) Visual inspection for shape, workmanship and finishing of the PCC poles.
- c) Checking of dimensions as per the ISS/GTP/ Spec.
- d) Verification of marking and red/ black strip as per GTP.

C) WITNESS OF TRANSVERSE LOAD TESTS :

- v) On PCC poles selected for transverse load strength test as per sampling plan.
- vi) On one PCC pole from every lot/sub lot be destructed to ascertain the No., size and configuration of steel reinforcement and GI earth wire etc.

The supplier should have transverse load testing arrangements of its own.

Testing arrangement shall be preferably as specified in the relevant specification i.e. IS:1678/1978 & IS:2905/1989 (both latest amended). As per provision of Clause No.6.2.3 of IS:2905/1989 the load shall be applied at a point stipulated in the relevant IS by means of a suitable device such as a wire rope and winch placed in a direction normal to the direction of the length of the pole so that the minimum length of the straight rope under pull is not less than the length of the pole.

As per provision of Clause No.6.2.5 "load measurement" of IS: 2905/1989. The dynamometer or any other satisfactory method of load measurement shall be calibrated at regular intervals (Not more than one year) and capable of measuring load to the accuracy of 50 N may be adopted.

The transverse strength test on poles shall be conducted in accordance with IS:2905. A prestressed concrete pole shall be deemed not to have passed the test if cracks wider than 0.1 mm appear at a stage prior to the application of the designed transverse load at first crack and the observed ultimate transverse load is less than the designed ultimate transverse load.

12. TEST AT SITE :

The purchaser reserves the right to get the material tested after receipt of inspected poles at sites/ stores and claiming any compensation or rejecting the poles if not found according to specification. All charges consequent to rejection, rectification and replacement shall be borne by the supplier.

13. TOLERANCE :

The following tolerances shall be allowed :

i)	Over all length of PCC poles.	±15 mm
ii)	Top and bottom dimension. (Breadth and depth of PCC poles)	± 3 mm
iii)	Clear concrete cover over HT steel wires (Average of measurements at three sections).	- 2 mm
iv)	Uprightness or straightness of the PCC poles	0.5 %
v)	Internal dia of eye hook	+ 20 mm and – 5 mm
vi)	Dia of holes	± 1 mm
vii)	Diameter of HT wires as per IS: 280/1979	± 0.05 %
viii)	Diameter of GI wire as per IS:280/1979	± 2.5%
ix)	Diameter of MS rod for eye hook as per 1786/1966	± 4%

Higher dimensions of poles shall attract no penalty / deduction as it will not be considered as deviation.

14. GUARANTEED TECHNICAL PARTICULARS :

The tenderer shall furnish the guaranteed technical particulars of the PCC poles as required in the schedule-A by mentioning specific figures therein. Any item of the GTP left unfilled or simply written as per ISS etc. shall be considered as incomplete GTP and such tender is liable to be rejected.

15. TRANSPORTATION ARRANGEMENTS :

The tenderer must furnish the location of the factory and road distances from their factory site to various destinations (sub-divisional headquarters of JDVVNL) through shortest route.

The tenderers should also furnish the particulars of transportation vehicles owned by them.

16. CRITERIA FOR ACCEPTANCE:

The inspected PCC poles should be strictly in accordance to the GTP of the specification otherwise the material shall be treated as rejected and shall not be accepted. However, the poles with some minor deviations may be accepted with deductions as per rates prescribed and in force.

Higher dimensions of poles shall not attract any penalty / deduction, as it will not be considered as deviation.

SCHEDULE-A

GUARANTEED TECHNICAL AND OTHER PARTICULARS(GTP) OF 8 Metre PCC POLES HAVING WORKING LOAD 200 KG. WITH FACTOR OF SAFETY 2.5

S.No.	Particulars	Requirement as per GTP
1	MANUFACTURER'S NAME	
2	OFFICE ADDRESS	
3	WORKS ADDRESS	

4	STANDARDS TO WHICH THE MATERIAL SHALL CONFORM	As per specification
5	OVER ALL LENGTH	8 Metre
6	PLANTING DEPTH	1.5 metre
7	TOP DIMENSIONS IN MM	145 x 90 mm
8	BOTTOM DIMENSIONS IN MM	290 x 90 mm
9	APPROXIMATE WEIGHT	380 Kg.
10	WORKING LOAD	200 Kg.
11	FACTOR OF SAFETY (F.O.S.)	2.5
12	NO. & DIA OF HT WIRE (TENSIONED)	12(4 mm dia)
13	NO. & DIA OF HT WIRE (UNTENSIONED)	2(4 mm dia) of length 3.95 mtr. each
14	CONFIGURATION OF HT WIRE	As per approved drawing
15	POSITION OF EARTH WIRE LENGTH AND SIZE OF WIRE	G.I. wire of 4 mm dia having continuous length with a projection of 100 mm at 250 mm from top and 150 mm from below ground level.
16	DIMENSIONS AND POSITION OF EYE HOOKS	2 Nos. of Eye hook of 10 mm dia M.S. round having internal dia of 40 mm at 1.7 metre from top and 1.6 metre from bottom
17	REINFORCEMENT (SIZE AND NO. OF RINGS)	8 Nos. of rings of 4 mm dia HT wires on top and 8 Nos. of rings on bottom (both ends) with minimum inter spacing of 20 mm.
18	CONCRETE COVER	20 mm
19	MARKING ON THE POLES	Marking should be engraved on transverse face
20	RED STRIP	A strip of 30-40 mm shall be painted with oil paint of red colour, on one side(transverse face) of the pole at a planting depth of 1.5 Metre from bottom.
21	HOLES POSITION	2 holes of 18 mm dia at 60 mm and 160 mm from top on longitudinal face of the pole(broad face).
22	ULTIMATE TENSILE STRENGTH	17500 Kg./ sq.cm
23	CONCRETE QUANTITY PER POLE	0.157M ³
24	CONCRETE GRADE	M-42

Note:- Max. tension in wire should not exceed 80% of its ultimate tensile strength.

Signature of the Bidder
Name _____
Designation _____
Common authorized seal of bidder

TECHNICAL SPECIFICATION AND OTHER REQUIREMENTS FOR GALVANISED M.S FORGED PINS FOR 11 KV PIN INSULATORS (11 KV PINS)

1.0 SCOPE :

1.1 This specification covers the design, manufacture, inspection and testing before despatch, supply of Galvanised M.S.Forged Pins specified herein for their satisfactory operation in 11 KV Sub-Transmission lines in Rajasthan.

1.2 The technical specifications, contained herein, are for the guidance of the bidders. Any deviation from the Purchaser's specification will be considered on their relative merits in respect of performance, efficiency, durability and overall economy consistent with the requirements stipulated herein after. Such deviations shall be clearly entered by the bidders in the form as per schedule-VI of the specification.

2.0 CLIMATIC CONDITIONS :

2.1 The pins shall be suitable for being installed directly in air with power conductors of 11 KV Double Circuit and Single Circuit Sub-transmission lines. They shall be therefore suitable for satisfactory operation under the tropical climatic conditions listed below :

- | | | |
|---|-------------------|---------|
| i) Location | in the state | |
| ii) Maximum ambient Air Temperature (deg.C) | | 50 |
| iii) Minimum Ambient Air Temperature (deg.C) | | (-) 2.5 |
| Temperature (deg.C) | | |
| iv) Average daily Ambient Air Temperature (deg.C) | | 32.2 |
| v) Maximum relative humidity (%) | 100 | |
| vi) Minimum relative humidity (%) | 50 | |
| vii) Average rainfall per annum (mm) | 150-1000 | |
| viii) Number of rainy days per Annum | 70 | |
| ix) Altitude above mean sea level (meters) | 100-1000 | |
| x) Isoceraunic level (Days/Annum) | 25(thunder storm) | |
| xi) Maximum wind pressure (Kg/sq.m.) | 195 | |
| xii) Seismic level (Horizontal Acceleration) | | 0.08 g |

3.0 PRINCIPAL PARAMETERS :

The 11 KV galvanized M.S.Forged Pins suitable for use with 11 KV Pin Insulators (Confirming to ISS:731:1971 with latest amendments if any) shall comply in all respects with the ISS:2486 (Part-I):1993 & ISS:2486(Part-2/1989)(with latest amendments if any).

3.1 DETAILS OF GALVANISED M.S.FORGED PINS :

The 11 KV Galvanised M.S. forged pins should be suitable to be used with 11 KV Pin Insulator respectively for a three phase, 11 KV Sub-transmission lines in a moderately polluted atmosphere.

3.2 DRAWINGS :

Detailed drawings must be furnished alongwith bid. The drawing shall comply with IS 2486(Part-I)/1993 & IS:2486 (Part-II)/1989 with latest amendment if any. The 11 KV Galvanised M.S.Forged Pins shall be suitable for use with 11 KV Pin Insulator (confirming to IS 731/1971 with latest amendment, if any) respectively.

4.0 GENERAL TECHNICAL REQUIREMENTS :

4.1 HEADS :

The head shall be of steel and shall be in accordance with Fig.1 of IS:2486 (Part-2) / 1989 with latest amendments, if any. They shall screw into a thimble fixed in the pin hole of the insulators. The dimensions of the gauges for these heads are given in fig. 2 to 4 of aforesaid IS.

4.2 PINS :

The 11 KV Galvanized M.S.Forged Pins suitable for use with 11 KV Pin Insulators (Conforming to IS:731/1971 with latest amendments if any) shall comply in all respects with the IS: 2486 (Part-1)/1993 & IS:2486 (Part-2)/1989 with latest amendments if any. The dimensions of the line pins shall be as given in fig. 5 of the above mentioned ISS.

4.3 STALKS :

The stalk length of line pins shall be measured above the seating face of the collar conforming to IS:2486 (Part-2)/1989.

4.4 SHANKS :

The shank length of the line pins shall be measured below the seating face of the Collor & conforming to IS:2486 (Part-2)/1989.

4.5 GALVANISED M.S.FORGED PINS :

i) GALVANISATION :

All ferrous pins and nuts shall be hot dipped galvanised. The galvanisation shall conform to IS: 2633/1986 with latest amendments and satisfy the requirements given in IS:4759/1984. The threads on the nuts & tapped holes shall be cutout after galvanising & shall be well oiled or greased. Spring washers shall be electro galvanised conforming to service grade No.4 of IS:1573/1986(latest amended).

ii) FAILING LOAD :

The 11 KV Pins shall be offered for minimum failing load of 5 KN.

iii) DIMENSIONS : The 11 KV Pins for supply under this specification shall be of small steel head as per figure No. 5 of IS:2486 (Part-2)/ 1989 and shall have the following dimensions.

- a) Stalk length. : 165 mm
- b) Shank length. : 150 mm
- c) Hexagon nut : M20 as per IS:1363(Part-3) /1992
- d) Spring washer : Nominal size 20 as per IS:3063/1972.

4.6. THREADS :

Threads shall be as specified in IS:4218 (Part-2) /1976 and matching with 11 KV Pin Insulators conforming to IS:731/1971 (with latest amendments if any)

4.7 HEXAGON NUTS :

Hexagon Nuts of M-20 size shall conform to IS:1363(Part-3):1992 (latest amended).

4.8 SPRING WASHERS :

Spring washers shall conform to IS:3063:1972 (Latest amended).

4.09 MATERIAL DESIGN AND WORKMANSHIP :

4.09.1 GENERAL :

i) All raw materials to be used in the manufacture of these pins shall be subject to strict raw material quality control and to stage testing/quality control during manufacturing stage to ensure the quality of the final end product. Manufacturing shall conform to the best engineering practices adopted in the field of high voltage transmission. Bidders shall therefore offer pins as are guaranteed by them for satisfactory performance on 11 kV Sub-transmission Lines.

ii) The design, manufacturing, process and material control at various stages be such as to give maximum working load, highest mobility, best resistance to corrosion, good finish, elimination of sharp edges and corners.

4.10 TESTS

4.10.1 TEST BEFORE DESPATCH: The 11 KV Galvanised M.S.Forged pins and accessories shall be subjected at maker's works before despatch, to the tests mentioned here-under as per IS: 2486(Part.1)/1993 (with latest amendments).

4.10.2 ROUTINE TESTS :

The following tests shall be conducted on each unit by the bidder at his works as per relevant standard - IS:2486 (Part-1)/1993 (latest amended) :

- a) Visual Examination (Clause-8)

4.10.3 ACCEPTANCE TESTS :

The following tests shall be conducted on samples taken at random from a lot as per relevant standard, IS:2486 (Part-1)/1993 (latest amended) in presence of purchaser's representative :

- a) Verification of dimensions (Clause 8 & 9.2.2)
- b) Galvanizing Test (Clause 9.4)
- c) Mechanical Tests (Clause 9.5)

5.0 TYPE TESTS

5.01 The bidder shall furnish valid and authenticated type test certificates from a Govt. approved / Govt. recognized / NABL Accredited laboratory / ILAC i.e. International Laboratory Accredited Laboratory (in case of foreign laboratory) of similar rating and design of tendered material/ equipment. Such type test certificates should not be older than 3 years as on the date of bid opening. For this purpose date of conducting type test will be considered.

The type test certificate by in house laboratory of tendering firm even if it is a Govt. approved / Govt. recognized / NABL accredited / ILAC accredited, shall not be accepted, in case of their own tender. This will not apply if tendering firm is Govt. company / public Sector undertaking.

5.02 The bidder should furnish documentary evidence in support of the laboratory whose type test have been furnished, that the said laboratory is a Govt. / a Govt. approved / a Govt. recognized / NABL accredited laboratory / ILAC accredited (in case of foreign laboratory).

5.03 The type test certificates shall be furnished either in original or copy duly attested by notary.

5.04 The following shall constitute the type tests which are to be conducted on atleast three units of each rating as per relevant standard IS:2486 (Part-1)/1993 (Latest amended) :-

- a) Freedom from defects (Clause 5 & 6).
- b) Verification of dimensions (Clause 8 & 9.2.2)
- c) Galvanising Test (Clause 9.4)
- d) Mechanical Tests (Clause 9.5)
- e) Chemical Composition Test (Clause 9.6)

5.2 SAMPLING : As per IS:2486 (Part-1)/1993 (latest amended)

5.3 TOLERANCE ON TEST RESULTS : As per IS:2486(Part-1)/1993 & IS:2486 (Part-2)/1989(latest amended).

6.0 TESTING FACILITIES :

The bidder must indicate clearly about the various testing facilities for type test as well as for routine/sample tests as per relevant ISS in respect of M.S.Forged Pins as are available at their works. In case no testing facilities are available at the bidder's works particulars of the place where such testing is proposed to be conducted during the course of inspection must be indicated.

7.0 INSPECTION

All the tests (as mentioned at Clause 4.10) and Inspection shall be made at the place of manufacturer unless otherwise especially agreed upon by the bidder and purchaser at the time of purchase. The bidder shall afford the inspection officer(s) representing the purchaser all reasonable facilities without charges, to satisfy him that the material is being furnished in accordance with this specification. The purchaser has the right to have the tests carried out at his own cost by an independent agency whenever there is a dispute regarding the quality of supply.

The Inspection may be carried out by the purchaser at any stage of manufacture/ before despatch as per relevant standard.

Inspection and acceptance of any material under the specification by the purchaser, shall not relieve the bidder of his obligation of furnishing material in accordance with the specification and shall not prevent subsequent rejection if the material is found to be defective. The Bidder shall keep the purchaser informed in advance, about manufacturing programs so that arrangements can be made for inspection.

The purchaser reserves the right to insist for witnessing the acceptance/ routine testing of the bought out items.

The Bidder shall give 15 days(for local supplies) / 30 days (in case of foreign bidder) advance intimation to enable the purchaser to depute his representative for witnessing the acceptance and routine tests. The inspection charges would be to the purchaser's account.

The bidders are required to indicate the delivery schedule in the schedule attached with the Specification.

8.0 TEST CHECKING OF MATERIAL AT STORES

8.1 The material received in the stores of the NIGAM shall be subjected to the test checking at stores before final acceptance of the material, the procedure for the same shall be as under :

8.2 SAMPLING

One sample out of **each sub-lot / lot of 3000 Nos.** or part thereof from each inspected lot received in stores shall be selected for test checking of material and shall be got tested. The selection of sample from the material received at stores shall be done as soon as material is received in stores without the presence of the representative of the supplier. However, testing of sample(s) at CTL shall be carried out in the presence of representative of the supplier after identification / confirmation by him that sample so selected belongs to them. In case the supplier disputes that the selected samples does not pertain to them, then fresh sample shall be selected in the presence of the representative of the supplier and test(s) be carried out.

8.3 TESTS

The following tests shall be carried out on the above items :

- a) Visual Examination, Verification of Dimension, weight and marking
- b) Mechanical Test.
- c) Galvanisation (Uniformity) Test.

8.4 Test of the material shall be got done at the test laboratory of the respective Discom in the presence of representative of supplier. For witnessing of the testing, clear 7 (seven) days notice shall be given to the supplier by fax/ speed post stating date, time & place where the test is to be conducted. In case the supplier do not attend for witnessing the testing, the testing shall be proceeded and completed and action be taken as per the contract.

8.5 The witnessing officers of the respective Discom or as designated by the purchaser shall send copies of test reports to the purchaser, consignees and the supplier and AO (CPC) of respective Discom.

8.6 Only those tests shall be conducted at CTL for which facility with CTL is available.

9.0 CRITERIA FOR ACCEPTANCE

9.1 Visual Examination, Verification of Dimension, weight and marking . As per specification/ ISS

9.2 Mechanical test.

In case of failure of sample in Mechanical Test, the material contained in the lot / sub-lot to which the sample belongs, shall be rejected. The rejected material shall have to be replaced by the supplier free of cost.

9.3 Galvanisation (Uniformity) Test.

9.2.1 The sample(s) shall be first tested for (n-2) number of dips where (n) is specified number of dips in the contract. If the sample(s) does not pass the uniformity of Galvanisation Test for (n-2) dips, the material shall be rejected and the material relating to relevant lot / sub-lot to which sample(s) pertains shall have to be replaced by the supplier free of cost.

9.2.2 If the sample has passed the uniformity of Galvanisation Test for (n-2) dips, then it shall be tested for (n-1) dips. If the sample has not passed the uniformity of Galvanisation Test with (n-1) dips, then material pertaining to relevant lot / sub-lot shall be accepted with a deduction @ 10% of cost of material.

9.2.3 If the sample has passed the uniformity of Galvanisation Test with (n-1) dips, then sample shall be tested for last one dip of one minute to complete the test for 'n' dips. If the sample does not pass the uniformity of Galvanisation Test with 'n' dips, then the material pertaining to relevant lot/ sub-lot shall be accepted with a deduction @ 5% of cost of material.

9.2.4 If the sample(s) have passed the Test with number of dips as specified in the contract (n), then material pertaining to relevant lot / sub-lot shall be accepted.

10.0 TEST CHARGES :

All test charges incurred towards test checking of the material received in our stores shall be borne by the NIGAM.

11.0 PAYMENT :

Payment shall be made only after receipt of successful test report from the CTL of JDVVNL on the samples selected from the material received at the stores.

12.0 IDENTIFICATION & MARKING :

Each 11 KV Pin shall be marked with the manufacturer's name or trade mark.

JODHPUR VIDYUT VITRAN NIGAM LIMITED

A Govt. of Rajasthan Undertaking

Prescribed technical specification for supply of

(Name of Material/Equipment/Machinery/T&P etc.)

GALVANISED M.S FORGED PINS FOR 11 KV PIN INSULATORS (11KV PINS)

S.No.	Technical specification which material/equipment/ Machinery/T&P shall conform	Name of IS/other standard specification to which material should conform	Other particulars if any.	to
1.	Specification for Insulator fittings for overhead power lines with nominal voltage greater than 1000 V	IS:2486		
	General requirements and test	Part-1	BS:3288(International Standard) IEC:120	
	Dimensional Requirements	Part-2		
2.	Hexagonal Head Bolts, Screws and Nuts of Product grade C	IS:1363 (Part.1)		
	Hexagonal Nuts (Size range M.5 to M.36)	IS:1363 (Part.3)		
3.	Metric Screw Threads	IS:4218		
4.	Dimensions for radii under the heads of bolts and screws.	IS:4172		
5.	Recommended practice for Hot dip galvanising of Iron & Steel.	IS:2629		
6.	Specification for Zinc	IS:209		
7.	Dimensions for nominal lengths and threads length for bolts, screws and studs.	IS:4206		
8.	Schedules for wrought steel for general engineering purpose. Steel specified by tensile and/or yield properties,	IS:1570 (Part.1)		
9.	Specification for Carbon steel forgings for general engineering purposes.	IS:2004		
10.	Method for determination of Zinc coating on Zinc coated iron steel articles.	IS:6745		

S.No.	Technical specification which material/equipment/ Machinery/T&P shall conform	Name of IS/other standard specification to which material should conform	Other particulars if any.	to
-------	---	---	------------------------------	----

- | | | | | |
|-----|---|---------|--|--|
| 11. | Electroplated coatings of zinc on iron and steel. | IS:1573 | | |
| 12. | Introduction & general | IS:1367 | | |

- information for threaded fasteners. (Part-1)
13. Product grades & tolerances IS:1367 Part-II
14. Mechanical properties & test methods for Bolts screws and studs with full load ability. IS:1367 Part-III
15. Plain washers(1st revision) IS:2016
16. Methods of testing uniformity of coating of zinc coated article (IInd revision). IS:2633

Certified that we agree to all the aforesaid technical specification

(Signature)

Name & Designation
with seal of the bidder.

SCHEDULE-(A)

**GUARANTEED TECHNICAL & OTHER PARTICULARS OF
11 KV GALVANISED M.S.FORGED PINS.**

S.N.	Description	11 KV PINS
1.	a) Manufacturer's Name & address.	To be filled by bidder
	b) Work's address	To be filled by bidder
2.	Minimum failing load (KN)	5 KN
3.	Standard specification to which the material shall conform.	IS: 2486 (Part-1)/1993 & IS: 2486 (Part-2)/1989 with latest amendments if any.

4.	Dimensions (mm):-	
a)	Total length.	315 mm
b)	Shank length.	150 mm
c)	Stalk length.	165 mm
5.	Type of threads.	As per IS 4218 (Part-2)/1976
6.	Threads per inches.	IS 4206
7) a	Type of Galvanisation.	Hot dip
b)	Galvanisation shall conform to.	As per IS: 2633/1986 with latest amendments if any.
8.	Hexagon nut shall conform to	M-20 IS: 1363(Part-3)/1992
9.	Spring washer shall conform to	Size 20 IS: 3063/1974
10.	Electro-galvanisation of spring washer shall conform to.	As per IS: 1573/1986
11.	Packing details :-	
a)	Type of packing	double bags, one HDP bag (inner) and one gunny bag (outer) or in double gunny bag
b)	Weight of each pin (approx.)	925 gms.± 2%
c)	No. of Pins in each packing.	50 Nos.
d)	Weight of each package (kg)	Less than 50 Kg.
12.	Tolerance in dimensions,if any.	As per IS: 2486 (Part-1)/1993 & IS: 2486 (Part-2)/1989 with latest amendments if any
13.	Tolerance in Weight	± 2% of 925 gms
14.	ISI certification license number, if any.	
15.	Any other relevant information the bidder would like to indicate.	
16.	Manufacturer's trade mark to be embossed on the pins.	To be filled by bidder
17.	Other details/informations.	

Signature
Name & Designation with seal of the firm

TECHNICAL SPECIFICATION FOR GALVANISED M.S FORGED L.T.PINS AND HARDWARE FITTINGS FOR L.T. SHACKLEINSULATORS FOR USE ON L. T. DISTRIBUTION OVERHEAD POWER LINES

1.0 SCOPE :

1.1 This specification provides for the design, manufacture, inspection and testing before dispatch, and supply of Galvanised M.S.Forged L.T. Pins and Hardware fittings for L. T. Shackle Insulators specified herein for their satisfactory use & operation on various distribution overhead power lines of the State.

1.2 It is not the intent to specify completely herein all the details of the design and construction of equipment. However, the equipment shall conform in all respect to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation up to the bidder's guarantee, in a manner acceptable to the purchaser, who will interpret the meanings of drawings and specification and shall have the power to reject any work or material which in his judgment is not in accordance therewith. The offered equipment shall be complete with all components necessary for their effective and trouble free operation. Such components shall be deemed to be within the scope of bidder's supply irrespective of whether those are specifically brought out in this specification and / or the commercial order or not.

2.0 CLIMATIC CONDITIONS :

The pins and Hardware fittings shall be suitable for being installed directly in air with power conductors L.T.single circuit/double circuit overhead distribution lines. These items, therefore, shall be suitable for satisfactory operation under the tropical climatic conditions listed below :

1.	Location	In the state of Rajasthan
i)	Maximum ambient air Temperature (deg.C)	50
ii)	Maximum Temperature attainable to an object exposed to sun (deg.C)	60
iii)	Minimum Ambient air Temperature (deg.C)	(-) 5.0
iv)	Average daily ambient air Temperature (deg.C)	40.0
v)	Maximum relative humidity (%)	100
vi)	Average rainfall per annum (mm)	100-1000
vii)	Average Number of rainy days per Annum	70
viii)	Maximum altitude above mean sea level (meters)	1000
ix)	Isoceraunic level (Days/Annum)	40
x)	Maximum wind pressure (Kg/sq.m.)	195
xii)	Seismic level	0.33 g

3.0 PRINCIPAL PARAMETERS :

The material shall conform to the following specific parameters :

S.No.	Item	Specification
1.	Type of Installation	Outdoor
2.	System Voltage	415 Volt(+10%, -15%)
3.	System frequency	50 Hz, + 5%

4.	Number of phases	Three
5.	System of earthing	Solidly grounded.

4.0 DETAILS OF ITEMS :

The Galvanised M.S. forged L.T. Pins & shackle insulator hardware fittings shall be suitable for use on single phase/three phase, 230/440 Volts overhead distribution lines in a moderately polluted atmosphere.

5.0 GENERAL TECHNICAL REQUIREMENTS :

5.1 GALVANISED M.S. FORGED L.T. PINS :

5.1.1 The M.S.Forged L.T. Pins suitable for L.T.Pin insulators shall comply in all respect, herein otherwise stated, with figure 2 of IS:7935/1975 (latest amended). The Pins shall be of steel complying with class 2 of IS:2004/1970 (latest amended). The pins shall be of good finish, free from flaws and other defects. The finishing of collar shall be such that sharp angle between the collar and shank is avoided.

5.1.2 DIMENSIONS : The L.T. Pins for supply under this specification shall conform to figure 2 of IS:7935/1975 (latest amended) and shall have the following dimensions:

S.No.	Item	Dimensions
1.	Length of Pin	260 mm
i)	Shank length	125 mm
ii)	Stalk length	135 mm
2.	Thickness of stalk collar	5 mm
3.	Diameter of stalk	
i)	at top	16 mm
ii)	at collar	32 mm
4.	Diameter of shank	16 mm
5.	Length of threads	
i)	on stalk	32 mm + 3 mm
ii)	on shank	75 mm
6.	Thickness of nut(M-16)	
i)	Maximum	15.9 mm
ii)	Minimum	14.1 mm
7.	Spring washer thickness(M-16)	3.5 mm + 0.2 mm
8.	Weight of L.T.Pin (Approx.)	0.425 Kg.± 2% Tolerance

5.1.3 THREADS : Threads of L.T. pins shall be matching with L.T. Pin Insulators conforming to IS:1445/1977 (latest amended) and shall be checked by means of gauges.

5.1.4 HEXAGONAL NUTS : Hexagonal Nuts of M-16 size shall be used & shall conform to IS:1363(Part-3):1992 (latest amended). The nuts shall be made of material conforming to class 4.8 of IS:1367 (Latest amended) with regard to its mechanical properties. The thickness of the hexagon nuts shall be in accordance with IS:1363 (Pt-3)/1984 (Latest amended). The screw threads on the shank and the nut shall be as prescribed in IS:4218 (Pt-6)/1978 (Latest amended).

5.1.5 SPRING WASHERS : Spring washers of 3.5 mm thickness of M-16 size shall be used which should conform to IS:3063:1994 (Latest amended).

5.1.6 FAILING LOAD : The minimum failing load of L.T. Pins shall be 2.0 KN.

5.1.7 GALVANISATION: The L.T.Pins shall be hot dip galvanised. The galvanisation of Pins shall conform to IS:2633/1986 (latest amended). The threads of nuts shall be cut after galvanisation and shall be well oiled or greased. Small parts like nuts and spring washers etc. may be electro-galvanised in accordance with IS:1573/1986 (latest amended).

5.2 GALVANISED HARDWARE FITTINGS FOR L.T. SHACKLE INSULATORS:

5.2.1 The hardware fittings for L.T. Shackle Insulators shall comply in all respects, herein otherwise stated, with fig.3, type-1 of IS:7935/1975 (latest amended). The hardware fittings assembly shall comprise the following:

- i) A pair of mild steel straps,
- ii) Two numbers of mild steel bolts with hexagonal head,
- iii) Two numbers of mild steel nuts of hexagonal head to suit bolts under item (ii) above &
- iv) Two numbers suitable washers.

5.2.2 DIMENSIONS: The dimensions of hardware fittings for L.T. shackle insulators for supply under this specification shall conform to figure 3, type 1 of IS:7935/1975 (latest amended) and shall have the following dimensions:

S.No.	Item	Dimensions
i)	Length of straps	185 mm
ii)	Width of straps	30 mm
iii)	Thickness of straps	3 mm
iv)	Diameter of holes at the end of straps	14 mm
v)	Dia. of bolts	12 mm
vi)	Length of bolts	115 mm
vii)	Dia.of bolt head	17 mm
viii)	Thickness of bolt head.(M-12)	
a	Nominal	7.5 mm
b	Maximum	7.95 mm
c	Minimum	7.05 mm
ix	Thickness of nuts	
a	Maximum	12.2 mm
b	Minimum	10.4 mm
x	Shape of bolt head& nuts	Hexagonal
xi	Length of threaded portion of bolts.	65 mm
xii	Thickness of galvanized spring washer (M-12)	3 mm + 0.15 MM
xiii	Weight of complete hardware fitting	0.475 Kgs.± 2% Tolerance

	set.(approx.)	
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5.2.3 HEXAGONAL NUTS : Hexagonal Nuts of M-12 size shall be used & shall conform to IS:1363(Part-3):1992 (latest amended). The nuts shall be made of material conforming to class 4.8 of IS:1367 (Latest amended) with regard to its mechanical properties. The thickness of the hexagon nuts shall be in accordance with IS:1363 (Pt-3)/1984 (Latest amended). The screw threads on the shank and the nut shall be as prescribed in IS:4218 (Pt-6)/1978 (Latest amended).

5.2.4 SPRING WASHERS : Spring washers of 3.0 mm thickness of M-12 size shall be used which should conform to IS:3063:1994 (Latest amended).

5.2.5 Galvanisation: The Hardware fittings shall be hot dip galvanised. The galvanisation of Hardware fittings shall conform to IS:2633/1972 (latest amended). The threads of nuts and tapped holes shall be cut after galvanisation and shall be well oiled or greased. Small parts like nuts and spring washers etc. may be electro-galvanised in accordance with IS:1573/1970 (latest amended)

5.3 IDENTIFICATION & MARKING :

5.3.1 The pins and hardware fittings for shackle insulators shall be marked with the manufacturer's name or trade mark.

5.3.2 The package containing the insulator fittings may also be marked with the ISI certification mark if available.

6.0 TESTS :

6.1 TEST BEFORE DESPATCH: The Galvanised M.S.Forged L.T. pins and Hardware fittings for L.T.shackle insulators shall be subjected at manufacturer's works before despatch, to the tests mentioned here-under as per IS: 7935/1975 (latest amended).

6.1.1 ROUTINE TESTS :

The following tests shall be conducted on each unit by the bidder at his works as per relevant standard - IS:7935/1975 (latest amended) :

- a) Visual Examination (Clause-4.4)

6.1.2 ACCEPTANCE TESTS :

The following tests shall be conducted on samples taken at random from a lot as per relevant standard, IS:7935/1975 (latest amended) in presence of purchaser's representative :

- a) Checking of threads on heads (Clause 4.6)
- b) Galvanizing / Electroplating test (Clause 4.7)
- c) Verification of dimensions (Clause 4.5)
- d) Mechanical Strength Test (Clause 4.8)

6.2 TYPE TESTS

a) The bidder shall furnish valid and authenticated type test certificate from a Govt. approved/ a Govt. recognized/ NABL accredited laboratory/ ILAC i.e. International Laboratory Accredited laboratory / ILAC i.e International Laboratory Accrediation Cooperation (In case of foreign laboratory) . Such type test certificates should not be older than **five years** as on the date of bid opening. For this purpose date of conduction Type Test(s) will be considered.

b) The type test certificates by in house laboratory of bidding firm even if it is a Govt approved/ Govt recognized/ NABL accredited/ ILAC accredited,shall not be accepted, in case of their own bid. This will not apply if bidding firm is Govt. Company/ Public Sector Undertaking.

c) The bidder should furnish documentary evidence in support of the laboratory whose type test have been furnished, that the said laboratory is a Govt/ a Govt. approved/ a Govt. recognized/ NABL accredited laboratory/ ILAC accredited (in case of foreign laboratory)

d) The type test certificates shall be furnished either in original or duly attested by notary.

e) The bids of only those bidders shall be considered to be meeting the type test criteria who furnishes complete type test certificates with the bid as per above provision.

6.2.1 The following shall constitute the type tests which are to be conducted on at least three units of each rating as per standard IS:7935/1975 (Latest amended) and other relevant standards :-

- a) Visual examination test (Clause 4.4).

- b) Verification of dimensions (Clause 4.5)
- c) Checking of threads on heads (clause 4.6)
- d) Galvanising/electroplating test (Clause 4.7)
- e) Mechanical strength tests (Clause 4.8) (for pins only)

6.2.2 However, the purchaser reserves the right to demand repetition of some or all the type tests in presence of purchaser's representative. For this purpose, the bidder should indicate unit rates for carrying out such type tests. These test charges shall not be taken into consideration for bid evaluation.

6.3 SAMPLING : As per IS:7935/1975 (latest amended)

6.4 TOLERANCE ON TEST RESULTS : The tolerance for dimensions when not indicated in the drawing i.e. fig. 2 & 3 of IS:7935/1975 (Latest amended) for L.T.Pins & Hardware Fittings for L.T.Shackle Insulators, shall be $\pm 5\%$ except on collar thickness of L.T.pins for which tolerance is allowed upto 2 mm on plus side and 0.5 mm on minus side.

6.5 TEST AT SITE:

The purchaser reserves the right to conduct all tests on Galvanised M.S.Forged L.T. Pins & Hardware fittings after arrival at site / store and the contractor shall guarantee test certificate figures under actual service conditions.

6.6 TESTING FACILITIES:

The bidder must indicate clearly about the various testing facilities for the acceptance tests as well as routine tests as per relevant ISS as are available at their works. In case no testing facilities are available at the bidder's works, particulars of the place where such testing is proposed to be conducted during the course of inspection must be indicated.

7.0 INSPECTION

7.1 All the tests as mentioned at Clause 6.1.1 & 6.1.2 for pre-despatch inspection shall be made at the place of manufacturer unless otherwise especially agreed upon by the bidder and purchaser at the time of purchase. The bidder shall afford the inspection officer(s) representing the purchaser all reasonable facilities without charges, to satisfy him that the material is being furnished in accordance with this specification. The purchaser has the right to have the tests carried out at his own cost by an independent agency whenever there is a dispute regarding the quality of supply.

7.2 The Inspection may also be carried out by the purchaser at any stage of manufacture/ before despatch as per relevant standard.

7.3 Inspection and acceptance of any material under the specification by the purchaser, shall not relieve the bidder of his obligation of furnishing material in accordance with the specification and shall not prevent subsequent rejection if the material is found to be defective. The Bidder shall keep the purchaser informed in advance, about manufacturing programme so that arrangements can be made for inspection.

7.4 The purchaser reserves the right to insist for witnessing the acceptance/ routine testings of the bought out items.

7.5 The Bidder shall give 15 days advance intimation to enable the purchaser to depute his representative for witnessing the acceptance and routine tests. The inspection charges would be to the purchaser's account.

8.0 DOCUMENTATION :

8.1 The Bidder shall furnish full description and illustrated catalogues of material offered alongwith the bid.

8.2 The Bidder shall also furnish alongwith the bid the outline drawing of L.T. Pins & hardware fittings as per reference fig. of relevant ISS.

8.3 TEST REPORTS :

8.3.1 Two sets of type test reports duly approved by the purchaser shall be submitted by the supplier for distribution before commencement of supply. Adequate copies of acceptance & routine test certificate, duly approved by the purchaser shall accompany the dispatched consignment.

8.3.2 All records of routine test reports shall be maintained by the Supplier at his works for periodic inspection by the Purchaser.

8.3.3 All test reports of tests conducted during manufacture shall be maintained by the Supplier. These shall be produced for verification as and when requested for by the Purchaser.

9.0 PACKING & FORWARDING :

9.1 All insulator fittings shall be packed in double bags, one HDP bag (inner) and one gunny bag (outer) or in double gunny bag. The gross mass of the each packing shall not normally exceed 50 Kg.

9.2 The packing shall be of sufficient strength to withstand rough handling during transit, storage at site and subsequent handling in the field.

10.0 TEST CHECKING OF MATERIAL AT STORES

The material received in the stores of the NIGAM shall be subjected to the test checking at stores before final acceptance of the material, the procedure for the same shall be as under :

10.1 SAMPLING

One sample out of each sub-lot / lot of **3000** Nos. or part thereof from each inspected lot received in stores shall be selected for test checking of material and shall be got tested. The sample selection shall be done in the presence of supplier or his authorised representative for which 7 days notice shall be given to the supplier.

10.2 TESTS

10.2.1 The following tests shall be carried out on the above items :

- a) Visual Examination, Verification of Dimension, weight and marking.
- b) Mechanical Strength Test (for LT Pins only).
- c) Galvanisation (Uniformity) Test.

Only those test shall be conducted at CTL for which facility with CTL is available.

10.2.2 Test of the material shall be got done at the test laboratory of the NIGAM or any other test laboratory designated by the Chief Engineer (MM). For witnessing of the testing, 7 days notice shall be given to the supplier stating date, time & place where the test is to be conducted. In case the supplier do not attend for witnessing the testing, the testing shall be proceeded and completed and action taken as per the contract.

10.2.3 The witnessing officers of the NIGAM or as designated by the purchaser shall send copies of test reports to the purchaser, consignees and the supplier.

11. CRITERIA FOR ACCEPTANCE

11.1 Visual Examination, Verification of Dimension, weight and marking .

As per specification/ ISS

11.2 Mechanical Strength Test (for LT Pins only)

In case of failure of sample in Mechanical Strength Test, the material contained in the lot / sub-lot to which the sample belongs, shall be rejected. The rejected material shall have to be replaced by the supplier free of cost.

11.3 Galvanisation (Uniformity) Test.

11.3.1. The sample(s) shall be first tested for (n-2) number of dips where (n) is specified number of dips in the contract. If the sample(s) does not pass the uniformity of Galvanisation Test for (n-2) dips, the material shall be rejected and the material relating to relevant lot / sub-lot to which sample(s) pertains shall have to be replaced by the supplier free of cost.

11.3.2 If the sample has passed the uniformity of Galvanisation Test for (n-2) dips, then it shall be tested for (n-1) dips. If the sample has not passed the uniformity of Galvanisation Test with (n-1) dips, then material pertaining to relevant lot / sub-lot shall be accepted with a deduction @ 10% of cost of material.

11.3.3 If the sample has passed the uniformity of Galvanisation Test with (n-1) dips, then sample shall be tested for last one dip of one minute to complete the test for `n' dips. If the sample does not pass the uniformity of Galvanisation Test with `n' dips, then the material pertaining to relevant lot/ sub-lot shall be accepted with a deduction @ 5% of cost of material.

11.3.4 If the sample(s) have passed the Test with number of dips as specified in the contract (n), then material pertaining to relevant lot / sub-lot shall be accepted.

12.0 TEST CHARGES :

All test charges incurred towards test checking of the material received in our stores shall be borne by the NIGAM.

13.0 PAYMENT :

Payment shall be made only after receipt of successful test report from the CTL on the samples selected from the material received at the stores.

JODHPUR VIDYUT VITRAN NIGAM LIMITED

A Govt. of Rajasthan Undertaking

Prescribed technical specification for supply of

(Name of Material/Equipment/Machinery/T&P etc.)

L.T.Pins & Hardware Fittings for L.T.Shackle Insulators

S.No.	Technical specification	Name of IS/other	Other particulars
	to which material/equipment/ Machinery/T&P shall conform	standard specification to which material should conform	if any.

1. Specification for Insulator fittings IS:7935/1975 for overhead power lines with a nominal voltage upto and including 1000 V
2. Methods of testing weight, thickness IS:2633/1986 & Uniformity of coating on Hot Dip Galvanised articles.
3. Specification for electroplated coating IS:1573/1986 of zinc on iron and steel
4. Specification for Zinc IS:209/1992
5. Specification for porcelain insulators IS:1445/1977 for overhead power lines with a nominal voltage upto and including 1000 V.

6. Specification for carbon steel forgings IS:2004/1991 for general engineering purposes.
7. Technical supply conditions for threaded IS:1367 fasteners. Pt-I/1980
Pt-II/1979
Pt-III/1991
8. Specification for insulator fittings for IS:2486(Pt.I)/ 1993 overhead power lines with a nominal voltage greater than 1000 V - General requirements & tests.
9. Recommended practices for hot dip IS:2629/ 1985 galvanizing of iron & steel.

S.No.	Technical specification to which material/equipment/ Machinery/T&P shall conform	Name of IS/other standard specification to which material should conform	Other particulars if any.
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10. Fastners - single coil rectangular IS:3063/1994 section spring lock washers.
11. Specification for Hexagon Head Bolts, IS:1363/ 1992(Pt.I/II/III) Screws & Nuts of product grade `C'.
12. ISO Screw Threads-Limit of size for IS:4218 (Pt.VII)/1978 commerceal bolts & nuts (diameter range 1 to 39 mm)

Certified that we agree to all the aforesaid technical specification

(Signature)

Name & Designation

with seal of the bidder.

Schedule- A

**GUARANTEED TECHNICAL & OTHER PARTICULARS
OF GALVANISED M.S.FORGED L.T.PINS**

S. No.	Description	Particulars
1.	MANUFACTURER'S NAME & ADDRESS	
i)	OFFICE	

ii)	WORKS	
2.	STANDARD SPECIFICATION TO WHICH THE INSULATORS PINS SHAL CONFORM	IS:7935/1975 (Fig.2) Latest & other relevant ISS
3.	DIMENSIONS OF PIN:	
A)	LENGTH OF PIN	260 MM
i)	SHANK LENGTH	125 MM
ii)	STALK LENGTH	135 MM
B)	THICKNESS OF STALK COLLER	5 MM
C)	DIAMETER OF STALK	
i)	AT TOP	16 MM
ii)	AT COLLAR	32 MM
D)	DIAMETER OF SHANK	16 MM
E)	LENGTH OF THREADS ON BOTH SIDES	
i)	STALK	32 MM + 3 MM
ii)	SHANK	75 MM
F)	THICKNESS OF NUT (M16)	
i)	MAXIMUM	15.9 MM
ii)	MINIMUM	14.1 MM
G)	SPRING WASHER THICKNESS (M16 SIZE)	3.5 MM + 0.2 MM
4.	TOLERANCE ON VARIOUS DIMENSIONS	± 5% on all dimensions but tolerance of collar thickness on plus side upto 2 mm and on minus side upto 0.5 mm.
5.	MINIMUM FAILING LOAD	2.0 KN
6	WEIGHT OF PIN (approx)	0.425 Kg ± 2% Tolarence
7	TYPE OF GALVANISATION	
i)	L.T. PIN	HOT DIP GALVANISED
ii)	NUTS & SPRING WASHERS	HOT DIP/ELECTRO- GALVANISED.THE MIN. LOCAL THICKNESS OF ELECTROPLATED ZINC COATING SHALL BE 25 MICRON AS PER SERVICE GRADE NO.4 OF IS:1573/1986.
8.	MARKING	
9.	DETAILS OF PACKING	double bags, one HDP bag (inner) and one gunny bag (outer) or in double gunny bag

SIGNATURE OF BIDDER WITH SEAL

Schedule-B

**GUARANTEED TECHNICAL & OTHER PARTICULARS
OF L.T.SHACKLE HARDWARE FITTINGS**

S.	Description	Particulars
1.	MANUFACTURER'S NAME & ADDRESS :	

i)	OFFICE	
ii)	WORKS	
2.	STANDARD SPECIFICATION TO WHICH THE H/W FITTINGS SHALL CONFORM	IS:7935/1975 (FIG.3) LATEST & OTHER RELEVANT ISS
3.	DIMESIONS OF H/W FOR L.T SHACKLE INSULATOR:	
A)	LENGTH OF STRAPS	185 MM
B)	WIDTH OF STRAPS	30 MM
C)	THICKNESS OF STRAPS	3 MM
D)	DIAMETER OF HOLES AT THE END OF STRAPS.	14 MM
E)	LENGTH OF BOLTS	115 MM
F)	DIAMETER OF BOLTS	12 MM
G)	DIAMETER OF BOLT HEAD	17 MM
H)	THICKNESS OF BOLT HEAD	8 MM
I)	THICKNESS OF NUTS	
i)	MAXIMUM	12.2 MM (M12)
ii)	MINIMUM	10.4 MM
J)	SHAPE OF BOLT HEAD & NUT	HEXAGONAL
K)	LENGTH OF THREAD PORTION OF BOLT.	65 MM
L)	GALVANISED SPRING WASHER THICKNESS.(M12 SIZE)	2.5 MM + 0.15 MM
4.	TOLERANCE ON VARIOUS DIMENSIONS	± 5%
5	WEIGHT OF COMPLETE H/W SET	0.475 KG (APPROX.) ± 2% Tolerance
6	TYPE OF GALVANISATION	
i)	STRAPS	HOT DIP GALVANISED
ii)	BOLTS	HOT DIP GALVANISED
iii)	NUTS & SPRING WASHERS	HOT DIP/ELECTRO-GALVANISED.THE MIN. LOCAL THICKNESS OF ELECTROPLATED ZINC COATING SHALL BE 25 MICRON AS PER SERVICE GRADE NO.4 OF IS:1573/1986.
7.	MARKING	
8.	DETAILS OF PACKING	double bags, one HDP bag (inner) and one gunny bag (outer) or in double gunny bag
9.	ANY OTHER PARTICULARS WHICH THE TENDERER MAY LIKE TO GIVE.	

SIGNATURE OF BIDDER WITH SEAL

TECHNICAL SPECIFICATION AND OTHER REQUIREMENTFOR 33 KV and 11 KV PIN INSULATORS

SCOPE :This specification covers the design, manufacture, testing, supply and delivery of 33 KV/11 KV /LPin Insulators for use of 11 KV over head power lines in Rajasthan.

- 1.0 The 33 KV/ 11 KV Pin Insulator shall be brown glazed porcelain and shall have minimum failing load of 10 KN/5KN
- 2.0 The 33 KV/11 KV Pin insulator shall comply in all respects with the IS:731/1971 (With latest amendments).
- 3.0 The insulator marked with ISI certification mark will be given preference.

4.0 GENERAL REQUIREMENT :

- a) The porcelain should be sound, free from defects thoroughly vitrified and smoothly glazed.
- b) The glaze of the insulators shall be brown in colour. The glaze shall cover all the porcelain parts of the insulators except those which serve as supports during fixing or are used for the purpose of assembly.
- c) The design of the insulator shall be such that the stresses due to expansion and contraction in any part of the insulator shall not lead to deterioration. The porcelain shall not engage directly with hard metal.
- d) Cement used in the construction of the insulator shall not cause fracture by expansion or loosening by contraction and proper care shall be taken to locate the individual parts correctly during cementing. The cement shall not give rise to chemical reaction with metal fitting and its thickness shall be uniform as possible.

4.01 THIMBLES :

The insulators shall suitably be provided with cemented in zinc or lead thimbles.

4.02 FAILING LOAD :

The 33 KV Pin Insulator shall have a minimum failing load of 10 KN .
The 11 KV Pin Insulator shall have a minimum failing load of 5 KN .

4.03 THREADS :

The Pin Insulators with cemented in thimbles shall have the threads suitable for use with large & small steel head galvanised M.S. Forged Pins covered under ISS:2486 (with its latest amendments if any).

4.04 DRAWING :

The bidder shall submit detailed drawing along with bid showing design and dimensions in absence of which, the offer is likely to be ignored.

4.05 TESTS BEFORE DESPATCH :

The material shall be subjected at manufacturer's works before dispatch to the routine & acceptance tests given here-under as per IS:731/1971 (latest amended).

4.06 ROUTINE TESTS :

These tests are to be carried out to check various requirements of Pin insulators which are likely to vary during production. The following tests shall be conducted / carried out on each insulator by the bidder at his works as per relevant IS:731/1971 (Latest amended) and he should furnish certificate / record thereof during pre-dispatch inspection:-

- i) Visual Examination (clause 10.13)
- ii) Electrical Routine Test (clause 10.15)

4.07 ACCEPTANCE TESTS :

These tests shall be carried out on the samples taken from the lot for the purpose of the acceptance of lot which are to be conducted as per relevant IS:731/1971 (latest amended) :

- i) Verification of dimensions (Clause 10.5)
- ii) Temperature Cycle test (Clause 10.6)
- iii) Mechanical Failing Load test (Clause 10.8)
- iv) Puncture test (Clause 10.10)
- v) Porosity Test (Clause 10.11)

4.08 ADDITIONAL ACCEPTANCE TEST- INSULATION RESISTANCE TEST

In addition to acceptance test, insulation resistance test shall also be conducted on the samples. For carrying out test, the sampling procedure given in appendix C of IS:731/1971 (2nd revision) shall be followed.

The procedure for carrying out this test shall be as under:

- a) Clean insulator and dry properly, then meggar the insulator with 2.5 KV/ 5 KV meggar.
- b) IR value so measured should not be less than 1000 (one thousand) mega ohms. The testing and criteria for conformity shall be as applicable to puncture test.

4.09 SAMPLING :

The sampling procedure as laid down in IS:731/1971 with latest amended shall be followed for carrying out specified acceptance tests.

4.10 TOLERANCE ON DIMENSIONS / TEST RESULTS :

As per IS:731/1971 (latest amended).

4.11 TESTS AT SITE :

The purchaser reserves the right to conduct all tests on each type of insulator after arrival at site and bidder shall guarantee test certificates figures under actual service conditions.

4.12 PACKING :

All insulators shall be packed in suitable crates or boxes so as to withstand rough handling of packing.

4.13 GUARANTEED TECHNICAL AND OTHER PARTICULARS :

The full guaranteed technical and other particulars shall be given in the proforma given in Schedule-V Any deviation from the specifications referred to above shall be supported by adequate justification.

4.14 TEST CHECKING OF MATERIAL AT STORES

The material received in the stores of the NIGAM shall be subjected to the test checking at stores before final acceptance of the material, the procedure for the same shall be as under :

4.15 SAMPLING

One sample of 33 KV Pin insulator out of each sub-lot / lot of 1000 Nos. or part thereof,
One sample of 11 KV Pin insulator out of each sub-lot / lot of 3000 Nos. or part thereof,
from each inspected lot received in stores shall be selected from each store for test checking of material and shall be got tested.

one extra sample of Pin insulator for conducting Puncture test.

The sample selection shall be done as soon as the material is received by the consignee, without calling the representative of supplier. However, testing at CTL or else where as arranged by NIGAM shall be done in the presence of representative of supplier after identification/ confirmation by the supplier's representative that sample(s) so selected belong to them.

4.16 TESTS

The following tests shall be carried out on the above items :

- a) Visual examination, verification of dimensions, creepage distance etc,
- b) Mechanical failing Load Test
- c) Porosity test
- d) Puncture Test

In case if the facility for conducting any of the above test(s) is not available at the NIGAM's CTL, the purchaser reserve the right to get such test (s) conducted at any independent NABL Test House.

- i) For witnessing of the testing, clear 7 days notice shall be given to the supplier stating date, time & place where the test is to be conducted. The testing shall be started after identification / confirmation of sample by the representative of the supplier that sample selected for testing pertain from

the lot supplied by them. In case the supplier does not attend for witnessing the testing, the testing shall be proceeded and completed and action be taken as per the contract.

- ii) The CTL shall send copies of test reports to the purchaser, consignees and the supplier and Sr. Accounts Officer (CPC).
- iii) Only those tests shall be conducted at CTL for which facility with CTL is available.

4.17 CRITERIA FOR ACCEPTANCE

In case of failure of any of sample (s) in any of the above tests, the material contained in the lot / sub-lot received in store to which the samples belong, shall be rejected. The rejected material shall have to be replaced by the supplier free of cost.

4.18 TEST CHARGES :

All test charges incurred towards test checking of the material received in our stores shall be borne by the NIGAM

TECHNICAL SPECIFICATION FOR PURCHASE OF VARIOUS STEEL SECTIONS

1. SCOPE:-

- 1.1 This specification covers for design, manufacture, stage testing, inspection & testing before dispatch, packing supply and delivery of steel plates, strips, section, flats, bars etc. for use in structural work.
- 1.2 These sections shall be suitable for welded, bolted and riveted structures and for general engineering purposes.
- 1.3 Where welding is employed for fabrication and guaranteed weld-ability is required, welding procedure should be as specified in IS:9595:1980.
- 1.4 All steel items shall be supplied galvanized as per ISS

2.0 Standards:

Except as modified in this specification, the material, and purpose of material covered under "SCOPE" clause 1.1 to 1.3 shall confirm to the latest revision with amendments thereof the following bureau of Indian Standard & where the relevant ISS is not available, the material/equipment should comply the latest B.S.S.

S.No.	Bureau of Indian Standards. ISNo.	Title
1	2062	Steel for General structural purpose (Fifth revision)
2	228	Method of chemical analysis of steel (second revision)
3	1608/1995	Mechanical testing of metals- Tensile testing (Second Revision)
4	1757/1988	Method for charpy impact test (V notch) for metallic material (second revision)
5	3803 Part.I/ 1989	Steel-conversion of elongation values Part.I Carbon & alloy Steels (Second revision)
6	8910/1978	Ground technical delivery requirements for steel & steel products.
7	10842/1984	Testing & evaluation procedure for Y groove crackability test.
8	1786/1985	High Strength Deformed Steel Bars and wires for concrete reinforcement.
9	1599/1985	Method for bend test(second revision)
10	1052/1985	Rolling and cutting tolerances for hot rolled steel products (Third Revision).

3.0 GENERAL TECHNICAL REQUIREMENT

The technical, parameters to which the steel sections shall confirm are as under:-

3.1 MECHANICAL PROPERTIES:

a	Grade	A
b.	Designation	Fe 410 W A
c.	Tensile strength min., mpa	410
d.	Yield strength min., mpa	<20, 20-40 >40 mm mm mm 250 240 230
e.	Elongation percent, min.(at gauge length 5.65xSQRT (So)	23
f.	Internal Diameter of Bend min.	3t
g.	Charpy V Notch Impact energy J, min.	

3.2 CHEMICAL COMPOSITION

a	Grade	A
b.	Designation	Fe 410 W A
c.	Ladle Analysis, percent, Max.	C- 0.23 Mn- 1.50 S - 0.050 P - 0.050 Si - 0.40
d.	Supply condition.	As rolled
e.	Carbon equivalent (CE) Max.	0.42
f.	De-oxidation mode	

3.3 MASS & STANDARD LENGTH

S.No	Name of the Steel Sections	Size in mm	Mass in Kg. Per Metre	Required length in metre (Standard length)
1	MS Channel	100x50x6	As per ISS	8-11
2	MS Angle	65x65x6	As per ISS	8-11
3	MS Angle	50x50x6	As per ISS	8-11
4	M.S. Flat	50x6	As per ISS	8-11

3.4 TOLERANCE IN STANDARD LENGTH:- $\pm 5\%$ for all sections

3.5 TOLERANCE IN DIMENSIONS:- As per relevant IS

3.6 PACKING AND MARKING:-

a) Packing As per ISS

b) Marking The steel sections shall be marked with colour

code as per IS and each product shall carry a tag or be marked with the manufacturer name or trade mark.

3.7 WORKMANSHIP

- i) All finished steel shall be well and clearly rolled to dimensions, sections and masses specified. The finished material, shall be reasonably free from surface flows, laminations, rough/jagged and imperfect edges and other harmful defects.
- ii) Minor surface defects may be removed by the manufacturer.

4.0 IDENTIFICATION MARKING:

Each individual structure / section shall carry a code number conforming to component number given to it in the drawing / Bill of material. The code number of approved size shall be stamped with a metal dye of 16 mm size on the member and shall be legible. The name of manufacturers in suitable code and the word "DDUGJY"& "TNTW No" shall also be stamped / punched on each individual section with metal dye of not less than 16 mm size.

If the above marking is not found on the material received in the stores, the receipted challan shall not be given by the concerned stores. The challan shall only be issued after verification of material by the Store officer.

5.0 QUALITY ASSURANCE PLAN:

The bidder shall invariably furnish the following information alongwith his offer, failing which the offer shall be liable for rejection. Information shall be separately given for individual type of steel section.

- i) Statement giving list of important raw materials, names of sub-supplier for the raw material, list of standards according to which the raw material are tested, list of tests normally carried out on raw material in presence of bidders representatives, copies of tests certificates.
- ii) Information and copies of test certificates as in (i) above in respect of bought out items.
- iii) List of manufacturing facilities available
- iv) Level of automation achieved and list of areas where manual processing exists.
- v) List of areas in manufacturing process, where stage inspections are normally carried out for quality control and details of such tests and inspections.

The supplier shall submit the routine test certificates of bought out items and raw material at the time of routine testing.

6.0 PACKING & FORWARDING

The various sections of steel shall be packed in such a manner so that same should be able to resist hazard involved in transportation, unloading, stacking etc.

7.0 TESTS

Tests before dispatch:- The various steel sections before dispatch shall be subject to following tests as per IS:2062 at the maker's works.

ROUTINE TEST/ACCEPTANCE TEST:

- (i) Dimensional checking & visual inspection.
- (ii) Weight checking
- (iii) Chemical composition test
- (iv) Mechanical properties tests

8.0 INSPECTION

The inspection shall be carried out on each lot separately. The following number of pieces selected at random shall be subjected to inspection/ testing and checking.

- | | |
|---------------------------------------|--|
| a) Workmanship and dimension checking | : 1 samples from each 50 MT or part thereof. |
| b) Chemical test | : One sample of each section from the entire lot of material offered for inspection. |
| c) Tensile test | : One sample from every 50 MT or part thereof of each section. |
| d) Bend test | : One sample from every 50 MT or part thereof of each section. |

All the tests and inspection shall be carried out at the place of manufacturer unless otherwise especially agreed upon by the bidder and purchaser at the time of purchase.

The bidder shall afford all reasonable facilities without charges for the inspecting officer(s), to satisfy him that the material is being furnished in accordance with this specification. The purchaser has the right to have the tests carried out at his own cost by an independent agency whenever there is a dispute regarding the quality of supply.

The inspection may be carried out by the purchaser at any stage of manufacture/ before dispatch as per relevant standard.

Inspection and acceptance of any material under the specification by the purchaser, shall not relieve the bidder of his obligation of furnishing material in accordance with the specification and shall not prevent subsequent rejection if the material is found to be defective. The bidder shall keep the purchaser informed in advance, about manufacturing programme so that arrangements can be made for inspection.

The test for chemical and mechanical properties shall have to be arranged in presence of Inspecting officer at recognized Lab.

Schedule-A

GUARANTEED & OTHER TECHNICAL PARTICULARS FOR VARIOUS STEEL SECTIONS

A. GENERAL			
1	Maker's Name		
2	Address for correspondence		
3	Address of Works		
B. STANDARDS & SPECIFICATION			
1	Dimension	As specified	
2	Testing	As per IS:2062 (Latest amended). If not supported by test certificate of steel from main producers.	
C. TOLERANCE		As per IS:1852-1985 (Latest amended)	
Mechanical properties:			
a	Grade	A	
b.	Designation	Fe 410 W A	
c.	Tensile strength min., mpa	410	
d.	Yield strength min., mpa	<20, 20-40 >40 mm mm mm 250 240 230	
e.	Elongation percent, min.(at gauge length 5.65xSQRT (So)	23	
f.	Internal Diameter of Bend min.	3t	
g.	Charpy V Notch Impact energy J, min.	-	
Chemical composition			
a	Grade	A	
b.	Designation	Fe 410 W A	

c.	Ladle Analysis, percent, Max.	C- 0.23 Mn- 1.50 S - 0.050 P - 0.050 Si - 0.40	
d.	Supply condition.	As rolled	
e.	Carbon equivalent (CE) Max.	0.42	
f.	De-oxidation mode		

Mass & standard length : As specified.

Tolerance in Dimension : As per relevant ISS:

Marking : The steel sections shall be marked with colour code as per ISS and each product shall carry a tag or be marked with the manufacturer name or trade mark.

Signature of Bidder

Name _____

Designation _____

Common authorized seal of bidder

TECHNICAL SPECIFICATION FOR SUPPLY OF SUB-STATION STRUCTURE FOR MOUNTING OF 11/0.4 KV TRANSFORMERS ON DOUBLE POLE / 33 KV LINE DP STRUCTURE/ 33 KV SUB-STATION STRUCTURE AND SUB-STATION STRUCTURE FOR SINGLE PHASE 16 KVA DT

1. SCOPE

This specification covers fabrication, testing & delivery of fabricated steel items as a complete package, complete in all respect as per GTP/Drawings (to be provided by the purchaser to the successful bidder). The steel sections generally used, tentative unit weight of fabricated item is as per GTP. The final bill of material for the purpose of payment shall be prepared and submitted by the supplier after approval of model assembly by the purchaser.

2. STANDARDS :

All materials and equipments shall comply in all respect with the requirements of the latest edition of the relevant Indian Standard Specification(s) except as modified in this specification. Where the relevant ISS is not available, the material / equipment should comply the latest BSS. All the items should be made / fabricated/tested from steel sections conforming to IS:2062 (latest amended).

3. DRAWING & MODEL ASSEMBLY :

3 sets of drawing shall be furnished by the successful bidder based on JDVVNL drawing for according approval of the purchaser before commencement

4. MARKING

Each individual structure / section shall carry a code number conforming to component number given to it in the drawing / Bill of material. The code number of approved size shall be stamped with a metal dye of 16 mm size on the member and shall be legible. The name of manufacturers in suitable code and the word “DDUGJY” & “TNTW No” shall also be stamped / punched on each individual section with metal dye of not less than 16 mm size.

If the above marking is not found on the material received in the stores, the receipted challan shall not be given by the concerned stores. The challan shall only be issued after verification of material by the Store officer.

5. INSPECTION, TESTING & CHECKING :

The finished product before acceptance shall be subject to inspection in respect of workmanship, checking of dimension/weight & testing as per requirement of relevant IS:2062 (latest amended), approved drawings and bill of material, at the suppliers works if not supported by test certificates of main producers viz. SAIL/TISCO/RINL. The certificate for type test (chemical composition & mechanical properties test) issued by prime producer(s) shall be furnished along with the inspection call to the SE(DDUGJY), otherwise testing shall be arranged at independent Lab on the cost of supplier. The certificate and relevant invoices shall be in the name of the firm on whom the order is placed by the Nigam. **In case bidder use the steel sections manufactured by prime producers then the inspecting officer shall verify and record in the inspection report regarding stamping and mark of prime producers.** The certificate(s) in the name of other parties/ sources shall not be accepted and in such cases the tests for chemical and mechanical properties shall have to be arranged in the presence of inspecting officer(s) at recognized lab.

The supplier shall present the latest Calibration Certificate(s) of testing instruments/ equipments to be used for the testing of the material covered in the purchase order to the authorized inspecting officer/inspecting agency of the purchaser. The testing instruments/ meters/ apparatus etc. should be got calibrated by the supplier from time to time from independent test laboratory/ house having valid accreditation from National/ Accreditation Board for testing and calibrating laboratories for testing equipments/ original manufacturer having trace ability to NABL/NPL or equivalent.

The calibration certificate(s) should not in any case be older than one year at the time of presenting the same to the inspecting officer/inspecting agency of the purchaser. The testing instruments/equipments should be duly sealed by the Calibrating agency and be indicated in the calibration certificate(s).

The following facilities are to be provided by the supplier at his own cost to the inspecting officer of JDVVNL.

- (d) Suitable accommodation.
- (e) Local conveyance between arrival point, place of stay, works and departure point.
- (f) The supplier shall assist in arranging return ticket and reservation on the request of the inspecting officer for which the payment shall be made by the inspecting

officer. In case of joint inspection, single or shared double room accommodation shall be provided.

6. TESTS

Test before dispatch:- The various steel section/structure before dispatch shall be subject to following test as per IS:2062(latest amendment) at the manufacturer's works

Routine test/acceptance test

- (i) Dimensional checking and visual inspection
- (ii) Weight checking
- (iii) Chemical composition test
- (iv) Mechanical property test

7. SAMPLING:

The inspection shall be carried out on each lot separately. The following number of pieces selected at random shall be subject to inspection/ testing and checking.

- a) Workmanship and dimension checking : 3 % samples from finished item.
- b) Chemical test : One sample of each steel section from the entire lot of material offered for inspection.
- c) Tensile test : One sample of each steel section from every 50 MT or Part thereof.
- d) Bend test : One sample of each steel section from every 50 MT or Part thereof.

8. TOLERANCE IN DIMENSIONS :

The tolerance(s) shall be permissible as per IS: 1852: (latest amended). Further the following tolerance(s) on fabricated items will also be allowed.

- i) Tolerance in over all length $\pm 3\text{mm}$
- ii) Tolerance in edge dimensions (centre of hole to end) $\pm 2\text{mm}$
- iii) Tolerance in hole centre $\pm 2\text{mm}$
- iv) Circular holes No tolerance
- v) Weight Tolerance +2% to (-) 4%

9. GUARANTEED TECHNICAL PARTICULARS :

The bidder shall furnish the guaranteed technical particulars of the material as required in the schedule-A by mentioning specific figures therein. Any item of the GTP left unfilled or simply written as per ISS etc. shall be considered as incomplete GTP and such tender is liable to be rejected.

10. PACKING AND FORWARDING

The finished items complete in all respect dully inspected and cleared for dispatch, shall have to be delivered in Nigam's stores located anywhere in Jodhpur Discom by Road. Unloading of material at store(s) is Suppliers responsibility.

11. CRITERIA FOR ACCEPTANCE

The inspected material should be strictly in accordance to the GTP of the specification otherwise the material shall be treated as rejected and shall not be accepted.

12. WEIGHT

The weight of structure shall mean the weight of structures calculated by using standard sectional weights of all steel structural members of the sizes indicated in the fabrication drawings and/or subsequently revised drawings and bill of material without taking into consideration the reduction in weight due to drilling of bolt-holes, skew cuts, chamfering etc. or the increase in weight due to galvanization.

The material shall be acceptable if found within permissible tolerance limit i.e. +2% and (-)4%.

DETAILS OF APPLICABLE STANDARDS / SPECIFICATION/ MANUALS :

The material shall comply with the relevant provisions made in the following Indian Standards Specification (now BIS) with latest amendments.

1	IS:2062: (Latest amended)	Raw material and Method of testing
2	IS:1852: (Latest amended)	Rolling & cutting Tolerance

All materials and sections shall comply in all respect with the requirement of latest addition of relevant Indian Standard Specification except as modified in this Specification . Where the relevant ISS is not available, the material / sections should comply with the latest BSS. All the item should be made/ fabricated from steel sections conforming to IS:2062: (latest amended). Rolling and cutting tolerances for hot rolled steel products shall be governed as per IS:1852:(latest amended).

SCHEDULE-A

GUARANTEED & OTHER TECHNICAL PARTICULARS FOR SUB-STATION STRUCTURE FOR MOUNTING OF 11/0.4 KV TRANSFORMERS ON DOUBLE POLE UNDER

A. GENERAL :

1. Name of firm :
2. Address for correspondence :
3. Address of Works :

B. STANDARDS & SPECIFICATION :

1. Dimension : As per approved drawing.
2. Testing
- a) Steel : As per IS:2062: (Latest amended). If not supported by test certificate of prime producers.

C. TOLERANCE :

- a) Steel : As per IS:1852:(Latest amended)

- b) Length : +/- 3 mm
- c) Edge dimensions : +/- 2 mm
- d) Hole centre : +/- 2 mm
- e) Weight tolerance : +2% to (-) 4%

D) GUARANTEED WEIGHT OF STRUCTURE : As per BOM

E) Properties of steel (for class `A')

(a) Chemical composition.

- (i) Carbon % (Max.) 0.23
- (ii) Manganese % (Max.) 1.50
- (iii) Sulphur % (Max.) 0.05
- (iv) Phosphorus % (Max.) 0.05
- (v) Silicon % (Max.) 0.40
- (vi) C.E. % (Max.) 0.42

(b) Mechanical Properties :

- UTS(Mpa) Min. 410
- Y.S.(Mpa) Min. 240
- EI (%) Min. 23

Signature of Bidder

Name _____

Designation _____

Common authorized seal of Bidder

TECHNICAL SPECIFICATION FOR GALVANISED STEEL STAY SETS OF SIZE 16X1800MM AND 20x2400 MM

1.0 SCOPE

This specification covers the design, manufacture, inspection, testing before dispatch, supply and delivery F.O.R. destination anywhere in Jodhpur Discom of hot dip galvanized steel stay sets of size 16x1800 mm and 20X2400(oiled threads) with G.S. Anchor plates, as per pattern-1 of BS:16/1974.

1.1Size 20X2400 mm

Hot dip galvanized steel stay sets of dia 20mm, 2400 mm long (oiled threads complete with ratchet nut, GS anchor plates size 380x380x4 mm (having square hole size as 22 x 22 mm in centre) & fitted with cast iron cross head and steel bow dia 14 mm conforming to pattern-1 of BS:16/1974

1.2Size 16X1800 mm

Hot dip galvanized steel stay sets of dia 16mm, 1800 mm long (oiled threads complete with ratchet nut, GS anchor plates size 300x300x4 mm (having square hole size as 18 x 18 mm in centre) & fitted with cast iron cross head and steel bow dia 12 mm conforming to pattern-1 of BS:16/1974

2.0 PRINCIPAL PARAMETERS :

The hot-dip galvanized steel stay sets and anchor plates shall strictly conform to BS:16/1974 with latest amendments thereof as per pattern-1 in all respect, except herein otherwise stated. The ratchet nut and the cross head bow shall be having three (3) cuts in place of six(6) . The dimensions of the cross head portion of the bow of each type of stay set shall be as per the drawing enclosed at Appendix-A (i) & (ii). Tolerances in dimensions shall be governed by the values appearing at Schedule of GTP.

The stay sets shall have galvanizing as per BS:729/1961 part-I with latest amendments thereof and shall be galvanized by hot dip galvanization process.

3.0 GENERAL TECHNICAL REQUIREMENTS :

- i) The rod and bow shall be free from flaws and other defects, shall be of good finish and the cross head shall not fail, draw and deformed when the assembly is tested to fracture as their full section by tensile strength. The ratchet nuts and ratchet face of each cross head shall be well formed, so that any nut and any cross head of the appropriate size shall provide good ratchet action. The

treads of stay sets shall be cut after galvanising and shall be lubricated with good quality of mobile oil to prevent rusting.

- (ii) The rods and bow shall be of steel suitable to give strength as per table of tensile strength as at 5.2(a) below:
- (iii) The cross head may be made of forged mild steel/ hot rolled steel. The ratchet nuts shall be of steel or malleable cast iron.
- (iv) The side of each bow shall be well riveted into the cross head (sound/strong iron casting) & shall not draw when the complete assembly is tested to fracture by tensile stress.
- (v) In case of galvanized steel stay sets & anchor plates, all the ferrous metal parts shall be smoothly & continuously hot dip galvanised with zinc, the nuts shall have neat fit so that they can be turned easily through out the length of the threads on the bolts & nuts shall be capable of developing the full strength of the bolts. The galvanising shall satisfactorily withstand the test specified BSS:729/1961 Part.I with latest amendments.
- (vi) The parts of stay sets of the same type shall be strictly interchangeable.
- (vii) The steel anchor plates shall be clearly cut off and punched and shall be free from cracks after punching.
- (viii) The rods,bows and plates shall strictly conform to table 3 and 6 of BS:16/1974 (stay rods No.13 M & 15 M & anchor plates No.23 M1 & 45 M1) in respect of dimensions etc. and figure 4& 5 (Pattern-I) in respect of shape etc. The dimensions of the cross head portion of the bow shall be as per the drawing enclosed at Appendix-A of this section.

4.0 TEST :

4.1 TEST BEFORE DESPATCH :

The G.S.Stay Sets and accessories shall be subjected at manufacturer's works before dispatch to the following test(s) as per BS/IS.

A) ROUTINE TEST ON EACH UNIT AS PER RELEVANT STANDARD :

The dimension of the stay rods, bows and plates shall strictly conform to table 3 and 6 of BS-16/1974 (Stay rods No.13 M & 15 M and anchor plates No.23 M-1 & 45 M-1) in respect of dimensions etc., and fg. No.4 & 5 (Pattern-1) in respect of shape etc. the dimensions of cross head portion of the bow shall be as per drawing

4.2 ROUTINE / ACCEPTANCE TEST :

The following tests shall be got conducted inpresence of Purchaser's representative.

a) TENSILE TEST :

The finished stay sets when subject to tensile test shall comply with the requirement of the tensile strength as per the table given below:

S.No.	Diameter of rods	Breaking load
1.	20 mm	96 KN
2.	16 mm	62 KN
(1 KN = 101.972 Kgf)		

b) HOT DIP GALVANISED TEST :

The finished stay sets when subject to dip test in standard copper sulphate solution for the testing of galvanization quality should be able to witness four dips of one minute each as per BS:729/1961 Pt.I with out any copper deposits on the surface.

The weight of zinc coating should not be less than 610 grams per sq.m for rods and 460 grams per sq.m for plates as per BS:729/1961 Pt.I.

4.3 SAMPLING PLAN FOR INSPECTION:

Since the sampling procedure/ plan has not been mentioned in the BS:16/1974, the following sampling plan shall be applicable for inspection testing/ checking of the stay sets.

(i) FOR TENSILE STRENGTH TEST : 1 out of 1000 Nos.

CRITERIA FOR CONFORMITY :

If one or more sample(s) fail, twice the number of samples originally tested shall be selected and shall be subjected to the test. If there is no failure among these samples, the lot or the sub lot shall be considered to have satisfied the requirement of this test. If one more sample(s) of the second sample fails, the lot or sub lot represented by the corresponding samples shall be considered not to have passed the test.

(ii)FOR PHYSICAL DIMENSIONAL CHECKING AND GALVANISATION TEST:

The sampling plan will be as under :

The lot offered for inspection, be divided in sub lot not exceeding 5000 Nos. sets for each sub lot. Acceptance or otherwise of sub lot shall be determined on the basis of performance of the samples selected from it as per details mentioned as under :

Size of sub-lot	Sample size	Sample size for re-inspection	Permissible Failure	
			From 1st sample size	From total samples including re-inspection
	n1	n2	c1	c2
Upto 1000	2	4	0	1
1000 to 2000	4	8	0	1
2001 to 3000	6	12	1	2
3001 to 5000	10	20	1	3

4.4 CRITERIA FOR CONFORMITY

Sub lot shall be considered as conforming to the requirement of the acceptance test if the Nos. of failure found in first samples selected as per Col. No.2 of above

table, are upto the No. mentioned in Col.4 If the No of failure is more than or equal to the sample mentioned in Col.5 lot shall be considered as not conforming to the requirement of acceptance and shall be rejected. If the No. of failure is between c1 and c2, a second sample of n2 stay sets shall be selected and subjected to acceptance test. If the number of failure in the two samples sizes (n1+n2) combined is less than c2, the lot shall be considered as conforming to the requirement of acceptance tests otherwise it shall be considered to have failed.

4.5 TOLERANCE ON TEST RESULTS :

As per BS:16/1974 and GTP of specification .

The purchaser reserve the right to conduct all test(s) on stay sets after arrival at site and the contractor shall guarantee tests certificate under actual service condition(s).

5.0 INSPECTION

5.1 All the tests (as mentioned at Clause 5.1 and 5.2) and Inspection shall be made at the place of manufacturer unless otherwise especially agreed upon by the bidder and purchaser at the time of purchase. The bidder shall afford the inspection officer(s) representing the purchaser all reasonable facilities without charges, to satisfy him that the material is being furnished in accordance with this specification. The purchaser has the right to have the tests carried out at his own cost by an independent agency whenever there is a dispute regarding the quality of supply.

5.2 The Inspection may be carried out by the purchaser at any stage of manufacture/ before dispatch as per relevant standard.

5.3 Inspection and acceptance of any material under the specification by the purchaser, shall not relieve the bidder of his obligation of furnishing material in accordance with the specification and shall not prevent subsequent rejection if the material is found to be defective. The Bidder shall keep the purchaser informed in advance, about manufacturing programme so that arrangements can be made for inspection.

5.4 The purchaser reserves the right to insist for witnessing the acceptance/ routine testings of the bought out items.

5.5 The Bidder shall give 15 days advance intimation to enable the purchaser to depute his representative for witnessing the acceptance and routine tests. The inspection charges would be to the purchaser's account.

6.0 DOCUMENTATION :

6.1 All drawing(s) shall conform to International Standard Organization (ISO) 'A' series of drawing sheet / Indian Standards Specification IS:656. All drawing(s) shall be in ink and suitable for microfilming. All dimension(s) shall be in SI Units.

6.2 List of drawing(s) and documents :

The bidder shall submit four sets of drawings, complete with fully dimensioned elevation, cross sectional and longitudinal section drawings of each type of material and its assemblies. All drawings shall be to scale with full details.

All important dimensions being given therein and the material of which each part is made of shall be clearly indicated. The drawing of cross head portion and bow and tolerance in the dimensions as per this specification shall be forming a part of contract.

The manufacturing of the equipment shall strictly be in accordance with the approved drawings and no deviation shall be permitted without the written approval of the purchaser. All manufacturing and fabrication work in connection with the equipment prior to the approval of the drawing shall be at the supplier's risk.

The equipment shall conform to high standard of engineering, design workmanship and latest revisions of relevant standards at the time of ordering and purchaser shall have the power to reject any work or materials which in his judgment, is not in full accordance herewith.

7.0 MARKING:

Each bow of stay sets shall be provided with the following marking :

- a) Name of Manufacturer or Trade Mark.
- b) DDUGJY/TNTW No.....

The marking on bow should be embossed during the course of casting.

8.0 TEST CHECKING OF MATERIAL

The material received shall be subjected to the test checking at CTL before final acceptance of the material, the procedure for the same shall be as under :

9.0 SAMPLING

One sample out of each sub-lot / lot consisting of following quantities or part thereof in case of each type of G.S. Stay Set from each inspected lot received in stores shall be selected for test checking of material and shall be got tested.

- I. G.S Stay Set of size 16X1800 mm– 1000 sets.
- II. G.S Stay Set of size 20X2400 mm – 1000 sets.

The selection of sample from the material received at stores shall be done as soon as material is received in stores without the presence of the representative of the supplier. However, testing of sample(s) at CTL shall be carried out in the presence of representative of the supplier after identification / confirmation by him that sample so selected belongs to them. In case the supplier disputes that the selected samples does not pertain to them, then fresh sample shall be selected in the presence of the representative of the supplier and test(s) be carried out.

10.0 TESTS

The following tests shall be carried out on the above items :

- a) Visual Examination, Verification of Dimension(s), weight and marking Test
- b) Tensile strength test.
- c) Galvanisation (Uniformity) Test.

10.1 Only those tests shall be conducted at CTL for which facility with CTL is available.

10.2 CRITERIA FOR ACCEPTANCE

a) Visual Examination, Verification of Dimension(s), weight and marking .

As per specification/ ISS/ BIS

b) Tensile strength test.

In case of failure of sample in tensile strength test the material contained in the lot / sub-lot to which the sample belongs, shall be rejected. The rejected material shall have to be replaced by the supplier free of cost.

c) Galvanisation (Uniformity) Test.

- i) The sample(s) shall be first tested for (n-2) number of dips where (n) is specified number of dips in the contract. If the sample(s) does not pass the uniformity of Galvanisation Test for (n-2) dips, the material shall be rejected and the material relating to relevant lot / sub-lot to which sample(s) pertains shall have to be replaced by the supplier free of cost.
- ii) If the sample has passed the uniformity of Galvanisation Test for (n-2) dips, then it shall be tested for (n-1) dips. If the sample has not passed the uniformity of Galvanisation Test with (n-1) dips, then material pertaining to relevant lot / sub-lot shall be accepted with a deduction @ 10% of cost of material.
- iii) If the sample has passed the uniformity of Galvanisation Test with (n-1) dips, then sample shall be tested for last one dip of one minute to complete the test for 'n' dips. If the sample does not pass the uniformity of Galvanisation Test with 'n' dips, then the material pertaining to relevant lot/ sub-lot shall be accepted with a deduction @ 5% of cost of material.
- iv) If the sample(s) have passed the Test with number of dips as specified in the contract (n), then material pertaining to relevant lot / sub-lot shall be accepted.

11.0. TYPE TEST REPORTS :

- 11.01 The bidder shall furnish valid and authenticated type test certificates from a Govt. approved / Govt. recognized / NABL Accredited laboratory / ILAC i.e. International Laboratory Accredited Laboratory (in case of foreign laboratory) of similar rating and design of tendered material/ equipment. Such type test certificates should not be older than 05 years as on the date of bid opening. For this purpose date of conducting type test will be considered.
- The type test certificate by in house laboratory of tendering firm even if it is a Govt. approved / Govt. recognized / NABL accredited / ILAC accredited, shall not be accepted, in case of their own tender. This will not apply if tendering firm is Govt. company / public Sector undertaking.
- 11.02 The bidder should furnish documentary evidence in support of the laboratory whose type test have been furnished, that the said laboratory is a Govt. / a Govt. approved / a Govt. recognized / NABL accredited laboratory / ILAC accredited (in case of foreign laboratory).
- 11.03 The type test certificates shall be furnished either in original or copy duly attested by notary.
- 11.04 The bids of only those bidders shall be considered to be meeting the type test criteria who furnishes complete type test certificate with the bid as per above provision.

TECHNICAL SPECIFICATION FOR THE SUPPLY OF DANGER PLATES FOR 33/11 KV & 11/0.4 KV SUB-STATIONS

1.0 SCOPE

This specification covers the fabrication, manufacture, testing, checking & supply of Danger Label/ plates for 33/11KV & 11/0.4 KV Sub-Stations. Before despatch of material, the inspection testing & checking will be witnessed by the representative of the purchaser.

2.0 SPECIFICATIONS & STANDARDS:

The relevant ISS to which this material shall conform are indicated as below:-

S.NO.	Bureau of Indian Standards	Title
a)	IS:2551-1982 (Latest amended)	For general checking
b)	IS-5-1978 (Latest amended)	For colours for ready mixed paints and enamels.
c) i.	IS:3972 (Pt.2/Sec.1):1985	For resistance to citric acid at room temperature and boiling temperature.
ii)	IS:3972 (Pt.2/Sec.1)1985	For low & high voltage tests for detecting and locating defects.
iii)	IS:3972 (Pt.1)Sec.1):1982	For production of Specimen for testing.

3.0 DIMENSIONS:-

S. No.	Items	Nominal thickness of M.S. Plate (Min.)	Other dimension as per ISS	
			Length in mm	Width in mm.
1.	Danger Plates for 33/11 KV & 11/0.4 KV Sub-stations.	1.6mm	250	200
IS-2551/1982 (latest amended)				

4.0 Material

The Danger plates shall be made from mild steel sheet of at least 1.6mm thick and vitreous enameled white with letters, figures and conventional skull and cross bones in signal red colour conforming to IS-5-1978 on the front side and rear side should be enameled black. The edges & rear side should be enameled black. Holders for fixing the plates should be drilled not punched.

5.0 TESTS:-

In order to ensure that Danger plates conform to the specification the following tests are to be carried out:-

- a) Visual Examination.
- b) Dimensional check including checking of thickness of M.S. Plate and weight.
- c) Test for weather proofness.
- d) Checking of thickness of enamel.
- e) Resistance to citric acid at room temperature.
- f) Low & high voltage tests for detecting and locating defects.

6.0 INSPECTION:-

The number of samples of danger plates selected at random from the lot shall be in accordance with the table given below:-

Lot size	First sample for tests a,b,c, d,e & f.	sample size for checking of thickness of steel plate & enameling.	Permissible Rejection number.	Second sampling.	Permissible Rejection number
a)	Upto 500	5	1	0	2
b)	501 to 800	7	2	0	3
c)	801 to 1300	10	4	0	3
d)	1301 to 3200	15	6	1	4

e)	3201 to 8000	25	8	2	5
f)	8001 & above	35	10	2	7

The checking of the thickness of M.S. plates and enamelling on the plates number of samples as per Column 3 is acceptable provided the rejection of the samples is not more than the number mentioned in column 4.

In the event of rejection being more than the number in Column 4 double the sampling as per Column 5 be done. Incase of rejection of samples is beyond the number mentioned at 6, the lot shall be considered rejected.

On inspection/ testing/checking, if the material is found acceptable as per above criteria the purchaser's representative shall seal the material, before dispatch.

7.0 MARKING

The essential information that would be necessary to identify the manufacture of Danger Plates such as JDVVNL/TW/DDUGJY /TNTW No..... shall be marked in such a manner & position on the plates that it does not interfere with the other information and should be of permanent nature.

8.0 TEST CHECKING OF MATERIAL AT TESTING LABORATORY:

The material received in nigam shall be subjected to the test checking at testing laboratory before final acceptance of material. The procedure for testing shall be as under:

i) SAMPLING

One sample out of each sub lot/ lot of (1000 Nos.) thousand Nos. or part thereof from each inspected lot received in stores shall be selected from each store for test checking of material and shall be got tested. The selection of sample from the material received at stores shall be done as soon as material is received in stores without the presence of the representative of the supplier. However, testing of sample(s) at CTL or else where as arranged by the JDVVNL shall be carried out in the presence of representative of the supplier after identification / confirmation by him that samples so selected belong to them.

ii) TESTS

The following test shall be carried out on the above samples :

- a) Visual examination , verification of dimensions, weight and marking as per GTP/ISS/Specification/ approved drawing.

iii) CRITERIA FOR ACCEPTANCE

Visual Examination, verification of dimensions, weight and marking as per Specification/ GTP/ ISS/ approved drawing.

iv) TEST CHARGES :

All test charges incurred towards test checking of the material received in our stores shall be borne by the NIGAM except that of personal expenses of the representative of the supplier for witnessing the tests.

9.0 PACKING

You shall pack the material in the suitable wooden cases so that the material may not be damaged in the transit and also remain protected from the atmosphere.

TECHNICAL SPECIFICATION FOR SUPPLY OF (A) 33 KV LINE DP (B) 1.8 METRE LONG MS CHANNEL BRACKET WITH CLAMP (C) 1.4 METRE LONG MS CHANNEL BRACKET WITH CLAMP

1. SCOPE

This specification covers fabrication, testing & delivery of fabricated steel items as a complete package, complete in all respect as per GTP/Drawings (to be provided by the purchaser to the successful bidder).

2. STANDARDS :

All materials and equipments shall comply in all respect with the requirements of the latest edition of the relevant Indian Standard Specification(s) except as modified in this specification. Where the relevant ISS is not available, the material / equipment should comply the latest BSS. All the items should be made / fabricated/ tested from steel sections conforming to IS:2062 (latest amended).

3. MARKING

Each individual structure / section shall carry a code number conforming to component number given to it in the drawing / Bill of material. The code number of approved size shall be stamped with a metal dye of 16 mm size on the member and shall be legible. The name of manufacturers in suitable code and the word “**DDUGJY**” & “**TNTW No**” shall also be stamped / punched on each individual section with metal dye of not less than 16 mm size.

If the above marking is not found on the material received in the stores, the receipted challan shall not be given by the concerned stores. The challan shall only be issued after verification of material by the Store officer.

3. INSPECTION, TESTING & CHECKING :

The finished product before acceptance shall be subject to inspection in respect of workmanship, checking of dimension/weight & testing as per requirement of relevant

IS:2062 (latest amended), approved drawings and bill of material, at the suppliers works if not supported by test certificates of main producers viz. SAIL/TISCO/RINL. The certificate for type test (chemical composition & mechanical properties test) issued by prime producer(s) shall be furnished along with the inspection call to the SE(Proc.), otherwise testing shall be arranged at independent Lab on the cost of supplier. The certificate and relevant invoices shall be in the name of the firm on whom the order is placed by the Nigam. **In case bidder use the steel sections manufactured by prime producers then the inspecting officer shall verify and record in the inspection report regarding stamping and mark of prime producers.** The certificate(s) in the name of other parties/ sources shall not be accepted and in such cases the tests for chemical and mechanical properties shall have to be arranged in the presence of inspecting officer(s) at recognized lab.

The supplier shall present the latest Calibration Certificate(s) of testing instruments/ equipments to be used for the testing of the material covered in the purchase order to the authorized inspecting officer/inspecting agency of the purchaser. The testing instruments/ meters/ apparatus etc. should be got calibrated by the supplier from time to time from independent test laboratory/ house having valid accreditation from National/ Accreditation Board for testing and calibrating laboratories for testing equipments/ original manufacturer having trace ability to NABL/NPL or equivalent.

The calibration certificate(s) should not in any case be older than one year at the time of presenting the same to the inspecting officer/inspecting agency of the purchaser. The testing instruments/equipments should be duly sealed by the Calibrating agency and be indicated in the calibration certificate(s).

The following facilities are to be provided by the supplier at his own cost to the inspecting officer of JDVVNL.

- (a) Suitable accommodation.
- (b) Local conveyance between arrival point, place of stay, works and departure point.
- (c) The supplier shall assist in arranging return ticket and reservation on the request of the inspecting officer for which the payment shall be made by the inspecting officer. In case of joint inspection, single or shared double room accommodation shall be provided.

5. TESTS

Test before dispatch:- The various steel section/structure before dispatch shall be subject to following test as per IS:2062(latest amendment) at the manufacturer's works

Routine test/acceptance test

- i. Dimensional checking and visual inspection
- ii Weight checking
- iii Chemical composition test
- iv Mechanical property test

6. TOLERANCE IN DIMENSIONS :

The tolerance(s) shall be permissible as per IS: 1852: (latest amended). Further the following tolerance(s) on fabricated items will also be allowed.

i) Tolerance in over all length	± 3mm
ii) Tolerance in edge dimensions (centre of hole to end)	±2mm
iii) Tolerance in holecentre	±2mm
iv) Circular holes	No tolerance
v) Weight Tolerance	+2% to (-) 4%

7. GUARANTEED TECHNICAL PARTICULARS :

The bidder shall furnish the guaranteed technical particulars of the. Any item of the GTP left unfilled or simply written as per ISS etc. shall be considered as incomplete GTP and such tender is liable to be rejected.

8. CRITERIA FOR ACCEPTANCE

The inspected material should be strictly in accordance to the GTP of the specification otherwise the material shall be treated as rejected and shall not be accepted.

9. WEIGHT

The weight of structure shall mean the weight of structures calculated byusing standard sectional weights of all steel structural members of the sizes indicated in the fabrication drawings and/or subsequently revised drawings and bill of material without taking into consideration the reduction in weight due to drilling of bolt-holes, skew cuts, chamfering etc. or the increase in weight due to galvanization.

The material shall be acceptable if found within permissible tolerance limit i.e. +2% and (-)4%.

TECHNICAL SPECIFICATION FOR SUPPLY OF GALAVANISED M.S.BOLTS & NUTS OF ASSORTED SIZE

1. SCOPE

The specification covers the manufacture, design, inspection, testing before dispatch, marking, packing and delivery at the consignees headquarter of M.S. Bolts & Nuts for 33 KV & 11 KV Sub-transmission line/sub-station, and operation & maintenance work.

2. STANDARDS

The relevant Indian Standard Specification(latest amended) to which the material shall conform are as follows:-

S.No.	Particulars	For M.S. Bolts & Nuts
1	Grade	Grade "C" as specified in IS-1367(Part-2)/2002.
2	Dimension	Nominal dia-16 mm length of bolt(IS-1363 Pt-I-1992 40,100,250,300 mm Length of Nut-15 mm (IS-1363-Part-III/1992 (with latest amendments)
3	Raw material	Low or medium carbon steel.
4	Tolerance	As per (IS:1367 Part-II)/
5	Chemical composition	For Bolt:IS:1367 Part(Pt.III/1991) For Nut: IS:1367 (Pt.VI)/1980
6	Testing	For Bolt:IS:1367 Part(Pt.III/1991) For Nut: IS:1367 (Pt.VI /1980)
7	Sampling	IS:2614-1969 for Bolts & Nuts

The M.S. Bolts & Nuts shall be purchased from the bidder who have valid ISI license. The bidder should furnish the copy of valid BIS License with the bid otherwise their offer shall be ignored.

3. FINANCIAL RESOURC ES AND EXPERIENCE

The bidder shall furnish the details regarding his previous experience in performing similar comparable work, the technical strength and manufacturing facilities available and also financial capability along with the tender. The bidder is also required to furnish the following information.

- a. Standing of the firm as manufacturer/supplier
- b. Approximate qty., manufacture/supplied so far at his works on monthly basis.
- c. Testing facilities available at his works

4. WORKMANSHIP

The characteristic and properties of finished product required are as detailed below:-

For Bolts & Nuts: (Properties class)

- i) Properties class for bolts required. : 4.6 as specified in IS:1367-Part-II
- ii) Properties class for nuts required : 5 as specified in IS:1367-Part-III/1980

CHEMICAL COMPOSITION

i) For Bolts: (IS-1367 Part-III) 1991

Carbon % max.	0.55
Phosphorous %	0.05
Sulphur %	0.06

ii) For Nuts:

Carbon % max.	0.50
Phosphorous %	0.12
Sulphur %	0.34

MECHANICAL PROPERTIES:

i) For Hexagonal Bolts:(IS-1367 Part-III)1991

- a) Tensile strength(to be arranged on size 150 mm & above) : N/mm sq. 400 (min)
- b) Stress under proof load. : N/mm sq. 225 (min)
- c) Brinell Hardness : HB 114(min) to 238 max.
- d) Rockwell hardness : HRB-Max. 67(min.) to 99.5 max.
- e) Vickers harness : HV 120 (min) to 250 max.
- f) Elongation after fracture : 3 Min. 22%
- g) Strength under wedge loading
(to be arranged on size above 40 mm) : N/mm sq. 400 (min)
- h) Head soundness : No fracture

ii) For Hexagonal Nuts(IS:1367 Part-VI/1980 Table4)

- a) Proof stress. : N/mm sq. 610 (min)
- b) Vicker Hardness : HV-Min. 130 HV-Max. 302

5. ISI CERTIFICATION AND TYPE TEST CERTIFICATE

The supplier must hold the licence of ISI mark. If supplier do not have ISI mark licence at the time of submission of tender documents, the same must be submitted before commencement of supplies, otherwise supplies shall not be accepted. Consequences on this account shall be to the suppliers account. .

The bidder shall furnish valid and authenticated type test certificates from a Govt. approved / Govt. Recognized / NABL Accredited laboratory / ILAC i.e. International Accreditation Corporation (in case of foreign laboratory) of similar rating and design of tendered material / equipment. Such type test certificates should not be older than 3 years as on the date of bid opening. For this purpose date of conducting type test will be considered.

The type test certificate by in house laboratory of bidding firms even if it is Govt. approved / Govt. Recognized / NABL Accredited laboratory / ILAC accredited, shall not be accepted, in case of their own bid. This will not apply if bidding firm is Govt. Company / Public sector undertaking.

The bidder should furnish documentary evidence in support of laboratory whose type test have been furnished, that the said laboratory is a Govt. / Govt. approved / Govt. Recognized / NABL Accredited laboratory / ILAC accredited (in case of foreign laboratory). The type test certificate shall be furnished either in original or copy duly attested by Notary.

TYPE TESTS

The following tests shall constitute the type tests and shall be carried out as per relevant IS:1367 Part-III.

- 1) Chemical Composition Test
- 2) Test for Mechanical Properties for Hexagonal Bolts
 - a) Tensile strength
 - b) Yield stress
 - c) Stress under proof load
 - d) Brinell Hardness
 - e) Rockwell Hardness
 - f) Vickers Hardness
 - g) Elongation after Fracture
 - h) Strength under Wedge loading
 - i) Head soundness
- 3) Test for Mechanical Properties for Hexagonal Nuts.
 - a) Proof Stress
 - b) Vickers Hardness

ROUTINE/ACCEPTANCE TEST

The following tests shall be got conducted in presence of purchasers representative as per relevant IS:1367 Part-III/1991 with latest amendment for Bolts and IS:1367 Part-VI/1980 with latest amendment for Nuts on the samples taken from the offered lot material for the purpose of acceptance of that lot of material.

- 1) Chemical Composition Test.
- 2) Test for Mechanical properties for Hexagonal Bolts:
 - a) Tensile strength
 - b) Yield stress
 - c) Stress under proof load
 - d) Brinell Hardness
 - e) Rockwell Hardness
 - f) Vickers Hardness
 - g) Elongation after Fracture
 - h) Strength under wedgeload
 - i) Head soundness
- 3) Test for Mechanical Properties for Hexagonal Nuts:
 - a) Proof stress
 - b) Vickers Hardness

6. MARKING

The bolts shall be marked with the following symbols on the top surface of the bolt head, either embossed or Indented, as given below:-

- (a) The Manufacturer's identification symbol
- (b) Property class
- (c) The material shall be marked as per the requirement of IS-1367 (Pt.XVIII)/ 1979 for Bolts & Nuts.

7. PACKING AND FORWARDING

The packing of material shall be made in two bags one HDP bag (inner) and one gunny bag (outer) or in double gunny bag, containing 50 Kg weight of Bolts & Nuts(Net wt.). The packing should capable to bear transportation hazards. The packing shall be such as to protect the material from the atmospheric effect like rains, humidity etc. The packing shall bear the marking as under:-

- a) Certification regarding ISI
- b) Particulars of material(s)
- c) Quantity
- d) Manufacturer's identification mark
- e) Complete dispatch details like name of the consignee and destination etc.

8. TESTING OF MATERIAL AT CTL

The material received in stores shall be subject to test checking at CTL of Nigam before final acceptance of material. The procedure for the same shall be as under:-

(i) Sampling:-

5 samples out of 1 MT Nuts and Bolts of assorted size or part thereof from each inspected lot received in stores shall be selected for test checking of material and shall be got tested. The sample selection shall be done as soon as material is received in stores without the presence of representative of supplier. However testing of sample(s) at CTL shall be carried out in presence of representative of supplier after identification of sample by supplier's representative.

(ii) Tests

The following tests shall be carried out on the above items:-

- (a) Visual examination

(b) Verification of dimension as per specification/ GTP/IS.

Testing shall be got done at the test laboratory of the Nigam i.e. CTL. For witnessing of the testing clear 7 days notice shall be given to the supplier stating date, time and place where the test is to be conducted. In case the supplier do not attend for witnessing the testing, the testing shall be proceeded and completed and action taken as per the contract.

9. CRITERIA FOR ACCEPTANCE

The material received in the stores shall finally be accepted provided the selected samples passes the test in CTL. The sample(s) shall be subject to verification of dimension as per specification/GTP and will be accepted as per tolerances specified in specification/ relevant IS: The material will be accepted as per GTP/IS.

The Executive Engineer (CTL) shall send copies of test reports to the purchaser, consignees and the supplier.

TECHNICAL SPECIFICATION FOR SUPPLY OF GALVANISED M.S.ROD TYPE EARTHING SET WITH CLAMPS AND G.I. WIRE

1. SCOPE

This specification covers design, manufacture, inspection and testing before dispatch, supply and delivery at consignees headquarter of Galvanised M.S.Rod type earthing sets with clamps and G.I. wire. The earthing sets shall be used to protect the 33 KV, 11 KV & LT lines and sub-stations from faulty currents.

2. STANDARDS

The relevant ISS: to which this material shall conform is indicated as below:-

For fabricated material

- (i) Raw material test (Manufacturer's Raw material test certificate as per ISS: 2062-Grade 'A')
- (ii) Galvanisation test as per relevant IS:2633.
- (iii) Checking/verification of Dimension etc. as per approved drawing.
- (iv) Sampling for workmanship and dimension checking 3% of each lot and as per ISS-4711-1976.

For Galvanised steel wire:

- (i) As per IS: 280(latest addition)
- (ii) Testing as per IS:7887 Grade-III

3. MARKING

Each bundle of earthing sets shall be legibly marked with the physical condition, weight, date of manufacture, trade mark or the name of manufacturer. The material which is inspected and cleared for dispatch shall be sealed with the JDVVNL seal.

4. PACKING AND FORWARDING

The Galvanised M.S.Rod type earthing sets shall be supplied in bundles (containing all items) and shall be suitably bound and fastened compactly and shall have a maximum weight of 400 Kgs. The bundles will be suitably protected by wrapping round by hessian cloth/polythene cover to avoid damage in transit and corrosion

5. TEST CHECKING OF MATERIAL

The material received in stores shall be subject to test checking in the test laboratory of Nigam (CTL) before final acceptance of material. The procedure for the same shall be as under:-

(i) One sample out of each sub-lot/lot of 2000 sets or part thereof from each inspected lot received in stores shall be selected for test checking of material and shall be got tested. The sample selection shall be done as soon as material is received in stores without the presence of representative of supplier. However testing of sample(s) at CTL shall be carried out in presence of representative of supplier after identification of sample by supplier's representative.

(ii) Tests

The following tests shall be carried out on the selected samples at CTL .

- (i) Visual examination
- (ii) Verification of dimension as per specification/ GTP/approved drawings.
- (iii) Galvanization uniformity test
- (iv) Weighment of selected sample

6. CRITERIA FOR ACCEPTANCE

(A) Verification of dimension.

The sample(s) shall be subjected to verification of dimension check up as per specification/GTP/approved drawings and will be accepted as per tolerances specified in specification/ relevant IS: The material will be accepted to any extent if tolerances are in positive side. If tolerances are in negative side then the material shall be accepted to the extent as specified in IS, without any deduction. If the dimensions are in negative side beyond the specified tolerances in IS then it will be accepted to the extent double the negative side tolerance as specified in IS but with following deductions:-

(a) for M.S.Rod:- 2% of the cost of material

(b) Other parts :- 1% of the cost of material

If the dimensions are beyond double the permissible negative tolerance then material shall be rejected and the supplier shall replace at his own cost.

(B) Galvanization (Uniformity) test

- (i) The sample shall be first tested for (n-2) number of dips where (n) is specified number of dips in the contract. If the sample(s) does not pass the uniformity of galvanization test for (n-2) dips, the **material shall be rejected** and the material relating to relevant lot/sub-lot to which sample(s) pertains shall have to be replaced by the supplier free of cost.
- (ii) If the sample(s) has passed the uniformity of galvanization test for (n-2) dips, then it shall be tested for (n-1) dips. If the sample has not passed the uniformity of Galvanization Test with (n-1), then material pertaining to relevant lot/sub-lot shall be accepted with a **deduction @ 10% of cost of material**.
- (iii) If the sample(s) has passed the uniformity of Galvanization Test with (n-1) dips, then sample shall be tested for last one dip of one minute to complete the test for 'n' dips. If the sample does not pass the uniformity test with specified number of dips i.e. 'n' dips, then material pertaining to relevant lot/sub-lot shall be accepted with a **deduction @ 5% of cost of material**.

BILL OF MATERIAL

The bill of material for galvanized M.S.Rod type earthing set with clamps and wire as under:-

S.No.	Particulars	Unit	Quantity
1	Galvanised M.S. Rod 20 mm dia electrodes having 3 Meter length	No.	1
2	Galvanised Earthing clamp of M.S.Flat of size 50x6 mm 220 mm length. One welded with earth electrode and loose to be bolted	Set (Two Pieces)	2
3	Galvanised Bolts, Nuts and Spring washers.	No.	2
4	G.I.Wire Size 8 SWG of 15 Meter length	No.	1

TECHNICAL SPECIFICATION FOR SUPPLY OF HOT DIP GALVANISED STEEL STAY WIRE of 7/10 SWG

1. SCOPE

This specification covers, manufacture, design, inspection, testing before dispatch & delivery at consignees head quarter of following sizes of hot dip heavily galvanized stranded steel stay wire, complete in all respect as per GTP/ISS

- i) Hot dip galvanized steel stay wire of 550-900 N/mm Quality confirming to IS-2141/2000 in all respect Including chemical composition (Heavily coated Hard quality) of dia 7/3.15 mm(7/10 SWG)

2. STANDARDS

The finished material shall comply in all respect with the requirement of the latest edition of the relevant ISS as mentioned below:-

- (i) The hot dip galvanized stranded steel stay wire (heavily coated) shall comply with the ISS:2141/2000, 4826/1979 and 6594/1977 with latest amendments thereof, if any in all respects, except herein otherwise stated, corresponding to grade-4 550-900 N/mm sq. minimum tensile strength quality. The galvanization coating of galvanized steel wire and technical supply conditions shall conform to IS:4826/1979 and IS:6594/1977 or latest amendment thereof if any.
- (ii) Goods meeting other authoritative standards which ensure an equal or higher quality than the standards mentioned above will also be accepted.
- (iii) The galvanized stranded steel stay wire shall be capable of withstanding the normal handling necessary for transportation and erection.

3. WORKMANSHIP:

The wire shall be manufactured from steel made by any suitable process(es) as mentioned in IS:2141/2000 & 7887/1975 and shall not contain sulphur and phosphorus exceeding 0.060 percent each.

Each coil shall be warranted to contain the joints only as permitted under relevant IS:2141/2000.

The galvanized stranded steel stay wire shall be well and clearly drawn to the dimension specified. The wire shall be free from scale, irregularities, imperfections, flaws splits and other defects and shall be uniformly galvanized having smooth and even zinc coating. The requirement for chemical composition of the wires shall conform to the value as specified in IS/7887/1975 and IS:280/1978.

4. ISI CERTIFICATION

The supplier must hold the licence of ISI mark. If supplier do not have ISI mark licence at the time of submission of tender documents, the same must be submitted by the bidder up to the official working hours of one working day prior to the schedule / notified date of opening of price bid.

(A) TEST BEFORE DESPATCH: The stay wire shall be subject to the following tests as per ISS at manufacturer's works before dispatch,.

ROUTINE/ACCEPTANCE TEST:- The following tests on selected samples as per relevant standard shall be got conducted in presence of purchaser's representative.

- i) Tensile and Elongation test
- ii) Adhesion and wrap test
- iii) Zinc uniformity and coating test
- iv) Chemical analysis test
- v) Dimension and weighment checkup of sample coils.
- vi) Lay ratio

(B) SAMPLING PLAN:

As per the provisions of IS:2141/2000.

(C) TOLERANCE ON TEST RESULTS

- i) Weight of the coil – 40-60 Kg per coil.
- ii) Dia of wire $\pm 2.5\%$ of wire dia with a minimum of 0.025 mm
- iii) Lay length -12 to 18 times strand dia
- iv) Tensile and elongation test –As prescribed in IS:2141/2000.
- v) Zinc uniformity and coating test – As per IS:4826
- vi) Chemical composition test IS:7887

5. MARKING

Each coil of wire shall be legibly marked with the physical condition, size of wire, weight, date of manufacture trade mark or the name of manufacturer. The material which is inspected and cleared for dispatch shall be sealed with the Nigam's seal.

6. PACKING AND FORWARDING:

The galvanized steel stay wire shall be supplied in coils. Each coil of GSS wire shall have single continuous length and shall be suitably bound and fastened compactly and shall weigh 40 kgs to 60 kgs. The coils will be suitably protected by wrapping round by hession cloth/polythene cover to avoid damage in transit and corrosion. Each coil shall be marked as mentioned above.

7. TYPE TEST / CHECKING OF MATERIAL AT STORES

The material received in the stores shall be subject to test checking at CTL of Nigam before final acceptance of the material. The procedure for the CTL test shall be as under :

SAMPLING

One sample out of each lot/sub-lot of 400 Nos coils or part thereof from each inspected lot received in stores shall be selected subject to maximum 7 samples for test checking of material and shall be got tested at the CTL of JDVVNL. The sample selection shall be done in the presence of supplier or his authorized representative for which advance notice shall be given to the supplier.

TESTS AT CTL

The following tests shall be carried out on the selected samples of G.S.Stay wire as per relevant standards:-

- (a) Uniformity of galvanization test
- (b) Tensile test
- (c) Dimensional check

For witness the test, advance notice to the supplier shall be given by CTL, stating date, time. In case the supplier do not attend for witnessing the testing, the testing shall be proceeded and completed and action shall be taken as per the contract.

The test reports shall be furnished to the purchaser, consignee and supplier.

8. CRITERIA FOR ACCEPTANCE OF ABOVE TEST

The inspected material should be strictly in accordance to the relevant ISS / GTP of the specification, however, the material shall be accepted on the basis of test results found/observed during test at CTL as mentioned below.

- (a) For uniformity of galvanization test.
 - (i) The sample shall be first tested for (n-1) number of dips where n is specified No. of dips of one minute in the contract. If the sample does not pass the uniformity of galvanization test for (n-1) dips, the material shall be rejected and the relevant lot/sub-lot to which the sample pertains shall have to be replaced by the supplier free of cost.
 - (ii) If the material has passed the uniformity of galvanization test for (n-1) dips then it shall be tested for last one dip of one minutes to complete the test for 'n' dips. If the sample does not pass the uniformity of Galvanisation Test with 'n' then material pertaining to relevant lot/sub-lot shall be accepted with a deduction @ 5% of cost of material
 - (iii) If the sample(s) have passed the Test with number of dips as specified in the contract (n) , then material pertaining to relevant lot/sub-lot shall be accepted.
- b) Tensile test:-If the material fails in tensile test the same shall stands rejected.
- c) Dimensional check:- If the material fails in dimensional check the same shall stands rejected.

TECHNICAL SPECIFIICATION FOR SUPPLY OF G.S WIRE SIZE 6 SWG AND 8 SWG

1. SCOPE

This specification covers design, manufacture, inspection ,testing before dispatch & delivery at consignees headquarter of following sizes of hot dip heavily galvanized steel wire, complete in all respect as per GTP/ISS

Hot dip galvanized steel wire of 550-900 N/mm

- (i) Quality confirming to IS-280/1978(latest amended) in all respect including chemical composition (Heavily coated Hard quality) of dia 4 mm
- ii) Hot dip galvanized steel wire of 550-900 N/mm
Quality confirming to IS-280/1978(latest amended) in all respect including chemical composition (Heavily coated Hard quality) of dia 5 mm

2. STANDARDS

- i) The hot dip galvanized steel wire (heavily coated) shall comply with the ISS:280/1978, with latest amendments thereof, if any, corresponding to grade-4, 550-900 N/mm sq. minimum tensile strength quality in all respects, except herein otherwise stated.
- ii) The galvanization coating of galvanized steel wire and technical supply conditions shall conform to IS: 4826/1979 and IS:6594/1977 or latest amendment thereof if any.
- iii) Goods meeting other authoritative standards which ensure an equal or higher quality than the standards mentioned above will also be accepted.
- iv) The galvanized stranded steel wire shall be capable of withstanding the normal handling necessary for transportation and erection.

1. ISI CERTIFICATION AND TYPE TEST CERTIFICATE

The supplier must hold the licence of ISI mark. If supplier do not have ISI mark licence at the time of submission of tender documents, the same must be submitted by the bidder up to the official working hours of one working day prior to the schedule / notified date of opening of price bid.

(A) TEST BEFORE DESPATCH: The G.S wire shall be subject to the following tests as per ISS at manufacturer's works before dispatch,.

ROUTINE TEST/ACCEPTANCE:- The following tests as per relevant standard shall be got conducted in presence of purchaser's representative.

- (i) Tensile and Elongation test
- (ii) Adhesion and wrap test

- (iii) Zinc uniformity and coating test
- (iv) Chemical analysis test
- (v) Dimension and weightment checkup of sample coils.
- (vi) Lay ratio

(B) SAMPLING PLAN: As per the provisions of IS:280/1978.

(C) TOLERANCE ON TEST RESULTS as per IS:280/1978

- (i) Weight of the coil – 40-60 Kg per coil.
- (ii) Dia of wire
- (iii) Lay length, wrap test
- (iv) Tensile and elongation test
- (v) Zinc uniformity and coating test
- (vi) Chemical composition test

4. MARKING

Each coil of wire shall be legibly marked with the physical condition, size of wire, weight, date of manufacture trade mark or the name of manufacturer. The material which is inspected and cleared for dispatch shall be sealed with the Nigam's seal.

5. PACKING AND FORWARDING:

The galvanized steel wire shall be supplied in coils. Each coil of GS wire shall have single continuous length and shall be suitably bound and fastened compactly and shall weigh 40 kgs to 60 kgs. The coils will be suitably protected by wrapping round by hessian cloth/polythene cover to avoid damage in transit and corrosion. Each coil shall be marked as mentioned above.

6. TYPE TEST / CHECKING OF MATERIAL

The material received in the stores shall be subject to test checking at CTL of Nigam before final acceptance of the material. The procedure for the CTL test shall be as under :

SAMPLING

One sample out of each lot/sub-lot of 400 Nos coils or part thereof from each inspected lot received in stores shall be selected subject to maximum 7 samples for test checking of material and shall be got tested at the CTL of JDVVNL. The sample selection shall be done in the presence of supplier or his authorized representative for which advance notice shall be given to the supplier.

TESTS AT CTL

The following tests shall be carried out on the selected samples of G.S. wire as per relevant standards:-

- (a) Uniformity of galvanization test
- (b) Tensile test
- (c) Dimensional check

For witness the test, advance notice to the supplier shall be given by CTL, stating date, time. In case the supplier do not attend for witnessing the testing, the testing shall be proceeded and completed and action shall be taken as per the contract.

The test reports shall be furnished to the purchaser, consignee and supplier.

TECHNICAL SPECIFICATION FOR SUPPLY OF 33 KV HORN GAP FUSE SETS WITH POST 2X24 KV INSULATORS & 11 KV HORN GAP FUSE SETS WITH 1X24 KV POST INSULATORS

1.0 SCOPE :

This specification covers the design, manufacture, testing before dispatch, packing & forwarding and delivery of 33 KV Horn Gap Fuses and 11 kV Horn Gap Fuses (including hardwares and post insulators). The Horn Gap Fuses shall be required for protection of lines and distribution Transformers at various sites of Jodhpur Discom, the details of principal parameters/various parts of horn gap fuses are indicated in subsequent clauses hereunder.

It is not the intent to specify completely herein all details of the design and construction of equipments. However, the equipment shall conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation upto the Bidder's guarantee in a manner acceptable to the Purchaser, who will interpret the meanings of drawings and specifications and shall have the power to reject any work or material which in his judgment is not in accordance therewith. The offered equipment shall be complete with all components necessary for its effective and trouble free operation along with associated equipments, interlocks , protection schemes etc. Such components shall be deemed to be within the scope of supply, irrespective of whether those are specially brought out in this specification and/or the commercial order or not.

2.0 PRINCIPAL PARAMETERS :

2.1 The equipment i.e. horn gap fuse unit covered in this specification shall be a complete unit with 2 x 24 KV Post Insulator type E-32 for use on 33 kV system and 1X24 KV Post Insulator type E-32 for use on 11 kV system The ratings of 33 kV & 11 KV Horn Gap Fuses with post insulators shall be as under :

PARTICULARS/ RATINGS HG FUSES	Specified values (33 KV H.G.)	Specified values (11 KV H.G.)
a) Nominal system voltage kV (rms)	33	11
b) Rated voltage kV(rms)	36	12
c) Rated frequency(Hz)	50	50
d) One minute power frequency withstand voltage kV(rms) (To earth & between poles).	70	55
e) Impulse withstand voltage kV peak).(To earth & between poles).	170	125
f) Permissible temperature rise above ambient temp. (50 deg cent.)	40 deg. Cent.	40 deg. Cent.
g) Rated Current (Amp)	200	100

2.2 The minimum mechanical & electrical values/ characteristics of 24kV Post Insulators shall be as follows :

S. No.	Particulars	Specified values
1.	Torsional Strength	680mm
2.	Cantilever Strength	9000 N
3.	Tensile Strength	30000 N
4.	Compression Strength	40000 N
5.	Highest system voltage (kV rms)	24
6.	Dry & wet power frequency withstand test voltage for one minute(kV rms)	55
7.	Impulse withstand test	125 (KV Peak)
8.	Visible discharge test	18 (KV rms)
9.	Power frequency puncture withstand test voltage (kV rms)	1.3 times the actual dry flash-over voltage of the unit.

2.3 DIMENSIONAL CHARACTERISTICS OF POST INSULATORS :

S.No.	Particulars.	2X24 kV (33 KV HG fuse)	1X24 KV (11KV HG Fuse)
1.	Nominal system voltage.	33 kV	11 KV
2.	No. of units	Two	One
3.	Total height of i) unit ii) Stack	254 mm 508 mm	254mm
4.	Diameter of Insulating part (max.)	210 mm	210mm
5.	Minimum total creepage distance of each unit	430 mm	430mm
6.	Top fitting pitch circle diameter	76 mm	76mm
7.	Bottom fitting pitch circle diameter	76 mm	76mm

2.4 One set of Horn Gap Fuse Shall consist of three single phase units of Horn Gap Fuses.

3.0 GENERAL TECHNICAL REQUIREMENTS :

HORN GAP FUSES :

3.1 The hardwares of horn gap fuses shall be designed and manufactured as per IS. The horn gap fuse sets are to be used for protection of lines and distribution transformers. The bill of material to complete one set (i.e. for Three phases) shall be as per requirement.

3.2 The hardware of Horn Gap Fuses shall be constructed out of the best quality of material suitable for weather conditions prevailing in Rajasthan. The workmanship shall be in accordance with the modern engineering practice. All ferrous parts shall be given an anticorrosive finish. The other parts shall be substantially non corrosive. The details of various specific parts for manufacture are as under :

(1) BASE CHANNEL :

The base channel shall be of size 125mmX60mmx542 mm Long(for 33 KV HG Fuse sets) and 75X40x542 mm Long (for 11 KV HG Fuse sets) of Hot Dip Galvanized mild steel conforming to ISLC 75 of Tata Reference Book 1970 in case of 33 KV Horn Gap Fuses. The base channel should have holes for mounting post insulators.

(2) HORN STOOL :

Two numbers of Horn Stools of Hot Dip Galvanized MS flat of size 50 x 6 mm will be used. The Horn Stool shall be fixed on the top of the post insulators with the help of electro galvanized bolts and spring washers. The Horn Stool must be rigid and strong enough for fixing the horn over the top of horn stool. Over the top of the horn stool, the horn will be fixed.

(3) ARCING HORN :

Two numbers arcing horns of 12 mm dia of Hot Dip Galvanized M.S. round rod will be used. It will be aluminum painted. The base of arching horns should be projecting to 25 mm. It shall be fitted on horn stool with the help of horn clamps, nuts, bolts and spring washers. The length of the horn/height should be maintained. The horn should have a hole & fixing brass thumb screw with fly nut and flat washer to tie and tighten with the fuse wire.

(4) BRASS THUMB SCREW :

There shall be one tapped hole on each arcing horn. The brass thumb screw will be fixed in the tapped hole provided in each arcing horn. The fuse wire is to be tied with brass thumb screw and tightened with help of fly nut (Brass) and flat washer (Brass). The length of brass thumb screw will be fully threaded and screwed up to the whole depth of the horn. The design must be such that the changing of fuse wire is convenient. There is no loose connection/contact and there should not be any possibility of thumb/jamming on account of arcing when fuse is blown off.

(5) HORN CLAMPING ARRANGEMENT :

There shall be two M.S. Horn clamp of size 50x105x6 mm fixed on horn stool with the help of bolts and nuts, spring washers for fixing the arcing horns and clamping the conductor. The lower part of the clamping for holding the required conductor shall be of size 50x50x6 mm. This shall be made from M.S. sheet. The clamp for 33 KV horn gap fuse shall be suitable for ACSR "DOG".

(6) EARTHING TERMINAL :

One number earthing terminal shall be provided on the flange portion of base channel. The M.S bolt of 12 mm dia and 25 mm long shall be used with flat washer for this purpose.

(7) BOLTS, NUTS AND WASHERS :

All the bolts, nuts and washers shall be electro-galvanized. However the thumb screw and its connecting fly nut and flat washer, to be used to fix fuse wire, will be of brass only. The size of various bolts, nuts and washers which are in the scope of supply are as below :

S.NO.	SIZE OF BOLTS, NUTS AND WASHERS.	TO BE UTILISED FOR	qty. for 1 unit of 33 KV	qty. for 1 unit of 11 KV
1.	Bolt size 12mm dia, 25mm long with flat washer & nut.	Earthing terminal	4 Nos.	4 Nos
2.	Bolt size 12mm dia, 38mm long with nuts & spring washer.	For fixing post insulators on base.	8 Nos.	8 Nos
3.	Bolt size 12 mm dia, 25mm long with nuts spring washers.	For fixing horn stool above the post insulators.	4 Nos	4 Nos
4.	Bolt size 5/6 dia 1.25" long with nuts and spring washers.	For fixing arcing horn on horn stool and clamping	16 Nos.	16 Nos
5.	Brass thumb screw (6mm dia. 30mm long) with Brass fly nut (30mm wing dia) flat washer (1mm thick, 20mm outer dia and internal dia. such as to accommodate the 6mm dia brass screw).	For fixing fuse wire on the arcing horn.	2 Nos.	2 Nos.

4.0 POST INSULATORS :

4.1 The 24 kV post insulators units shall be pedestal post type (conforming to IS-5350 Part-III and IS-2544). The insulators shall be constructed out of the best quality of material suitable for weather conditions prevailing in Rajasthan. The workmanship shall be of the highest grade and the entire manufacture shall be in accordance with the modern Engineering practices.

4.2 Where Porcelain Insulators are offered, the insulator shall be made of homogeneous and vitreous porcelain of high mechanical and die-electric strength. It shall have sufficient mechanical strength to sustain electrical and

mechanical loading on account of wind load, short circuit forces etc. Glazing of the porcelain shall be of uniform brown or dark brown colour with a smooth surface arranged to shed away rain water. The porcelain shall be free from laminations and other flaws or imperfections that might affect the mechanical or dielectric quality. It shall be thoroughly vitrified, tough and impervious to moisture. The porcelain and metal parts shall be assembled in such a manner and with such material that any thermal differential expansion between the metal and porcelain parts throughout the range of temperature specified in this specification shall not loosen the parts or create undue internal stresses which may affect the mechanical or electrical strength or rigidity of the unit as a whole or stack of two units. The assembly shall not have excessive concentration of electrical stresses in any section or across leakage surfaces. Cement used in the construction of post insulators shall not cause fracture by expansion or loosening by construction and proper care shall be taken to locate correctly the individual parts during cementing. The cement used shall not give rise to chemical reaction with metal fittings and its thickness shall be uniform. The insulator shall be suitable for water washing by rain or artificial means in service condition. Profile of the insulator shall also conform to the relevant IS.

- 4.3 Cap to be provided on top of the insulator shall be of malleable steel casting or of aluminum alloy . It shall be machine finished and hot dip galvanized in case of malleable steel casting. The cap of 24 kV Post Insulators shall have four numbers of tapped holes spaced on a pitch circle diameter of 76mm. The threads of the tapped holes in the post insulator metal fittings shall be cut after giving anti corrosion protection and shall be protected against rust by greasing or other similar means, all other threads shall be cut before giving anticorrosion protection and shall conform to IS:4218 or latest version thereof. The tapped holes shall be suitable for bolts with threads having anticorrosive protection. The effective depth of threads shall not be less than the nominal diameter of the bolt. The cap shall be so designed that it shall be free from visible corona.
- 4.4 The casting shall be free from blow holes, cracks and such other defects.
- 4.5 All the ferrous metal parts shall be given an anticorrosive finish and shall be hot dip galvanized smoothly as per IS:3638 (as amended upto date), IS:2633 or any other equivalent authoritative standard. The other parts shall be substantially non corrosive. The material shall be galvanized only after shop operations upon it have been completed. The metal parts before galvanizing should be thoroughly cleaned of any paint, grease, rust, scales or alkali or any foreign deposit which are likely to come in the way of galvanizing process. The coating on the metal parts shall withstand minimum four one minute dips in copper sulphate solution as per the relevant IEC/IS.
- 4.6 The insulator unit shall be assembled in a suitable jig to ensure correct positioning of the top and bottom metal fittings relative to one another. The faces of the metal fittings shall be parallel and at right angles to the axis of the insulator and the corresponding holes in the top and the bottom metal fittings shall be in a vertical plane containing the axis of the insulator.

- 4.7 It shall be the sole responsibility of the Supplier to carry out thorough inspection and quality checks on the insulators at the insulator supplier's works, before offering the insulators for Purchaser's inspection.
- 4.8 Two Nos. of 2 x 24 kV Post Insulator shall be provided on each pole of 33 kV Horn Gap Fuse set (Total six Nos. of 2 x 24 kV Post Insulator for three phases (Poles) of one set of H.G.) Two Nos. of 1 x 24 kV Post Insulator shall be provided on each pole of 11 kV Horn Gap Fuse set . (Total six Nos. of 1 x 24 kV Post Insulator for three phases (Poles) of one set of H.G.)
- 4.9 The porcelain and hardware surface coming in contact with cement shall be coated with bituminous paint for cushioning to relieve mechanical stress caused by temperature variation and cement expansion.
- 4.10 The post insulators shall conform to IS:5350. The total creepage distance of 24 kV post insulator as individual unit shall be minimum 430 mm.
- 4.11 Following makes of the Post Insulators shall be acceptable for the supply of Horn gap Fuse Set
- i) M/s.Jaipur Glass & Potteries, Jaipur.
 - ii) M/s.India Potteries, Kolkata.
 - iii) M/s.Bikaner Ceramices, Bikaner.
 - iv) M/s.CJI Porcelain, Khurja.
 - v) M/s.Vishal Melleable, Ankeleshwar.
 - vi) M/s.Allied Ceramices Pvt. Ltd., Kolkata.
 - vii) M/s.WSI, Chennai.
 - viii) M/s.IEC, Bhopal.
 - ix) M/s.MIL, Allahabad.
 - x) M/s.Jay Shree Insulators, Vadodara.
 - xi) M/s.Birla NGK Insulators Pvt. Ltd., Halol.
 - xii) M/s.MIL, Abu Road.
 - xiii) M/s.Sarvana Insulators Ltd., Kurinji Padi, Dist Cuddalore, (Tamilnadu).
 - xiv) M/s B.H.E.L.

4.12 Besides above, the Post Insulators manufactured by the vendors approved by the Power Grid Corporation of India Ltd (PGCIL) and National Thermal Power Corporation (NTPC) shall also be acceptable.

5.0 TESTS :

5.1 TEST BEFORE DESPATCH :

The parts of H.G. Fuses i.e. Hardwares and post insulators shall be subject to under mentioned tests separately at respective manufacturer's works before dispatch as per relevant standards.

INSULATORS :

A) Routine test

- i) Visual examination
- ii) Routine electrical test
- iii) Routine mechanical test

B) TYPE TESTS

- i) Visual examination
- ii) Verification of dimensions
- iii) Visible discharge test
- iv) Impulse voltage withstand test.
- v) Dry power-frequency voltage withstand test.
- vi) Wet power frequency voltage withstand test.
- vii) Temperature cycle test.
- viii) Mechanical strength :
 - a) Bending Test
 - b) Torsion Test.
 - c) Tensile or compressive test.
- ix) Puncture test.
- x) Porosity test.
- xi) Galvanizing test.

C) Acceptance Tests :

- i) Verification of dimensions
- ii) Temperature cycle test
- iii) Mechanical strength test
- iv) Puncture test
- v) Porosity test
- vi) Galvanizing test

TEST ON HORN GAP FUSE UNIT COMPLETE WITH INSULATORS AND HARDWARES

A TYPETEST (S) :

- i) Visual examination
- ii) Dimensional checkup
- iii) Temperature rise test
- iv) Power frequency H.V. Test, with inter phase distance as 1000 mm.(for 33 KV HG fuse set) and with inter phase distance as 600 mm.(for 11 KV HG fuse set)
- v) Impulse test. with inter phase distance as 1000 mm.(for 33 KV HG fuse set) and with inter phase distance as 600 mm.(for 11 KV HG fuse set)

B ACCEPTANCE TESTS :

- i) Visual examination
- ii) Dimensional checkup
- iii) Temperature Rise Test
On one sample per lot

5.2 TEST ON BOUGHT OUT ITEMS :

Tests are not required to be performed on small bought out parts like Nuts, Bolts & Washers etc. at the works of manufacturer. Furnishing of test certificates from original manufacturer(s) shall be deemed to be satisfactory evidence. Inspection of the tests at sub contractor's works will be arranged by the supplier when ever required.

5.3 ACCEPTANCE & ROUTINE TESTS :

5.3.1 All acceptance & routine tests as stipulated at clause No.6.1 shall be carried out in presence of purchaser's representative at manufacturer's works of Insulators and Hardwares separately before dispatch.

5.3.2 Immediately after finalization of the programme of type/acceptance, routine testing, the supplier shall give sufficient advance intimation to the purchaser to enable him to depute his representative for witnessing the tests.

The test samples after having withstood the routine tests shall be subjected to the following Acceptance tests in the order indicated below :

On Insulators

- i) Verification of dimensions as per approved drawing / ISS.
- ii) Temperature cycle test.
- iii) Mechanical strength test.
- iv) Puncture test.
- v) Porosity test
- vi) Galvanizing test

On Hardwares of Horn Gap Fuse sets

- i) Visual examination
- ii) Dimensional checkup
- iii) Temperature Rise Test (only on one unit per lot)

Fitment of Horn gap Fuse hardwares with Insulator test

One percent of insulators inspected shall be brought at the contractor works for checking of fitment with hardware.

5.3.3 For conducting acceptance tests on post insulators the number of post insulators or post insulators unit shall be selected as under:-

Lot size	number of post insulators unit to be selected
Upto 800	6
801 to 1300	8

1301 to 3200	10
3201 to 8000	14
8001 and above	20

5.3.4 10% samples will be selected from offered lot of complete Horn Gap Fuse sets Hardwares for conducting acceptance tests on the same except fitment test which shall be carried out on one percent of offered lot.

6.00 TYPE TEST CERTIFICATE:

- a) The bidder shall furnish valid and authenticated type test certificate from a Govt. approved/ a Govt. recognized/ NABL accredited laboratory/ ILAC i.e. International Laboratory Accredited laboratory / ILAC i.e International Laboratory Accreditation Cooperation (In case of foreign laboratory) of similar rating and design. Such type test certificates should not be older than three years as on the date of bid opening. For this purpose date of conducting type tests will be considered.
- b) The type test certificates by inhouse laboratory of tendering firm even if it is a Govt approved/ Govt recognized/ NABL accredited/ ILAC accredited, shall not be accepted, in case of their own tender. This will not apply if tendering firm is Govt. Company/ Public Sector Undertaking.
- c) The bidder should furnish documentary evidence in support of the laboratory whose type test have been furnished, that the said laboratory is a Govt/ a Govt. approved/ a Govt. recognized/ NABL accredited laboratory/ ILAC accredited (in case of foreign laboratory)
- d) The type test certificates shall be furnished either in original or duly attested by notary.
- e) The bids of only those bidders shall be considered to be meeting the type test criteria who furnishes complete type test certificates with the bid as per above provision.

7. Calibration Certificates:

The supplier shall present the latest calibration certificate(s) of testing instruments / equipments to be used for the testing of the materials covered in the purchase order to the authorized inspecting officer/ inspecting agency of the purchaser. The testing instruments / meters/ apparatus etc. should be got calibrated by the supplier from time to time from independent laboratory accredited from NABL or the manufacturer of the testing instruments having traceability to NPL or NABL accredited laboratory. The calibration certificates should not in any case be older than one year at the time of presenting the same to the inspecting officer/ inspecting agency of the purchaser. The testing instruments / equipments should be duly sealed by the calibrating agency and mention thereof shall be indicated in the calibration certificates(s).

8.0 DRAWING :

8.1 The one set of following drawings/documents of the equipment covered by this specification shall be furnished by the Bidder along with their offer:-

- i) Outline dimensional drawings of Horn Gap Fuse Set with insulator and list mentioning bill of material with complete details regarding metal hardware fittings.
 - ii) Assembly drawings showing complete details of all parts and separating mechanism and mass of main component part.
 - iii) Drawings showing dimension of upper and lower metal parts along with PCD of post insulator.
 - iv) Descriptive literature and manufacturing data on insulator shall be furnished.
 - v) Type test reports vi) Test reports, literature, pamphlets of the bought out items and raw materials.
 - vii) Detailed views of the insulator stacks & metallic and hardware unit.
- 8.2 The manufacturing of the equipment shall be strictly in accordance with the approved drawings and no deviation shall be permitted without the written approval of the Purchaser. All manufacturing and fabrication work in connection with the equipment prior to the approval of the drawing shall be at the Supplier's risk.
- 8.3 Approval of drawings/work by Purchaser shall not relieve the Supplier of his responsibility and liability for ensuring correctness and correct interpretation of the latest revision of applicable standards, rules and codes of practices.

9.0 PACKING AND FORWARDING :

9.1 Each Horn Gap Fuse Set Hardwares shall be legibly and indelibly marked to show the following :

- a) Name or trade mark of manufacturer.

The Post Insulators shall be legibly and indelibly marked to show the following :

- a) Name or trade mark of manufacturer.
- b) TNTW/DDUGJY/TW

Such marking on porcelain shall be printed, not embossed and shall be applied before firing.

9.2 The Horn Gap Fuse sets (hardwares) shall be suitability packed in double gunny bags worthy of rail/ road transport . The supplies shall have to insert in each case / bag packing list giving item wise details of articles in the packing as mentioned in the list. The post insulators shall be packed in crates suitable for vertical/ horizontal transport as the case may be and suitable to withstand handling during transport and outdoor storage during transit. The Supplier shall be responsible for any damage to the equipment during transit due to improper and inadequate packing. The easily damageable material shall be carefully packed and marked with the appropriate caution symbols.

Wherever necessary, proper arrangement for lifting, such as lifting hooks etc., shall be provided. Any material found short inside the packing cases shall be supplied by Supplier without any extra cost.

The inspected lot of Post Insulators should be directly delivered / dispatched from their (manufacturer's) works to consignee's stores.

9.3 Each consignment shall be accompanied by a detailed packing list containing the following information :

- a) Name of the consignee.
- b) Details of consignment.
- c) Destination.
- d) Total weight of consignment.
- e) Handling and unpacking instructions.
- f) Bill of material indicating contents of each package.

10.0 TEST CHECKING OF MATERIAL AT STORES:

The material received in the stores of the NIGAM shall be subjected to the test checking at stores before final acceptance of the material, the procedure for the same shall be as under :

10.1 SAMPLING

One sample out of each sub lot/ lot of 50 sets for 33 KV Horn gap fuse sets and 100 sets for 11 KV Horn Gap fuse sets or part thereof from each inspected lot received in stores shall be selected from each store for test checking of material and shall be got tested. The selection of sample from the material received at stores shall be done as soon as material is received in stores without the presence of the representative of the supplier. However, testing of sample(s) at CTL or elsewhere as arranged by JDVVNL shall be carried out in the presence of representative of the supplier after identification / confirmation by him that sample so selected belongs to them.

10.1 (a) one extra sample of 24 KV post insulator for conducting Puncture test.

At present since the facility for Puncture test is not available at Ajmer and Jodhpur Discom as such till such time this facility is made available, Puncture test on the samples selected from the supply received at stores of Ajmer & Jodhpur Discom shall be carried out at CTL, Jodhpur.

10.2 TESTS

The following tests shall be carried out on the above items :

- a) Visual examination , verification of dimensions, weight and marking as per PO/ GTP / approved drawing.
- b) Post Insulators :
 - i) Mechanical strength test.
 - ii) Porosity Test
 - iii) Puncture Test
- c) All galvanized parts. - Uniformity of galvanization test.

Testing of the material shall be got done at the test laboratory of the Nigam i.e. at CTL in the presence of the representative of the supplier. Only those test shall be conducted at CTL for which facility with CTL is available.

- i) For witnessing of the testing, clear 7 days notice shall be given to the supplier stating date, time & place where the test is to be conducted. The testing shall be started after identification / confirmation of sample by the representative of the supplier that sample selected for testing pertain from the lot supplied by them. In case the supplier does not attend for witnessing the testing, the testing shall be proceeded and completed and action be taken as per the contract.
- ii) The CTL shall send copies of test reports to the purchaser, consignees and the supplier.

10.3 CRITERIA FOR ACCEPTANCE

In case of failure of any of sample (s) in any of the above tests, the material contained in the lot / sub-lot received in store to which the samples belong, shall be rejected. The rejected material shall have to be replaced by the supplier free of cost.

TECHNICAL SPECIFICATION FOR 11 KV 45 KN DISC INSULATORS T&C TYPE. & 11 KV 45 KN DISC INSULATORS B&S TYPE

1.0 SCOPE :

1.1 This section covers for the design, manufacture, testing at manufacturer's works before dispatch, supply and delivery of Disc Insulators Tongue & Clevis type and Ball & Socket type for various overhead 33 KV and 11 KV Power Lines and overhead 132/33 KV Power Lines. The description of insulators & string arrangements have been given in Appendix- I, Appendix-II and Appendix-III

2.0 STANDARDS :

The Disc Insulator shall comply in all respects with the Indian Standard Specifications IS:731-1971 (Second Revision), IS:3188-1980, IS:2486 (Part-I)-1993 (Second Revision), IS:2486 (Part-II) 1989 (Second Revision) and IS:2486 (Part-III) 1974, IS:2486 (Part-IV) 1981 with latest amendments. The galvanisation of metallic parts shall conform to IS:2633/1972 (Latest amendments). The Insulator String shall consist of discs (B&S Type) of dimensions specified in Appendix-I, for use on 3 phase, 50 cycle power system. All applicable standards shall be clearly mentioned in schedule-III

3.0 MATERIALS, DESIGN & TYPE :

3.1 All the materials used in the manufacture of the insulators shall be of the first class quality. The porcelain shall be sound, free from defects thoroughly vitrified and smoothly glazed.

- 3.2 The glaze shall be brown in colour . The glaze shall cover all the porcelain parts of the insulators except those areas which serve as supports during firing or are left unglazed for the purpose of assembly . The glaze shall be uniform, smooth, hard, dense, continuous and brilliant.
- 3.3 The design of the insulator shall be such that stresses due to expansion and contraction in any part of the insulator shall not lead to deterioration. The porcelain shall not engage directly with hard metal.
- 3.4 Cement used in the construction of the insulator shall not cause fracture by expansion or loosening by contraction and proper care shall be taken to locate the individual parts, correctly during cementing . The cement shall not give rise to chemical reaction with metal fittings and its thickness shall be as uniform as possible.
- 3.5 All parts of different fittings which provide for interconnection shall be made such that sufficient clearance is provided at the connection point to ensure free movement and suspension of the insulator string assembly.
- 3.6 All hardware fittings (except those specified otherwise) shall be made of drop forged steel or heat treated malleable cast iron, and shall be hot dip galvanized after all machining and fittings have been completed. The material used in fittings shall be corrosion resistant.
- 3.7 The locking devices shall be resilient, corrosion resistant and of suitable mechanical strength. The hardness and temper of the material are important for their satisfactory operation.

The locking devices shall retain their locking ability after being operated from the locking to the coupling position at least twenty times at normal temperature. They should be effective at the lowest temperature likely to be encountered in service.

- 3.8 For Ball & Socket type disc insulators the cap and the pin shall be heavily galvanized and mechanically strong. The ball shall move freely in the cap sockets, but shall be so designed that they do not give way while in service. The dimensions of the pin ball & socket shall be conforming to ISS 2486/part -II. The cap shall be made of malleable cast iron conforming to IS:2108-1977. These shall be free from cracks, shrinks, air holes, burs and rough edges. The caps shall be circular, with inner and outer surfaces concentric and of such design that they will not yield or distort under the stress to the porcelain shells. The pin shall be single piece made of drop forged steel and shall be free from laps, field's burs and rough edges. All bearing surfaces shall be smooth and uniform so as to distribute the loading stresses uniformly. The pins shall be of such a design that they will not yield or distort under loaded condition. They shall not be made by joining, welding, shrink fitting or any other process from more than one piece of material. The locking devices 'W/R' type for Ball & Socket lockers shall be either of Phosphor bronze conforming to IS:7814-1975 or stainless steel conforming to IS:6603-1972 with minimum hardness of 160 HV. The dimensions shall conform to IS:2486(Part-3)-1974.

3.9 The dimension of the clevis and tongue connection shall be as shown in fig.25 and the dimension of cross arm strap shall be as shown in fig.26 of IS:2486/Pt.II/1989 (latest amendments)

The tongue and clevis type porcelain insulators shall be as per fig.2 and its dimension shall conform to table-2 of IS:3188/1980 (latest amendments)

The dimensions of pin ball socket shall be according to fig.8 and 9 respectively of IS:2486 (Part.II/1989) IIInd revision.

4.0 CLASSIFICATION SIZE & NO. OF DISCS :

4.1 The insulators shall be of type B as specified under clause 5 "Classification" of IS:731-1971(second revision).

4.2 The long rod Insulator falling under type A shall conform to IEC:433-1980(with latest amendments)& IEC-575/1977.

5.0 TESTING :

5.1 Sampling inspection, testing and acceptance of insulators shall be in accordance with the latest revision of IS:731/1971 while that of hardware associated with these discs shall be as per IS:2486(Pt.I)/1993 (second revision) IS:2486(Pt. II)/1989 (second revision) and IS:2486(Pt.III)/1974 & IS:3188-1980 with latest amendments.Sampling inspection, testing and acceptance of long rod insulators shall be in accordance with the latest edition of IEC :433/1980 & IEC:575/1977.

6.0 MECHANICAL LOADS :

The insulator strings shall be suitable for the minimum failing loads specified in Table-2, clause 7 of IS:731/1971 (IIInd Revision). The load shall be supplied axially to the insulator strings.

7.0 MARKINGS :

Each insulator shall be legibly and indelibly marked to show the following :

- a) Name or trade mark of the manufacturer.
- b) TW/TNTW NO.
- c) Minimum failing load in KNewton.

Marking on porcelain shall be originated and shall be applied before firing.

8.0 CREEPAGE DISTANCE :

The tenderer shall specify in his tender the creepage distances of the insulator.These values should not be less than those specified in IS:731-1971 & IS:3188-1980 (Latest amendment).

9.0 CRITERION OF CONFORMITY :

- 9.1 The criterion of conformity to the requirements of the tests given in 3.11.2 shall be as per clause No.C-2, of Appendix 'C' of IS:731/1971 (second revision).
- 9.2 No part of the lot withdrawn as described in 3.12.1 above shall constitute part of any other test submitted for the first time.

10.0 ROUTINE TESTS :

Routine tests shall be carried out on each insulator & to check requirements which are likely to vary during production as per relevant IS:731/1971 (with latest amendments).

11 PACKING :

All insulators shall be packed in suitable crates or boxes with suitable steel bands so as to withstand rough handling and storage at destination. The gross weight of packing shall not exceed 50 Kgs.

12 DRAWINGS :

The bidder shall submit detailed drawings showing design and dimensions of insulator , ball pin, socket cap & security pin . The type of the material used for various parts shall be clearly specified on the drawing.

13 TEST CHECKING OF MATERIAL AT STORES

The material received in the stores of the NIGAM shall be subjected to the test checking at stores before final acceptance of the material, the procedure for the same shall be as under :

i) SAMPLING

One sample out of each sub-lot / lot consisting of following quantities or part thereof in case of each type of insulators from each inspected lot received in stores shall be selected from each store for test checking of material and shall be got tested.

i(a) one extra sample of Disc insulator of each type for conducting Puncture test.

11 KV 45 KN Disc insulator "T&C" Type – **1000 Nos.**

11 KV 45 KN Disc insulator "B&S" Type – **1000 Nos**

The sample selection shall be done as soon as the material is received in stores, without calling the representative of supplier. However, testing at CTL or else where as arranged

by NIGAM shall be done in the presence of representative of supplier after identification/ confirmation by the supplier's representative that sample(s) so selected belong to them.

ii) TESTS

The following tests shall be carried out on the above items :

- a) Visual examination, verification of dimensions, creepage distance etc.
- b) Mechanical failing Load Test
- c) Porosity test
- d) Puncture Test

However, only those tests shall be conducted at CTL for which facility with CTL is available.

TECHNICAL SPECIFICATION OF LT PIN INSULATORS AND 11KV & 33 KV GUY (STAY)INSULATORSFOR 11 KV& 33 KV TRANSMISSION AND L.T.DISTRIBUION OVERHEAD POWER LINES

1.0 SCOPE :

- 1.1 This section provides for design, manufacture, inspection & testing before dispatch, supply and delivery of Porcelain 11 KVGuy (Stay) insulators, 33 KV Guy (Stay) insulators and L.T. Pin Insulators specified herein for their satisfactory use and operation on various 11 KV and 33KV sub-transmission & L.T. distribution overhead power lines of the state.
- 1.2 It is not the intent to specify completely herein all the details of the design and construction of equipment. However, the equipment shall conform in all respect to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation up to the bidder's guarantee, in a manner acceptable to the purchaser, who will interpret the meanings of drawings and specification and shall have the power to reject any work or material which in his judgment is not in accordance therewith. The offered equipment shall be complete with all components necessary for their effective and trouble free operation. Such components shall be deemed to be within the scope of bidder's supply irrespective of whether those are specifically brought out in this specification and / or the commercial order or not.\

2.0 PRINCIPAL PARAMETERS :

2.1 The material shall conform to the following specific parameters :

S.N. Item	Specification
1.	Type of Installation Outdoor
2.	System Voltage 415 Volt (+10%, -15%)
3.	System frequency 50 Hz, + 5%
4.	Number of phases Three
5.	System of earthing Solidly grounded.

2.2 Details of insulators :

- 2.2.1 The all type of Insulators shall be suitable for use on various 11 KV/33 KV and L.T. distribution Power lines in a moderately polluted atmosphere.
- 2.2.2 The 11 KV Guy (Stay) insulators shall of size 110x75x22mm having dimensions as per fig 2 and 33 KV Guy Insulators shall of size 140x85x25mm having dimensions as per fig.3 of IS:5300/1969 (latest amended).
- 2.2.3 The 11 KV/33KV Guy (Stay) insulators shall be brown glazed and conforming to IS:5300/1969 (Latest amended) in all respects.
- 2.2.3 The L.T. Pin insulators shall of size 100x70mm having dimensions as shown in Fig.1, type-1 of IS:1445/1977 (latest amended).
- 2.2.3 The L.T.Pin Insulators shall be brown glazed and conforming to IS:1445 / 1977 (Latest amended) in all respects.

3.0 GENERAL TECHNICAL REQUIREMENTS :

- 3.1 The porcelain of Insulators shall be sound, free from defects, thoroughly vitrified and smoothly glazed.
- 3.2 The glaze of the insulators shall be brown in colour. The glaze shall cover the entire porcelain surface parts except those areas that serve as supports during firing or are otherwise required to be left unglazed.
- 3.3 The design of the insulator shall be such that the stresses due to expansion & contraction in any part of the insulator shall not lead to its deterioration.
- 3.4 The dimensions of guy strain insulators essential from the point of view of inter-changeability shall be in accordance with IS:5300/1969(latest amended).
- 3.5 The insulator shall be in one piece.
- 3.6 The Pin Insulators shall have a top groove and both type of insulators shall have dimensions as specified above.
- 3.7. The Pin Insulators shall be threaded to take mild steel pins having profile as IS:1445/1977 (Latest amended).

4.0 INSULATOR CHARACTERISTICS :

A. The 11 KV & 33KV Guy (Stay) insulators shall have the electrical & Mechanical characteristics as given below:

11 KV 33KV

1. Designation of insulator	B	C
2. Length (mm)	110	140
3. Diameter (mm)	75	85
4. Cable hole dia (mm)	22	25
5. Minimum failing load KN	53	88

6.	Creepage distance	48	57
7.	Dry one minute power frequency withstand voltage KV (rms)	22	27
8.	Wet one minute power frequency withstand voltage KV (rms)	9	13

B.The L.T. Pin Insulators shall have the electrical & Mechanical characteristics as given below:

1.	Type of Insulator	Pin Insulator
2.	Size of Insulators (mm)	100x70
3.	Dry power frequency withstand Voltage KV (rms)	23
4.	Wet power frequency withstand Voltage KV (rms)	10
5.	Power frequency puncture withstand voltage KV (rms)	1.3 x the actual dry flashover voltage.
6.	Min. failing load(KN)	3.5

5.0 IDENTIFICATION & MARKING :

5.1 Each insulator shall be legibly and indelibly marked to show the following:

- i) Name or trade mark of the manufacturer.
- ii) Month & Year of manufacture.
- iii) Minimum failing load in KN
- iv) ISI certification mark if any.
- v) DDUGJY/TNTW NO./TW

5.2 Marking on porcelain shall be printed & shall be applied before firing.

5.3 Offer not complying the condition of marking shall be treated as non-responsive.

5.4 The insulators marked with ISI Certification Mark will be given preference

6.0 DRAWINGS & DOCUMENTATION :

6.1 The bidder shall furnish full description and illustrated catalogues of insulators offered alongwith the bid.

6.2 The bidder shall also furnish alongwith the bid the outline drawing of each insulator unit comply with relevant standard with latest amendment including

cross-sectional view of the shell. The drawing shall include the following information :

- i) Shell diameter and unit spacing with manufacturing tolerance.
- ii) Weight of unit insulator.
- iii) Identification mark.
- iv) Manufacturer's catalogue number.
- v) Brief installation instructions.

7.0 TESTS :

7.1 TESTS BEFORE DESPATCH :

The insulators shall be subjected at contractor's works before dispatch, to the routine & acceptance tests given here under as per relevant IS with latest amendment.

7.2 ROUTINE TESTS :

These tests are to be carried out to check various requirements of insulators which are likely to vary during production. The following tests shall be conducted / carried out on each insulator by the bidder at his works as per relevant IS with Latest amendment and he should furnish certificate / record thereof during pre-dispatch inspection:-

- i) Visual Examination

7.3 ACCEPTANCE TESTS :

These tests shall be carried out on the sample taken from the lot for the purpose of the acceptance of that lot and shall be carried out by the bidder in the presence of the purchaser's representative(s). The following tests should be conducted in the order given below as per relevant IS with latest amendment:

- i) **Verification of dimensions**
- ii) **Temperature Cycle test**
- iii) **Mechanical strength test**
- iv) **Porosity Test**

7.4 TYPE TESTS :

7.4.1 The type tests to be conducted on at least two units **11 KV & 33 KV Guy Insulators** as per relevant IS:5300/1969 (latest amended). The following tests shall constitute the type tests and shall be conducted in the order given below :

- (i) Visual examination (clause 7.8)
- (ii) Verification of dimensions (clause 7.5)
- (iii) Dry one minute power frequency withstand test (clause 7.2) test (clause 7.3)
- (v) Temperature cycle test (clause 7.6)
- (vi) Mechanical strength test (clause 7.4)
- (vii) Porosity test (clause 7.7)

7.4.2 The type tests to be conducted on at least two units of **LT Pin insulators** as per relevant IS:1445/1977 (latest amended). The following tests shall constitute the type tests:

- (i) Visual examination (clause 8.4)
- (ii) Verification of dimensions (clause 8.5)
- (iii) Dry power frequency voltage withstand test (clause 8.6)
- (iv) Wet power frequency voltage withstand test (clause 8.7)
- (v) Temperature cycle test (clause 8.8)
 - (vi) Mechanical failing load test (clause 8.9)
 - (vii) Power frequency puncture withstand test (clause 8.10)
 - (viii) Porosity test (clause 8.11)

However, the purchaser reserves the right to demand repetition of some or all the type tests in presence of purchaser's representative. For this purpose, the tenderer should indicate unit rate for carrying out such type tests. These test charges shall not be taken into consideration for bid evaluation.

8.0 SAMPLING :

The sampling procedure as laid down in IS:731/1971 with latest amended (For Guy Insulators) and IS 1445/1977 with latest amendment (For LT Pin Insulators) shall be followed for carrying out specified acceptance tests.

9.0 TOLERANCE ON DIMENSIONS / TEST RESULTS :

As per IS:5300/1969 with latest amendments (For 11 KV & 33 KV Guy Insulators). As per IS:1445/1977 with latest amendments (For LT Pin Insulators).

10.0 TESTS AT SITE :

The purchaser reserves the right to conduct all tests on each type of insulator after arrival at site and bidder shall guarantee test certificates figures under actual service conditions.

11.0 TESTING FACILITIES :

The bidder must indicate clearly about the various testing facilities for conducting various acceptance tests as well as routine tests as per relevant ISS as available at his works. In case no testing facilities are available at the bidder's works, particulars of the place where such testing is proposed to be conducted during course of inspection must be indicated.

12.0 TEST CHECKING OF MATERIAL

The material received of the NIGAM shall be subjected to the test checking at stores before final acceptance of the material, the procedure for the same shall be as under :

12.1 SAMPLING

One sample out of each sub-lot / lot of 3000 Nos. or part thereof from each inspected lot of each type of insulators received in stores shall be selected for test checking of material and shall be got tested. The sample selection shall be done in the presence of supplier or his authorized representative for which 7 days notice shall be given to the supplier.

12.2 TESTS

The following tests shall be carried out on the above items :

- a) Visual Examination, verification of dimensions, Creepage Distance & marking.
- b) Mechanical strength test.
- c) Porosity test.

In case if the facility for conducting any of the above test(s) is not available at the NIGAM's CTL, the purchaser reserve the right to get such test (s) conducted at any independent NABL Test House.

12.3 CRITERIA FOR ACCEPTANCE

In case of failure of any of sample (s) in any of the above tests, the material contained in the lot / sub-lot received to which the samples belong, shall be rejected. The rejected material shall have to be replaced by the supplier free of cost.

TECHNICAL SPECIFIICATION FOR SUPPLY OF (A) 33 KV CROSS ARM (ANGLE) WITH CLAMP AND TOP HAMPER ,(B)11 KV CROSS ARM (ANGLE) WITH CLAMP AND TOP HAMPER (C 11 KV TOP HAMPER (WITHOUT CLAMP) L.T.CROSS ARM (600 MM) WITH CLAMP AND L.T.CROSS ARM (1200 MM) WITH CLAMP

1. SCOPE

This specification covers fabrication, testing & delivery of fabricated steel items as a complete package, complete in all respect as per GTP/Drawings (to be provided by the purchaser to the successful bidder). The steel sections generally used, tentative unit weight & BOM of fabricated item is enclosed at Schedule-I. The final bill of material for the purpose of payment shall be prepared and submitted by the supplier after approval of model assembly by the purchaser.

2. STANDARDS :

All materials and equipments shall comply in all respect with the requirements of the latest edition of the relevant Indian Standard Specification(s) except as modified in this specification. Where the relevant ISS is not available, the material / equipment should comply the latest BSS. All the items should be made / fabricated/tested from steel sections conforming to IS:2062 (latest amended).

3. MARKING

Each individual structure / section shall carry a code number conforming to component number given to it in the drawing / Bill of material. The code number of approved size shall be stamped with a metal dye of 16 mm size on the member and shall be legible. The name of manufacturers in suitable code and the word "TW" & "DDUGJY/TNTW No" shall also be stamped / punched on each individual section with metal dye of not less than 16 mm size.

If the above marking is not found on the material received in the stores, the receipted challan shall not be given by the concerned stores. The challan shall only be issued after verification of material by the Store officer.

4. TESTS

Test before dispatch:- The various steel section/structure before dispatch shall be subject to following test as per IS:2062(latest amendment) at the manufacturer's works

Routine test/acceptance test

1. Dimensional checking and visual inspection
2. Weight checking
3. Chemical composition test
4. Mechanical property test

5. SAMPLING:

The inspection shall be carried out on each lot separately. The following number of pieces selected at random shall be subject to inspection/ testing and checking.

- | | |
|---------------------------------------|--|
| j) Workmanship and dimension checking | : 3 % samples from finished item. |
| b) Chemical test | : One sample of each steel section from the entire lot of material offered for inspection. |
| c) Tensile test | : One sample of each steel section from every 50 MT or Part thereof. |
| d) Bend test | : One sample of each steel section from every 50 MT or Part thereof. |

6. TOLERANCE IN DIMENSIONS :

The tolerance(s) shall be permissible as per IS: 1852: (latest amended). Further the following tolerance(s) on fabricated items will also be allowed.

- | | |
|--|------------------|
| i) Tolerance in over all length | $\pm 3\text{mm}$ |
| ii) Tolerance in edge dimensions (centre of hole to end) | $\pm 2\text{mm}$ |
| iii) Tolerance in hole centre | $\pm 2\text{mm}$ |
| iv) Circular holes | No tolerance |
| v) Weight Tolerance | +2% to (-) 4% |

7. GUARANTEED TECHNICAL PARTICULARS :

The bidder shall furnish the guaranteed technical particulars of the material as required in the schedule-V by mentioning specific figures therein. Any item of the GTP left unfilled or simply written as per ISS etc. shall be considered as incomplete GTP and such tender is liable to be rejected.

8. CRITERIA FOR ACCEPTANCE

The inspected material should be strictly in accordance to the GTP of the specification otherwise the material shall be treated as rejected and shall not be accepted.

9. WEIGHT

The weight of structure shall mean the weight of structures calculated by using standard sectional weights of all steel structural members of the sizes indicated in the fabrication drawings and/or subsequently revised drawings and bill of material without taking into consideration the reduction in weight due to drilling of bolt-holes, skew cuts, chamfering etc. or the increase in weight due to galvanization.

The material shall be acceptable if found within permissible tolerance limit i.e. +2% and (-)4%.

TECHNICAL SPECIFICATION FOR 9 KV 10 KA HEAVY DUTY SURGE ARRESTERS (LIGHTNING ARRESTERS)

1.0 SCOPE:

- 1.1 This specification provides for the design, engineering, manufacture, assembly, stage testing, inspection and testing before dispatch, packing, forwarding and delivery of Metal Oxide (gapless) Surge Arresters complete with accessories for 11KV system as specified hereunder:
- 1.2 It is not the intent to specify completely herein all the details of design and construction of Surge Arresters, However, Surge Arresters shall conform in all respects to the high standard of design and workmanship and be capable of performing in continuous commercial operation upto Bidder's guarantee in a manner acceptable to Purchaser, who will interpret the meanings of drawings and specifications and shall have the power to reject any work or material which in his judgment are not in accordance therewith. The Arresters offered shall be complete with all parts, necessary for their effective and trouble free operation. Such components shall be deemed to be within the scope of supply, irrespective of whether they are specifically brought out in the commercial order or not.

2.0 STANDARDS:

2.1 The Surge Arresters shall conform to the latest editions and amendments available at the time of supply, of the standards listed hereunder:

Sl

No.

Standard

Ref No.

Title

1. IEC 99-4 Specification Part.4 for Surge Arresters without gap for AC system.
2. IS:3070(Part-III) Specification for Lightning Arresters for alternating current System
3. IS:2629 Recommended practice for hot dip galvanising of iron and steel.
4. IS:2633 Method for testing uniformity of coating on Zinc coated articles.
5. IS:5621 Specification for large hollow porcelain for use in electrical installation.

- 6 IS:2147 Degree of protection provided by enclosures for lowvoltage switchgear and control gear.
- 7. Indian Electricity Rules.1956.

Note :

- i) For the purpose of this specification all technical terms used hereinaftershall have the meaning as per IEC specification.
- ii) For the parameters of the Arrester which are not specified in IECspecification for Surge Arresters, the provisions of ISS 3070 (Part.III) shall beapplicable.

2.2 Surge Arresters meeting with the requirements of other authoritative standards,which ensure equal or better quality than the standards mentioned above shall also be acceptable. Where the equipment offered by the Bidder conforms to other standards, salient points of difference between the standards adopted and the specified standards shall be clearly brought out in the offer. Four (4) copies of the reference standards in English language shall be furnishedalong with the offer.

3.0 PRINCIPAL PARAMETERS :

The Surge Arresters offered under this specification shall conform to the parameters given below.

 S.No. Particulars. System Voltage (KV rms)

9 KV Station type

- 1. Nominal system voltage 11(kv rms)
- 2. Highest system voltage 12(kv rms)
- 3. 1.2/50 microsecondimpulse voltage withstand level
 - a. Transformer and reactors 75(kvp)
 - b. Other equipment and 75lines (kvp)
- 4. Minimum prospective 10symmetrical fault currentfor 1 second at Arresster location(KA rms)
- 5. Anticipated levels oftemporary over voltageand its duration.
 - a. Voltage(p.u.) 1.5
 - b. Duration(Seconds) 1/10
- 6. System frequency(Hz) -----50 Hz plus minus 1.5--
- 7. Neutral Grounding -----Effectively Earthed--
- 8. Number of Phases -----Three-----

Note: 1. 1 p.u. = 12 x Root 2 kvp/ Root 3

4.0GENERAL REQUIREMENTS :

- 4.1 The materials and components not specifically stated in this specification butwhich are necessary for satisfactory operation of the equipment are deemed tobe included in the scope of supply unless specifically excluded.
- 4.2 Unless otherwise brought out separately by the Bidder in the schedule ofdeviations the Surge Arresters offered shall conform to the specificationscrapulously. All deviations from the specification shall be brought out in theschedule of deviations. The discrepancies between the specification and thecatalogues or literature

submitted as part of the offer shall not be considered as valid deviations unless specifically brought out in the schedule of deviations.

- 4.3 Any deviation which has not been specifically brought out in the schedule of deviations of the Bid Proposal Sheets, shall not be given effect to. The deviations brought out in the schedule shall be supported by authentic documents, standards and other references.
- 4.4. Each individual unit of Surge Arresters shall be hermetically sealed and fully protected against ingress of moisture. The hermetic seal shall be effective for the entire life time of the Arrester and under the service conditions as specified. The Bidder shall furnish sectional view of the Arrester, showing details of sealing employed.
- 4.5 The bidder shall furnish in the offer, a sectional view of pressure relief device employed in the Station type Surge Arresters offered.
- 4.6 The Surge Arresters shall be suitable for hot line washing.
- 4.7 Construction :
 - 4.7.1 All the units of Arresters of same rating shall be interchangeable without adversely affecting the performance.
 - 4.7.2 The Surge Arresters shall be outdoor and suitable for pedestal/ clamp type mounting.
 - 4.7.3 All the necessary flanges, bolts, nuts, clamps etc., required for assembly of complete Arrester with accessories and mounting on support structure to be supplied by the Purchaser shall be included in Bidder's scope of supply.
 - 4.7.4 The drilling details for mounting the Arrester on Purchaser's support shall be supplied by the Supplier.
 - 4.7.5 The minimum permissible separation between the Surge Arrester and any earthed object shall be indicated by the Bidder in his offer.

4.8. PORCELAIN / POLYMERIC HOUSING :

- 4.8.1 The housing may be of Porcelain or Polymeric.
- 4.8.2 Where the bidders are quoting for Surge Arresters with Porcelain Housing, all porcelain housings shall be free from lamination cavities or other flaws affecting the maximum level of mechanical and electrical strengths.
- 4.8.3 The porcelain shall be well vitrified and nonporous.
- 4.8.4 The creepage distance of the Arrester housing shall be as per Annexure-A.
- 4.8.5 The porcelain petticoat shall be preferably of self cleaning type (Aerofoil design). The details of the porcelain housing such as height, angle of inclination, shape of petticoats, gap between the petticoats, diameter (ID and OD) etc., shall be indicated by the Bidder in his offer in the form of a detailed drawing.
- 4.8.6 The Arrester housing shall conform to the requirements of IEC specification.

4.9. GALVANISATION, NICKEL PLATING ETC.:

- 4.9.1. All ferrous parts exposed to atmosphere shall be hot dip galvanised as per IS:2629 as amended from time to time. Tinned copper/brass lugs shall be used for internal wiring. Screws used for electrical connections shall be either made of brass or nickel plated.
- 4.9.2. Ground terminal pads and name plate brackets shall be hot dip galvanised.
- 4.9.3 The material shall be galvanised only after completing all shop operations.

5.0. ACCESSORIES AND FITTINGS :

- 5.1 All necessary accessories and earthing connection leads shall be in the Bidder's scope of supply.
- 5.2 Terminal connector conforming to IS:5561 shall be supplied along with the

arrester.

5.3 The grounding terminal shall be suitable for accommodating Purchaser's grounding connection to steel earth mat.

5.4. Name Plate :

The arrester shall be provided with non-corrosive legible name plate indelibly marked with the following information:

1. JDVNL
2. DDUGJY/TNTW/
3. Manufacturer's name, address, Phone & Fax Number, trade mark and identification no. of the Arrester being supplied.
4. Rated Voltage.
5. Maximum continuous operating voltage.
6. Type.
7. Rated Frequency.
8. Nominal discharge current.
9. Line discharge class.
10. Pressure relief current in kA rms.
11. B.I.L. of the equipment to be protected.
12. Year of manufacture.
13. Date of dispatch.
14. Date of Expiry of Warranty.

6.0. **TESTS :**

6.1 **TEST BEFORE DESPATCH:** The Surge Arrester of various rating and accessories shall be subjected at maker's works before dispatch, to the following tests as per relevant standards.

A) **ROUTINE TEST ON EACH UNIT AS PER RELEVANT STANDARDS :**

1. Measurement of reference voltage.
2. Residual voltage test.
3. Satisfactory absence from partial discharges and contact noises.
4. For arrester units with sealed housing leakage check shall be made on each unit.
5. Current distribution test for multi Column arrester.

6.2 TYPE TESTS :

The bidder must furnish type test reports from a Govt. approved / Govt. recognized/ NABL Accredited laboratory / ILAC i.e. International Laboratory Accredited Laboratory (in case of foreign laboratory) of similar rating and design of tendered material/ equipment along with detailed dimensional drawing duly signed & verified by testing agency also showing size & numbers of blocks dimensions contained in the housing along with bid as per the qualification requirement of the Tender Specification. Such type test certificates should not be older than **5 (Five) years** as on the date of bid opening. For this purpose date of conducting type test will be considered. The type test certificates should be furnished either in Original or in copy duly Notary attested.

6.2.1: **TYPE TESTS SHALL BE CONDUCTED ON ONE UNIT OF EACH RATING AS PER RELEVANT STANDARD.**

1. Insulation withstand test.
2. Residual voltage test.
3. Bending test on arrester housing assembly.
4. Long duration current impulse withstand test.
5. Operating duty test.
6. Pressure relief test (Only for station type)
7. Artificial pollution test on porcelain.

8. Partial discharge test.
9. Housed arresters.
 - a) Temperature cycle test.
 - b) Porosity test.
10. Galvanising test on exposed ferrous metal parts.
11. Any other type test which are not specified above but covered as per amendment/latest edition of relevant IS/IEC.

6.3 TEST ON BOUGHT OUT ITEMS :

Tests are not required to be performed on bought out equipments/items like, Terminal connector etc. at the works of manufacturer. Furnishing Test Certificate of bought out items from the original equipment manufacturers shall be deemed to be satisfactory evidence. Inspection of the tests at Sub-contractors works will be arranged by the supplier whenever required.

6.4 ROUTINE/ACCEPTANCE TESTS :

The following tests shall be got conducted in presence of purchaser's representative, as per stipulation of the relevant standards. Acceptance tests whenever possible, shall be conducted on the complete arrester unit. No. of samples to be selected for acceptance tests shall be nearest lower whole number to the cube root of the number of arresters to be supplied.

1. Measurement of power frequency reference voltage on the complete arrester at the reference current measured at the bottom of the arrester.
2. Lightning Impulse residual voltage.
3. Partial discharge test.
4. Visual inspection & verification of dimension.
5. Special thermal stability test.
6. Galvanising test on Ferrous metal parts.
7. Any other tests as per IS.

6.5 TOLERANCE ON TEST RESULTS :

As per relevant standards/specifications.

6.6. CHECKING (TEST AT CTL):

One out of every 50 Nos. Surge Arresters will be selected for checking at Store for visual, dimensional, weight, marking etc. as per relevant ISS/GTP/approved drawing.

TECHNICAL SPECIFICATION FOR L.T. AERIAL BUNCHED CABLES

1. SCOPE:

This specification covers the requirement of crosslinked polyethylene insulated aluminium cable twisted over central bare aluminium alloy messenger wire for use on L.T. overhead lines in electrification system.

RATED VOLTAGE:

Rated voltage of the cables shall be 1100 Volts.

2. SERVICE CONDITIONS:

Equipment to be supplied against the specifications shall be suitable for satisfactory continuous operation under the following tropical conditions.

2.1	Maximum ambient temperature (Degree C)	50
2.2	Maximum temperature in shade (Degree C)....	45
2.3	Minimum temperature of Air in Shade (Degree C)..	3.5
2.4	Relative Humidity (Percent)	10 to 100
2.5	Maximum annual rainfall (mm)	1450
2.6	Maximum wind pressure (Kg/sq.mm.)	150
2.7	Maximum altitude above mean sea level (Metres)	1000
2.8	Isoceraunic level (day per year)	50
2.9	Seismic level (Horizontal Acceleration)	0.3g
2.10	Ground Temp.	30 Degree C
2.11	Moderately hot and humid tropical climate Conducive to rust and fungus growth	

3. STANDARDS:

APPLICABLE STANDARDS :

Unless otherwise specified elsewhere in this specification the ratings as well as performance and testing of the L.T.A.B. cables shall conform to the IS: 14255/1995 or the latest revision available at the time of placement of order and bearing ISI mark. In addition the following Standards (or the latest version thereof) shall be applicable :

- i) IS 8130-1984 cross linked polyethylene insulated aluminium cables.
- ii) IS 398 (Part- IV) - 1994 Aluminium alloy conductors.

4. GENERAL TECHNICAL REQUIREMENTS:-

The insulated phase conductors (with additional street lighting conductor, if provided) shall be twisted around the bare aluminium alloy messenger wire, which shall take all the mechanical stress. The messenger wire can also serve as the earth cum neutral wire.

5. PHASE/NEUTRAL CONDUCTORS:

The conductors shall be made of aluminium & shall be stranded in construction and shall be insulated with black weather resistant cross linked polyethylene suitable for 1100 Volts insulation. The insulated conductors shall generally conform to the standards (i) and (ii) quoted in clause 3 above. The conductors shall be suitably compacted. The outer diameters shall be within the limit as specified in 5.3 below :

The conductors shall be provided with one, two and three ridges for quick identification. The tensile strength of the aluminium wires used in the conductors shall not be less than 90 N/sq.mm.

The standard size and technical characteristics of conductors shall be as shown in the following table:

Nominal Sectional Area(sq. mm)	Diameter of compacted conductor(mm)	Max.DC Resistance at 20Deg.(Ohm/km)	Insulation thickness (mm)	Approx. mass(kg/km)	Minimum No.of Strands
(1)	(2)	(3)	(4)	(5)	(6)
16	4.4	1.91	1.0	42	6
35	6.8	0.868	1.0	95	6
50	7.9	0.641	1.2	127	6
70	9.6	0.443	1.4	184	12
95	11.3	0.320	1.4	254	15
120	12.7	0.253	1.6	320	15
150	14.2	0.196	2.1	382	17

NOTE:-

- (A) The resistance values given in col.3 are the max. Permissible.
 (B) Tolerance of +5% is allowable on diameters shown in Col.2.

6. MESSENGER WIRE:

The bare messenger wire shall be made of aluminium alloy generally conforming to IS-398(part-IV)-1994 or the latest version thereof composed of 7 strands and shall be suitably compacted to have smooth round surface to avoid damage to the insulation of the phase conductors twisted around the messenger. There shall be no joints in any wire of the stranded messenger conductor except those made in the base rod of wires before final drawing. The sizes and other technical characteristics of the messenger wire shall be as given in the following table :

Nominal Sectional Area(sq. mm.)	Diameter of compacted conductor(mm)	Approx Mass (kg/km)	Max.DC Resistance at 20Deg.(Ohm/km)	Minimum Tensile Strength.(KN)
(1)	(2)	(3)	(4)	(5)
25	5.8	65	1.380	7.4
35	6.8	95	0.968	10.3
50	8.1	130	0.690	14.7
70	9.6	185	0.493	20.6
95	11.2	210	0.398	26.3
120	13.7	287	0.312	33.2

7.0 CROSS LINKED POLYETHYLENE INSULATION:

The polyethylene insulation shall generally conform to IS:14255/1995 or the latest version thereof. The following properties shall be guaranteed by the supplier

Melt flow index	0.5 or less
Yield Stress	Not less than 8N/sq.mm

Percentage elongation	Not less than 350
Carbon black content	Between 2 and 3
Vicat Softening Point	Not less than 85 Deg. C
Insulation resistivity:	
at 27 Deg. C	1x10 ¹⁵ ohmcm (Min)
at 70 Deg. C	1x10 ¹³ ohmcm (Min)

8.0 COMPOSITION AND DESIGNATION OF FINISHED CABLES:

The composition and designation of finished cables are given in the following tables:

Sr.No	Designation	Complete Bunched Cables	
		Overall dia approx (mm)	Total mass approx (kg/km.)
1.	3x50+16+35	32	640
2.	3x70+16+50	34	890
3.	3x95+16+70	39	1180
4.	3x120+16+95	42	1430
5.	3x150+16+120	49	1905

Note:-

The first part of the designation refers to the number and size of the phase conductor, the middle to the street lighting conductor (where provided) and the last to the bare messenger wire. The sizes shown are the nominal sectional areas.

9.0 TESTS FOR PHASE CONDUCTORS:

9.1 TYPE TESTS:

All the type tests are detailed below in accordance with relevant IS , amended up to date , shall be performed on cable samples drawn by the purchaser.

Type tests are required to be carried out from the first lot of supply on a sample of any one size of cable ordered. In case facilities of any of the type test is not available at the work of the supplier, then such type tests shall be carried out by the supplier at an independent recognized laboratory at the cost of supplier. Sample for the type test will be drawn by the purchaser's representative and the type tests will be witnessed by him.

Supplier, however, can claim exemption from carrying out type tests as above, provided such type tests were already conducted for the UPPCL in the past within five years and the test certificates thereof submitted to authorities may grant waiver from carrying type tests, if the type test certificates are acceptable. In case of other Government recognized laboratories / Test House valid approved Government certificates shall be enclosed along with test certificate.

TYPETESTS:

a. Conductor Resistance Test	(IS :8130)
b. Test for thickness of insulation	(IS :14255)
c. Physical tests for polyethylene insulation	(IS :14255)
d. Test for bleeding and blooming of pigment	(IS :14255)
e. Insulation Resistance Test	(IS :14255)
f) High voltage test including water immersion test	(IS: 14255)

9.2

All tests as per 9.1 except (c) and (d)
In addition, check of diameter values as per clause 5.5.

10.0 TESTS FOR MESSENGER:

TYPETESTS:

- a) Breaking load test (to be made on the finished conductors) (IS:398-PART-IV)
- b) Elongation test (IS:398-PART-IV)
- c) Resistance test (IS:398-PART-IV)

ACCEPTANCE TESTS:

All tests indicated in clause 10.1 above.
In addition, check of diameter values as per clause 6.3

11.0 BENDING TEST ON THE COMPLETE CABLE:

The test shall be performed on a sample of complete cable. The sample shall be bent around a test mandrel at room temperature for at least one complete turn. It shall then be unwound and the process shall be repeated after turning the sample around its axis 180 Deg. The cycle of these operations shall then be repeated twice more. The diameter of the mandrel shall be

$$10(D + d)$$

Where D = actual diameter of the cable (i.e. the minimum circumscribing circle diameter), in mm; d = actual diameter of the conductor, in mm. No cracks visible to the naked eye are allowed.

12. PACKING AND MARKING

The cables shall be wound on non-returnable wood end drums conforming to IS:1778/1961 or the latest version thereof (specification for Reels & Drums for bare wire). The drum shall be marked with the following.

- a. Manufacturer's name.
- b. Trademark, if any.
- c. Drum number or identification number.
- d. Size of conductors.
- e. Size of messenger.
- f. Voltage grade.
- g. Number and length of pieces of cable in each drum.
- h. Gross mass of the packing.
- i. Net mass of cable,
- j. ISI mark.

The drum shall be of such construction as to ensure delivery of conductor in the field free from displacement and damage and should be able to withstand all stresses due to handling and the stringing operations so that cable surface is not dented, scratched or damaged in any way during transport and erection. The cable shall be properly lagged on the drum.

The cable drum should be suitable for wheel mounting.

The mass of finished cable in a drum (without mass of drum) of various designations shall not exceed by more than 10% of the actual values.

The normal length of each cable shall be 500 meters with plus/minus 5% tolerance. While longer lengths shall be acceptable, shorter lengths not less than 100 meters shall be acceptable to the extent of 5% of the ordered quantity.

13.0 INSPECTION:

All tests and inspections shall be made at the place of manufacture unless otherwise especially agreed upon by the manufacturer and purchaser at the time of purchase. The manufacturer shall afford the inspector representing the purchaser all reasonable facilities without charge, to satisfy him that the material is being furnished in accordance with this specification.

14.0 QUALITY ASSURANCE PLAN:

A detailed list of bought-out items which go into the manufacture of cables should be furnished indicating name of the firms from whom these items are procured. The bidder shall also give the details of quality assurance plan followed by him in respect of the raw materials, in process, final inspection, packing and marking. Company may at its option order the verification of these plans at manufacturer's works as a prequalification for technically accepting the bid. During verification if it is found that firm is not meeting with quality assurance plans submitted by the firm, the offers shall be liable for rejection.

TECHNICAL SPECIFICATION IS IMARKED FOUR CORE AND TWO CORE LTXLPE INSULATED AND PVC SHEATHED ARMoured CABLES.

11.0 SCOPE:

1.1 This section provides for manufacture, testing before dispatch, supply and delivery F.O.R. destination of IS Marked Four Core & Two Core LTXLPE Insulated and PVC Sheathed Armoured Circular Cables with Aluminium Conductors suitable for working voltage upto & including 1100 Volts & Conforming to IS: 7098 (Pt.-I)/1988 with latest amendments. The requirement of various sizes of Four Core & Two Core LTXLPE Insulated Armoured Cables shall be as per schedule of requirement annexed with this section at Schedule-I. It may be noted that the requirement indicated in the schedule is tentative and may vary at the time of placement of order. The cables shall be IS marked.

2. STANDARDS:

Unless otherwise stipulated in this specification the following standards with latest amendments shall be applicable.

- i) IS:7098(Pt.-I)/1988:XLPE Insulated cables for working voltages upto and including 1100 Volts.
- ii) IS:8130 : Conductors for insulated cables.
- iii) IS:5831 :PVC insulation and sheath of electric cables.
- iv) IS:10810 :Methods of test for cables.
- v) IS:3975/1979 :Galvanized Steel Wire/Strips.

vi) IS:10418 :Drumsforelectriccables.

3. GENERAL REQUIREMENT:

The LTXLPE Insulated Armoured cables shall conform to IS:7098(Pt.- I)/1988 with latest amendment and bear BIS certification mark. The material used for construction of the cables shall be of best qualities complying with the requirements of IS:7098(Pt.- I)/1988 and other relevant standards. The cables shall be suitable for outdoor/indoor installation free in air and shall be capable of withstanding the normal stresses associated with transportation, erection, reeling and unreeling operations without getting deformed.

The cables shall be suitable for use where combination of ambient temperature and temperature rise due to load results in a conductor temperature not exceeding 90 degree C under normal operation and 250 degree C under short circuit condition.

The LTXLPE Insulated Armoured Cables shall be ISI marked. The bidders should be a manufacturer of tender item. The offers from Sole Selling Agents/Authorised Dealers shall not be entertained. The bids from the trading firms shall not be considered.

4.0 CONDUCTOR:

The conductor shall be composed of plain aluminium wires complying with IS:8130/1984 with latest amendments.

The bidder must guarantee the minimum weight of Aluminium in Kg/Km corresponding to nominal cross sectional area of conductor as mentioned in the G.T.P.

5.0 INSULATION:

Insulation shall be **Cross-Linked Polyethylene (XLPE)** conforming to the requirements given in Table-I of IS:7098(Pt.- I)/1988 with latest amendments.

6.0 FILLERS:

The fillers shall be of vulcanized rubber, un-vulcanized rubber, Thermoplastic material or textile material and shall be provided to fill the gaps between cores.

The filler materials shall be so chosen so as to be compatible with temperature of the cable and shall have no deleterious effect on other components of the cable. These shall not be harder than XLPE and PVC used for insulation and outer sheath respectively.

The Central hole/void, if any, of the cables shall be invariably filled with suitable filler materials so that there is no gap in the center.

7.0 ARMOURING:

Armourings shall be galvanized round steel wires/Strip.

7. OUTERSHEATH:

The outersheath shall consist of type ST-2 PVC Compound conforming to the requirements of IS:5831/1984.

Construction of the conductor shall be solid for **2Cx4Sq.mm**

4Cx6Sq.mm &

whereas the conductor shall be stranded for size **4CX10Sq.mm** as per Clause No.8.1 of IS:7098 (Pt.-I)/1988 & relevant clause of IS:8130/1984.

A protective barrier may be applied between the conductor and insulation. Such barriers when used, shall be compatible with insulating material and suitable for the operating temperature of the cable.

8. INSULATION:

The conductor (with protective barrier, wherever applied) shall be provided with Cross-Linked Polyethylene (XLPE) insulation applied by extrusion. The insulation shall be so applied that it fits closely on the conductor and it shall be possible to remove it without damage to the conductor. The thickness and tolerance on thickness of insulation shall be as per Clause No.9.2 of IS:7098 (Pt.-I)/1988.

9. CORE IDENTIFICATION:

The core shall be identified by different colouring of XLPE insulation as per Clause No.10.1 of IS:7098 (Pt.-I)/1988.

10. LAYING UP OF CORES:

The cores shall be laid up together with the suitable righthand lay. The interstices shall be filled with non-hygroscopic material.

11. INNERSHEATH (COMMON COVERING):

The laid up cores shall be provided with an innersheath applied either by extrusion or by wrapping. **However, application of innersheath by EXTRUSION shall be preferred.** It shall be ensured that it is as circular as possible. The thickness of innersheath shall be as given in Table-5 of IS:7098 (Pt.-I)/1988.

The innersheath shall be so applied that it fits closely on the laid up cores and it shall be possible to remove it without damage to the insulation.

12 ARMOURING:

Application:-

Armouring shall be applied over the innersheath. The armour Wire/Strip shall be applied as closely as possible.

The direction of lay of armour shall be lefthand. A Binder Tape may be provided on the armour.

Type of Armour & Dimension:-

The armour shall consist of **galvanized round steel wires for cables size 2Cx4Sq.mm, 4Cx6Sq.mm. & 4Cx10Sq.mm.** whereas it shall consist of **galvanized steel strip for remaining sizes** with the dimensions as specified in Table-6 of IS:7098(Pt-1)/1988.

Joints:- The joints in the armour Wire/Strip shall be made by brazing or welding and the surface irregularities shall be removed. A joint in any strip shall be at least 300mm. from the nearest joint in any other armour strip in the completed cable.

13 OUTERSHEATH:

The outersheath shall be applied by extrusion over armoring.

The colour of the outersheath shall be black.

The minimum thickness of PVC outersheath shall not fall below the nominal thickness (ts) specified in Table-8 of IS:7098(pt.1)/1988.

14. TESTS AND TEST CERTIFICATES:

The cables should meet the requirement of all tests including optional tests as specified at Clause No. 15.4 of IS:7098(Pt.1)/1988.

The following shall constitute Routine Test:

6.1.1 Conductor resistance test.

6.1.2 High Voltage test.

The following shall constitute Acceptance Tests:

- i) Tensile test (for Aluminium).
- ii) Wrapping test (for Aluminium).
- iii) Conductor resistance test.
- iv) Test for thickness of Insulation & Sheath.
- v) Hot Set Test for Insulation.
- vi) Tensile strength & elongation at break of insulation & sheath.
- vii) Insulation resistance (Volume Resistivity) test.
- viii) High Voltage test.
- ix) Test for Armour:
 - a) Verification of Dimension of Wire/Strip.
 - b) Tensile Strength & elongation at break.
 - c) Uniformity of Zinc Coating.
 - d) Weight of Zinc Coating.
 - e) Winding Test on Armour.
 - f) Resistivity Test on Armour.

The following shall constitute Optional Tests:

- i) Cold Bend Test for outer sheath.
- ii) Cold Impact Test for outer sheath.

The following shall constitute Type Tests:

a) Tests of Conductor:

- i) Tensile test (for aluminium)
- ii) Wrapping test (for aluminium)
- iii) Conductor resistance test.

b) Test for Armouring Wire/Strip.

c) Tests for thickness of insulation and sheath.

d) Physical tests for insulation:

- i) Tensile strength and elongation at break.
- ii) Ageing in air oven.
- iii) Hot Set test.
- iv) Shrinkage Test
- v) Water Absorption (Gravimetric).

e) Physical tests for Outer Sheath:

- i) Tensile strength and elongation at break.
- ii) Ageing in air oven.
- iii) Loss of mass in air oven.
- iv) Shrinkage Test.
- v) Hot Deformation Test.
- vi) Heat Shock Test.
- vii) Thermal Stability.
- f) Insulation resistance (Volume Resistivity test)
- g) High voltage test.
- h) Flammability test.
- i) Any other test as per relevant ISS.

TYPETESTS: The material offered, shall be fully type tested as per relevant standard of specification of IS:7098 (Part. 1/1988) amended up to date. The bidder must furnish type test reports of similar rating & design of material

The bidder must also clearly indicate various testing facilities available at their works for testing the material as per relevant standards. In case of otherwise particular of the place where such testing is proposed to be conducted during the course of inspection shall be indicated with the offer. However, the purchaser reserves the right to demand repetition of same or all the type tests in presence of purchaser's representative.

The bidding firms (manufacturers) must have a valid ISI license for the offered cable. The bidder shall furnish the details of ISI License granted to them.

15. INSPECTION (TEST BEFORE DISPATCH):

The inspection may be carried out by the purchaser at any stage of manufacturer. Acceptance of any equipment/material under this specification by the purchaser shall not relieve the supplier of his obligation of furnishing equipment in accordance with the specification and shall not prevent subsequent rejection if the equipment/material is found to be defective.

The suppliers shall keep the purchaser informed in advance about the manufacturing program so that an arrangement can be made for inspection.

The acceptance tests as per IS: 7098 (Pt. I)/1988 shall also be conducted by the manufacturer before dispatch in the presence of a Representative/Inspecting Officer along with verification of lengths & weight and checking the manufacturing defects, if any, of sample coils. The mass of Aluminium, XLPE, PVC & Filler in sample coils shall also be verified by the Inspecting Officer(s).

Cold bend/cold impact test (IS: 5831/1984) shall constitute the optional tests and shall be conducted on first lot and any from other lot of the offered cables of each size as per Clause No. 15.4 of IS: 7098 (Pt. I)/1988.

- The purchaser reserves the right to insist on witnessing the acceptance/routine tests of the bought-out items.

The bidder shall furnish Packing list mentioning serial Nos. of Drums, length in each drum, gross weight of drum without lagging along with inspection offer duly signed by the authorized representative of the firm. The purchaser reserves the right to insist on witnessing the acceptance/routine tests of the bought-out item.

At least 5% of total numbers of drums subject to minimum of 2 in any lot put up for inspection shall be selected at random to ascertain the length/workmanship of cable by the following method:

“At the work of the manufacturer, the cables shall be transferred from one drum to another for checking any manufacturing defects in the cable drums selected for conducting acceptance tests, at the same time measuring its length with the help of the graduated pulley & cyclometer. The difference in the average length thus obtained from the declared length by the supplier in the packing list shall be applied to all the drums if the cable is found short during checking the sample lot(s)”.

The suppliers shall present the latest Calibration Certificate(s) of testing instruments/equipment to be used for the testing of the material covered in the Purchase Order to the authorized inspecting officer/inspecting agency of the purchaser. The testing instruments/meters/apparatus etc. should be got calibrated by the supplier from time to time from

Govt. Laboratory or any independent test laboratory/house having valid accreditation from National Accreditation Board for Testing and Calibrating Laboratories for the testing equipments/original manufacturer having traceability to NABL/NPL or equivalent.

The calibration certificate(s) should not in any case be older than one year at the time of presenting the same to the inspecting officer/inspecting agency of the purchaser. The testing instruments/equipment should be duly sealed by the Calibrating Agency and mention thereof shall be indicated in the calibration certificate(s).

16. TEST CHECKING OF MATERIAL:

- i) Sample drums from the material received in

Nigam shall be selected for testing at CTL as per sampling plan given hereunder in presence of firm's representative.

- ii) The selected sample drum for CTL testing shall be identified by the seals provided by Inspecting Officer/Inspecting Agency during pre-dispatch inspection at firm's works and these sealing details shall be invariably mentioned in the selection Memo by the nominated officers of Nigam.
- iii) The tests in the Nigam Testing laboratory (CTL) shall be conducted in the presence of representative of supplier for which a 7 days notice shall be issued through Fax/Speed Post stating Date & Time to the firm, so that supplier can deput their representative to witness the test. In case the supplier or his representative does not turn up the testing shall be proceeded & completed. The payments shall be released only after receipt of successful test reports for the sample selected at purchaser's stores for mandatory test checking on the sample to be selected from material received at Nigam's stores by officer to be nominated by Circle SE's/SE(I&S) for testing at CTL.

17. SAMPLING:

One number Drum out of each lot/sub-lot of 25 Nos. Drums or part thereof for the material received in Nigam.

i) TESTS: The following tests shall be carried out as per relevant clause of latest IS on each selected drum by drawing sample of 10 Mtr. at CTL from random distance during re-winding:

- a) Rewinding test (Measurement of Length) & Checking of Manufacturing defects.
- b) Measurement of Resistance of conductor.
- c) Tensile strength & Elongation at Break Test for Insulation & Sheath
- d) Test for Thickness of Insulation & Sheath
- e) Hot Set Test
- f) Test for Armour:
 - i) Verification of Dimension of Wire/Strip.
 - ii) Tensile Strength & elongation at break.
 - iii) Uniformity of Zinc Coating.
 - iv) Weight of Zinc Coating.
 - v) Winding Test on Armour.
 - vi) Resistivity Test on Armour.
- g) Verification of Marking

In addition to above tests remaining acceptance tests as per relevant IS shall also be conducted at CTL provided the testing facility is available at CTL for these tests till the time. Only those tests shall be conducted for which testing facilities are available in NIGAM's Lab.

ii) CRITERIA FOR ACCEPTANCE:

- h) If the measured conductor resistance of the sample(s) exceeds beyond 2% as per the resistance specified in the contract, the material shall be rejected and the same shall have been replaced by the supplier.

- i) If the measured conductor resistance of the sample(s) exceeds the values specified in the contract but does not exceed by more than 2% of the resistance values specified in the contract, the material pertaining to the relevant lot/ sub-lot shall be accepted with a deduction @ 1.5% of the cost of cable for increase in resistance for every 1% or part thereof.
- j) If the sample(s) fails in any other test, the material contained in the pertinent lot/sub-lot shall be rejected and shall have to be replaced by the supplier.
- k) If the contractor/supplier fails to lift the material declared rejected or any part thereof from the consignee within a period of 15 days from the date of dispatch of information from the purchaser, the purchaser shall be entitled to effect recovery along with other actions as per Clause No. 1.62 of Section-II (General Condition of Contract).
- l) The results of measurement of length test shall be made applicable to all drums contained in each lot/sublot by making deduction of less length of cable in a Sample Drum.

18. TEST CHARGES:

All test charges incurred towards test checking of the material received in our stores shall be borne by the NIGAM.

19. IDENTIFICATION:

- i) The manufacturers shall be identified through-out the length of cable as per Clause No. 17.1 of IS:7098(Pt-I)/1988.

In order to distinguish these electric cables from telephone cables the word 'ELECTRIC' shall be indicated, printed or embossed throughout the length of the cable on outer sheath.

The cable codes shall be used as per Clause No. 17.3 of IS:7098(Pt-I)/1988.

The cables shall also be required to be embossed with the word 'Name of Manufacturer or trade name, Cable code, Voltage Grade, NAME OF DISCOM/TW/TNTW/DDUGJY/size of cable & year of manufacture' at every meter length for which no extra charges shall be paid. **The cables should be ISI marked & same should be embossed on the outer sheath of every meter of length of cable.**

20. MARKING:

The progressive length of cables shall be marked on the outer sheath of every meter length of cable.

21. PACKING AND MARKING:

The cables shall be wound on non-returnable wood drums conforming to IS:10418/1982 of suitable size and packed. The ends of the cables shall be sealed by means of non-hygroscopic sealing material. Only one cable length shall be supplied on a drum. The shaft diameter of the drum shall be as per relevant ISS but not less than 50mm. The cable can also be supplied on M-Steel Drums as per relevant ISS as applicable.

drum:

The cables shall carry the following information stenciled/painted on the

- i) **Manufactuer'sname,Brandnameortrademark.**
- ii) **Typeofcableandvoltagegrade.**
- iii) **NumberofCores.**
- iv) **NominalCross-sectionalareaoftheconductor.**
- v) **CableCode.**
- vi) **Lengthofcableonthedrum.**
- vii) **Approximategrossweight.**
- viii) **Yearofmanufacture.**
- ix) **BISCertificationmark.**
- x) **NameoftheConsigneeandfulldestination.**
- xi) **DDUGJY/ TW/TNTW no.**
- xii) **ThewordSUITABLEFOROUTDOORUSE
&LOWTEMPERATURECONDITIONS.**

16. STANDARDLENGTH:

Thecablesshallbesuppliedinthestandardlengthof1000Metersforsize4Cx10Sq.mm, 4Cx6Sq.mm&2CX4Sq.mm.

22.1 Atolerance(+/-)5%shallbeallowedin standardlength

22.2Onlyone cablelength shallbeacceptableby non-standard length
measuringnotlessthan50%
ofstandardlengthto completetheorderedquantityineachsize.

TECHNICAL SPECIFICATION FOR SUPPLY OF HOT DIP GALVANISED STEEL STAY WIRE 7/8 SWG

1. SCOPE

This specification covers, manufacture, design, inspection ,testing before dispatch of hot dip heavily galvanized stranded steel stay wire(7/8 SWG) , complete in all respect as per GTP/ISS

Hot dip galvanized steel stay wire of 550-900 N/mm

Quality confirming to IS-2141/2000 in all respect Including chemical composition (Heavily coatedHard quality) of dia 7/4 mm(7/8 SWG)

2.CLIMATIC CONDITIONS

XXI. Peak ambient temperature	50 Degree C
XXII. Maximum average ambient temperature	40 Degree C
XXIII. Maximum temperature attainable	60 Degree C
XXIV. Maximum relative humidity	100 %
XXV. Minimum relative humidity	50 %
XXVI. Average number of thunder storm days per annum	40
XXVII. Average number of rainy days per annum	100
XXVIII. Average annual rainfall	10-100 cm
XXIX. Maximum wind pressure	100 Kg/sq.m
XXX. Altitudes not exceeding	1000 mtrs

3. STANDARDS

The finished material shall comply in all respect with the requirement of the latest edition of the relevant ISS as mentioned below:-

- (i) The hot dip galvanized stranded steel stay wire (heavily coated) shall comply with the ISS:2141/2000, 4826/1979 and 6594/1977 with latest amendments thereof, if any in all respects, except herein otherwise stated, corresponding to grade-4 550-900 N/mm sq. minimum tensile strength quality. The galvanization coating of galvanized steel wire and technical supply conditions shall conform to IS:4826/1979 and IS:6594/1977 or latest amendment thereof if any.
- (ii) Goods meeting other authoritative standards which ensure an equal or higher quality than the standards mentioned above will also be accepted.

The galvanized stranded steel stay wire shall be capable of withstanding the normal handling necessary for transportation and erection.

4. WORKMANSHIP:

The wire shall be manufactured from steel made by any suitable process(es) as mentioned in IS:2141/2000 & 7887/1975 and shall not contain sulphur and phosphorus exceeding 0.060 percent each.

Each coil shall be warranted to contain the joints only as permitted under relevant IS:2141/2000.

The galvanized stranded steel stay wire shall be well and clearly drawn to the dimension specified. The wire shall be free from scale, irregularities, imperfections, flaws splits and other defects and shall be uniformly galvanized having smooth and even zinc coating. The requirement for chemical composition of the wires shall conform to the value as specified in IS/7887/1975 and IS:280/1978.

5. ISI CERTIFICATION

The supplier must hold the licence of ISI mark.

6. QUALITY ASSURANCE PLAN

The supplier shall invariably furnish the following information alongwith his offer, failing which his offer shall be liable for rejection.

- a) Statement giving list of important raw materials, names of sub-suppliers for the raw materials, list of standards according to which the raw materials are tested, list of tests normally carried out on raw materials in the presence of supplier's representative and copies of test certificate.
- b) Information and copies of test certificates as in (i) above in respect of bought out material.
- c) List of manufacturing facilities available.
- d) Level of automation achieved and list of areas where manual processing exists.
- e) List of areas in manufacturing process, where stage inspections are normally carried out for quality control and details of such test and inspection.

- f) List of testing equipments available with the supplier for final testing of G.S. stay wire and test plant limitation if any vis-à-vis the type, special acceptance and routine tests specified in the relevant standards. These limitations shall be very clearly brought out in schedule of deviation from specified test requirements.

7. INSPECTION, TESTING & CHECKING BEFORE DISPATCH:

All the tests and inspection shall be carried out at the works of manufacturer unless otherwise specifically agreed upon by the bidder and purchaser at the time of purchase. The bidder shall provide all reasonable facilities to the inspecting officer(s) without charges.

The inspection may be carried out by the purchaser at any stage of manufacture/before dispatch as per relevant standard. The purchaser has the right to have the tests carried out at his own cost by an independent agency whenever there is a dispute regarding the quality of supply.

Inspection and acceptance of any material under the specification by the purchaser, shall not relieve the bidder from his obligation of furnishing material in accordance with the specification and shall not prevent subsequent rejection if the material is found to be defective. The bidder shall keep the purchaser informed in advance, about manufacturing program so that arrangements can be made for inspection.

(A) TEST BEFORE DISPATCH: The stay wire shall be subject to the following tests as per ISS at manufacturer's works before dispatch,.

ROUTINE/ACCEPTANCE TEST:- The following tests on selected samples as per relevant standard shall be got conducted in presence of purchaser's representative.

- (i) Tensile and Elongation test
- (ii) Adhesion and wrap test
- (iii) Zinc uniformity and coating test
- (iv) Chemical analysis test
- (v) Dimension and weight checkup of sample coils.
- (vi) Lay ratio

(B) SAMPLING PLAN:

As per the provisions of IS:2141/2000.

(C) TOLERANCE ON TEST RESULTS

- vii) Weight of the coil – 40-60 Kg per coil.
- viii) Dia of wire $\pm 2.5\%$ of wire dia with a minimum of 0.025 mm
- ix) Lay length -12 to 18 times strand dia
- x) Tensile and elongation test –As prescribed in IS:2141/2000.
- xi) Zinc uniformity and coating test – As per IS:4826
- xii) Chemical composition test IS:7887

8. MARKING

Each coil of wire shall be legibly marked with the physical condition, size of wire, weight, date of manufacture trade mark or the name of manufacturer. The material which is inspected and cleared for dispatch shall be sealed with the Nigam's seal.

9. PACKING AND FORWARDING:

The galvanized steel stay wire shall be supplied in coils. Each coil of GSS wire shall have single continuous length and shall be suitably bound and fastened compactly and shall weigh 40 kgs to 60 kgs. The coils will be suitably protected by wrapping round by hessian cloth/polythene cover to avoid damage in transit and corrosion. Each coil shall be marked as mentioned above.

10. TYPE TEST / CHECKING OF MATERIAL AT STORES

The material received in the stores shall be subject to test checking at CTL of Nigam before final acceptance of the material. The procedure for the CTL test shall be as under :

SAMPLING

One sample out of each lot/sub-lot of 400 Nos coils or part thereof from each inspected lot received in stores shall be selected subject to maximum 7 samples for test checking of material and shall be got tested at the CTL of JDVVNL. The sample selection shall be done in the presence of supplier or his authorized representative for which advance notice shall be given to the supplier.

TESTS AT CTL

The following tests shall be carried out on the selected samples of G.S.Stay wire as per relevant standards:-

- (a) Uniformity of galvanization test
- (b) Tensile test
- (c) Dimensional check

For witness the test, advance notice to the supplier shall be given by CTL, stating date, time. In case the supplier do not attend for witnessing the testing, the testing shall be proceeded and completed and action shall be taken as per the contract.

The test reports shall be furnished to the purchaser, consignee and supplier.

11. CRITERIA FOR ACCEPTANCE OF ABOVE TEST

The inspected material should be strictly in accordance to the relevant ISS / GTP of the specification, however, the material shall be accepted on the basis of test results found/observed during test at CTL as mentioned below.

- (a) For uniformity of galvanization test.
 - (i) The sample shall be first tested for (n-1) number of dips where n is specified No. of dips of one minute in the contract. If the sample does not

pass the uniformity of galvanization test for (n-1) dips, the material shall be rejected and the relevant lot/sub-lot to which the sample pertains shall have to be replaced by the supplier free of cost.

- (ii) If the material has passed the uniformity of galvanization test for (n-1) dips then it shall be tested for last one dip of one minutes to complete the test for 'n' dips. If the sample does not pass the uniformity of Galvanisation Test with 'n' then material pertaining to relevant lot/sub-lot shall be accepted with a deduction @ 5% of cost of material
- (iii) If the sample(s) have passed the Test with number of dips as specified in the contract (n) , then material pertaining to relevant lot/sub-lot shall be accepted.

b) Tensile test:-

If the material fails in tensile test the same shall stands rejected.

c) Dimensional check

If the material fails in dimensional check the same shall stands rejected.

TECHNICAL SPECIFICATION AND OTHER REQUIREMENTS

FOR HARDWARE FITTINGS FOR 11 KV,45 KN DISC INSULATORS TONGUE & CLEVIS TYPE & HARDWARE FITTINGS11 KV,45 KN DISC INSULATORS BALL & SOCKET TYPE

1.0 SCOPE :

- 1.01 This specification covers the design, manufacture, testing supply and delivery of hardware fittings suitable for 11 KV disc insulators tongue & clevis type & Ball & Socket Type for use on various 11 KV /33KV sub transmissionlines. These fittings are to be designed as per drawing attached at Appendix-I (A) & I(C) { for T&C type } and I (B) & I(C) {For B&S type}
- 1.02 The technical specifications, contained herein,are for the guidance of the bidders

2.00 STANDARD :

Hardware fittings for 11 KV disc insulators T&C & B&S type should conform to ISS:2486 (Part.I/1993), 2486 (Part.II) 1989, ISS:2486Part.III/1974 and ISS:2486(Part.IV), 1981.

3.00 GENERAL REQUIREMENT :

- i) All forgings and castings shall be of good finish and free from flaws and other defects. The edges on the outside of fittings, such as at the eye clevis and holes, shall be rounded.

- ii) All parts of different fittings which provide for inter connection shall be made such that sufficient clearance is provided at connection point to ensure free movement. All eye and clevis connections shall be free in this manner but care shall be taken that too much clearance between eye and tongues of the clevis is avoided.
- (iii) All ferrous fittings and the parts other than those of stainless steel, shall be hot dipped galvanized. Small fittings like spring washers, nuts etc. may be electroplated with zinc conforming to IS:1573:1970 Grade-4.
- (iv) **MATERIAL :** The material of the fittings shall be so selected that yield strength of the material shall not be less than maximum working load.

All fittings except strain clamp shall be made of drop forged or upset forged steel (IS-2004/1978) and shall be hot dipped galvanised.

The strain clamp for aluminium AAC and ACSR Conductor shall be high strength Aluminium alloy (IS 6051/1970). The composition of the alloy shall be declared by the manufacturer giving reference to the relevant Indian Standard.

The cotter pins shall be provided with mild steel flat washers in addition to split pins. The split pin to be used on the cotter pin shall be of phosphor-bronze conforming to IS-7814/1975, stainless steel conforming to IS-5522/1992, or brass conforming to IS-410/1977 with a minimum hardness of 160 HV.

MATERIAL FOR :

S. No.	Description	Particulars
a)	Dead end straps.	Galvanised M.S.Twisted
b)	Strain bolts & nuts with spring washer	Galvanised M.S.
c)	Cotter pin.	Phosphorbronze/Brass/ stainless steel.
d)	Special envelope for bolted type clamp	Al.Alloy.
e)	Socket eye	Forged steel
f)	Ball eye	Forged Steel.
g)	Clevis ended strain clamp.	Aluminium alloy

- (v) Weight of T&C & B&S type hardware fittings set shall be indicated in GTP as per details below :-

S. No.	Description	"T&C"	"B&S"
i)	Net weight per set in kg	1.250	3.350
ii)	Net weight of steel parts in Kg.	1.050	2.675
iii)	Net weight of Aluminium part per set in Kg.	0.200	0.675

3.01 TOUNGE AND CLEVIS TYPE HARDWARE:

Each T&C type hardware fitting set shall be complete in every respect and shall comprise of the following:

S. No.	Description	Particulars
i)	Dead end straps.(As per drawing attached)	One set.
ii)	Strain bolt with hexgonal nuts.	One No.
iii)	Spring washer	One No
iv)	Flat washter	One No.
v)	Cotter pin.	One No.
vi)	Split pin	One No
vii)	Clevis ended aluminium alloy clamps suitable for ACSR conductor 7/2.11 MM, 7/2.59 MM and 7/3.35 MM. The ultimate strength of clamps shall not be less than 3000 Kgs (As per drawing attached)	One No.

The T&C type fittings shall conform in all respect to drawing attached with the specification.(Appendix-I A&C)

3.02 CLEVIS AND TONGUE CONNECTION :

The dimension of the tongue and clevis type connection shall conform to Fig 25 of ISS 2486 (Part-2)/1989.

3.03 BALL AND SOCKET TYPE HARDWARES :

Each B&S type hardware fitting set shall be complete in every respect and shall comprise of the following :

S. No.	Description	Particulars
i)	Dead end straps.(As per drawing attached)	One set.
ii)	Strain bolt with hexgonal nuts.	One set.
iii)	Spring washer	One set.
iv)	Ball eye.	One set.
v)	Socket eye	One set.
vi)	Split pin	One set.
vii)	Flat washer	One set.
viii)	Cotter pin	One set.
ix)	Strain clamp of special envelops type made of aluminium alloy (Bolted type).	One set.
x)	Security clips (W.type) Split pin shall not be accepted.	One set.

The dead end straps or cross arms straps shall comprise of a pair of twisted straps, one strain bolt with one spring washer and hexagonal nut and split pin. The strap shall conformed to drawing attached.(Appendix-1C)

The material for the hardware fittings shall be such that it gives the required mechanical strength with specified dimensions. The aluminium alloy of the clamp shall conform to A-6 of IS:617 and shall be gravity diecast.

All nuts shall be made of material conforming to properly class 5 of IS:1367:1967 with regard to its mechanical properties. Cotter pins shall be made of forged steel conforming to Clause No. 2 of ISS:2004:1962,IS-2004:1978.

For galvanising, zinc conforming to grade Zn-98 of IS:209/1966,IS 209/1979 shall be used.

The B&S type fittings shall conform in all respect to drawing attached with the specification.(Appendix-I B&1C)

3.04 GALVANISING :

The uniformity of zinc coating of hot dipped galvanised parts shall conform to IS:2633:1972 with latest amendments thereof, if any.

3.05 MARKING :

The clamps (aluminum portion) of each H/W fittings shall be provided with the following marking:

- a) Name of manufacturer or trade mark.
- b) Year of manufacture.

The packages containing fittings may also be marked with the standard mark, if available.

3.06 PACKING :

For packing double bags, one HDP bag (inner) and one gunny bag (outer) or double gunny bag shall be employed. The packing shall be fit to withstand rough handling during transit and storage at destination. The heads and threaded portions of the fittings shall be properly protected against damage. The gross weight of the packing shall not normally exceed 50 Kg. Different fittings shall be packed in different bags and shall be completed with their minor accessories fitted in place. All nuts shall be hand tightened over the bolts and screwed upto the farthest point.

3.7 DRAWINGS :

The Hardware fitting shall conform in all respects to drawing at Appendix-I A & IC for T&C type and Appendix IB & IC for B&S type Disc Insulators.

The bidder shall submit detailed drawing showing design and dimensions. The type of material used for various parts shall be clearly specified on the drawing.

3.8 TYPE TESTS :

3.8.01 The bidder shall furnish valid and authenticated type test certificates from a Govt. approved / Govt. recognized / NABL Accredited laboratory / ILAC i.e. International Laboratory Accredited Laboratory (in case of foreign laboratory) of similar rating and design of tendered material/ equipment. Such type test certificates should not be older than 5 years as on the date of bid opening. For this purpose date of conducting type test will be considered.

The type test certificate by in house laboratory of tendering firm even if it is a Govt. approved / Govt. recognized / NABL accredited / ILAC accredited, shall not be accepted, in case of their own tender. This will not apply if tendering firm is Govt. company / public Sector undertaking.

3.8.02 The bidder should furnish documentary evidence in support of the laboratory whose type test have been furnished, that the said laboratory is a Govt. / a Govt. approved / a Govt. recognized / NABL accredited laboratory / ILAC accredited (in case of foreign laboratory).

3.8.03 The type test certificates shall be furnished either in original or copy duly attested by notary.

3.9 ROUTINE AND ACCEPTANCE TESTS :

The material shall be subjected to all routine and acceptance tests specified in the latest edition of relevant IS, before dispatch. Such tests shall be witnessed by the inspecting officer from the purchaser's side.

3.10 TESTING FACILITIES :

The bidder must indicate clearly about the various testing facilities for type tests as well as routine/sample tests as per relevant ISS in respect of hardwares are available at the bidders works. In case no testing facilities are available at the bidders works, particulars of the place where such testing is proposed to be conducted during the course of inspection must be indicated.

3.11 VERIFICATION OF DIMENSIONS :

The following tolerances are allowed on all dimensions to which special tolerances do not apply :

Dimensions	Tolerance
Upto and including 35 mm	(+/-) 0.7 mm
Over 35 mm	(+/-) 2%

3.12 TEST CHECKING OF MATERIAL AT STORES

3.12.1 The material received in the NIGAM shall be subjected to the test checking before final acceptance of the material, the procedure for the same shall be as under :

3.12.2 **SAMPLING**

One sample out of each sub-lot / lot consisting of following quantities or part there of of hardware fittings for disc insulators from each inspected lot received in stores shall be selected for test checking of material and shall be got tested.

H/W fittings for 11 KV 45 KN Disc Insulator B&S type- 1000 Sets

H/W fittings for 11 KV 45 KN Disc Insulator T&C type- 3000 Sets

The selection of sample from the material received at stores shall be done as soon as material is received in stores without the presence of the representative of the supplier. However, testing of sample(s) at CTL shall be carried out in the presence of representative of the supplier after identification / confirmation by him that sample so selected belongs to them. In case the supplier disputes that the selected samples does not pertain to them, then fresh sample shall be selected in the presence of the representative of the supplier and test(s) be carried out.

3.12.3 **TESTS**

The following tests shall be carried out on the above items :

- a) Visual Examination, Verification of Dimension, weight and marking Test
- b) Slip Strength Test.
- c) Ultimate Strength Test.
- d) Galvanisation (Uniformity) Test.

3.12.4 Testing of the material shall be got done at the test laboratory of the NIGAM i.e. at CTL in the presence of the representative of the supplier. For witnessing of testing, clear 7 days notice shall be given to the supplier by fax / speed post stating date, time & place where the test is to be conducted. In case the supplier do not attend for witnessing the testing, the testing shall be proceeded and completed and action be taken as per the contract.

3.12.5 The witnessing officers of the NIGAM or as designated by the purchaser shall send copies of test reports to the purchaser, consignees and the supplier.

3.12.6 Only those tests shall be conducted at CTL for which facility with CTL is available.

3.13. **CRITERIA FOR ACCEPTANCE**

3.13.1 Visual Examination, Verification of Dimension, weight and marking Test
As per specification/ ISS

3.13.2 Slip Strength test & Ultimate Strength Test :

In case of failure of sample in Slip Strength test or Ultimate Strength Test, the material contained in the lot / sub-lot to which the sample belongs, shall be rejected. The rejected material shall have to be replaced by the supplier free of cost.

3.14.3 Galvanisation (Uniformity) Test.

- i) The sample(s) shall be first tested for (n-2) number of dips where (n) is specified number of dips in the contract. If the sample(s) does not pass the uniformity of Galvanisation Test for (n-2) dips, the material shall be rejected and the material relating to relevant lot / sub-lot to which sample(s) pertains shall have to be replaced by the supplier free of cost.
- ii) If the sample has passed the uniformity of Galvanisation Test for (n-2) dips, then it shall be tested for (n-1) dips. If the sample has not passed the uniformity of Galvanisation Test with (n-1) dips, then material pertaining to relevant lot / sub-lot shall be accepted with a deduction @ 10% of cost of material.
- iii) If the sample has passed the uniformity of Galvanisation Test with (n-1) dips, then sample shall be tested for last one dip of one minute to complete the test for 'n' dips. If the sample does not pass the uniformity of Galvanisation Test with 'n' dips, then the material pertaining to relevant lot/ sub-lot shall be accepted with a deduction @ 5% of cost of material.
- iv) If the sample(s) have passed the Test with number of dips as specified in the contract (n), then material pertaining to relevant lot / sub-lot shall be accepted.

TECHNICAL SPECIFICATION OF REQUIREMENT FOR SUPPLY OF ISI MARKED VARIOUS SIZES OF FOUR CORE LT XLPE INSULATED AND PVC SHEATHED ARMoured CABLES.

1. SCOPE:

This section provides for manufacture, testing before dispatch and supply of **ISI Marked** various sizes of Four Core LT XLPE Insulated and PVC Sheathed Armoured Circular Cables with Aluminium Conductor suitable for working voltage up to & including 1100 Volts & Conforming to IS:7098(Pt.-I)/1988 with latest amendments. **The cables shall be ISI marked.**

2. STANDARDS:

Unless otherwise stipulated in this specification the following standards with latest amendments shall be applicable.

- i) IS:7098(Pt.-I)/1988 : XLPE Insulated cables for working voltages up to and including 1100 Volts.
- ii) IS:8130 : Conductors for insulated cables.
- iii) IS:5831 : PVC insulation and sheath of electric cables.
- iv) IS:10810 : Methods of test for cables.
- v) IS:3975/1979 : Galvanized Steel Wire/Strips.
- vi) IS:10418 : Drums for electric cables.

3. CLIMATIC CONDITIONS:

- i) Peak ambient temperature in shade 50 deg.C
- ii) Maximum average ambient temperature in a 24 hours period in shade. 40 deg.C
- iii) Min. ambient air temperature in shade (-)5 deg.C
- iv) Maximum temperature attainable by an object exposed to sun. 60 deg.C
- v) Maximum relative humidity. 100%
- vi) Average number of thunder storm days per annum. 40
- vii) Average number of rainy days per annum. 100
- viii) Average annual rainfall 10 to 100 cm
- ix) Number of months of tropical monsoon conditions. 4 months
- x) Maximum wind pressure. 100kg/sq.mm.
- xi) Altitude not exceeding 1000 M

4. GENERAL REQUIREMENT:

- 4.1 The LT XLPE Insulated Armoured cables shall conform to IS:7098 Pt.-I)/1988 with latest amendment and **bear BIS certification mark**. The material used for construction of the cables shall be of best qualities complying with the requirements of IS:7098(Pt.-I)/1988 and

other relevant standards. The cables shall be suitable for outdoor / indoor installation free in air and shall be capable of withstanding the normal stresses associated with transportation, erection, reeling and unreeling operations without getting deformed.

4.2 The cable shall be suitable for use where combination of ambient temperature temperature rise due to load results in a conductor temperature not exceeding 90 degree C under normal operation and 250 degree C under short circuit condition.

4.3 The LT XLPE Insulated Armoured Cable shall be **ISI marked**.

The firms having ISO: 9001 will be preferred.

5.0 MATERIAL:

5.1 CONDUCTOR:

conductor shall be composed of plain aluminium wires complying with IS:8130/1984 with latest amendments.

The bidder must guaranteed the minimum weight of Aluminium in Kg/Km corresponding to nominal cross sectional area of conductor as mentioned in the G.T.P.

5.2 INSULATION:

Insulation shall be **Cross-Linked Polyethylene (XLPE)** conforming to the requirements given in Table-I of IS: 7098(Pt.-I)/1988 with latest amendments.

5.3 FILLERS:

5.3.1. The filler shall be of vulcanized rubber, un-vulcanized rubber, Thermoplastic material or textile material and shall be provided to fill the gaps between cores.

5.3.2. The filler materials shall be so chosen so as to be compatible with temperature of the cable and shall have no deleterious effect on other components of the cable. These shall not be harder than XLPE and PVC used for insulation and outer sheath respectively.

5.3.3 The Central hole/void, if any, of the cable shall be invariably filled with suitable filler material so that there is no gap in the center.

5.4 ARMOURING :

Armouring shall be galvanized round steel Strip.

5.5 OUTER SHEATH:

outer sheath shall consist of type ST-2 PVC Compound conforming to the requirements of IS:5831/1984.

6. CONSTRUCTION:

6.1 CONDUCTOR:

construction of the **conductor shall be** as per Clause No.8.1 of IS:7098 (Pt.-I) /1988 & relevant clause of IS:8130/1984 for all sizes of cable.

A protective barrier may be applied between the conductor and insulation. Such barriers when used, shall be compatible with insulating material and suitable for the operating temperature of the cable.

6.2 INSULATION:

The conductor (with protective barrier, wherever applied) shall be provided with Cross-Linked Polyethylene (XLPE) insulation applied by extrusion. The insulation shall be so applied that it fits closely on the conductor and it shall be possible to remove it without damage to the conductor. The thickness and tolerance on thickness of insulation shall be as per Clause No.9.2 of IS:7098(Pt.-I)/1988.

6.3 CORE IDENTIFICATION:

The core shall be identified by different colouring of XLPE insulation as per Clause No.10.1 of IS:7098(Pt.-I)/ 1988.

6.4 LAYING UP OF CORES:

The cores shall be laid up together with the suitable right hand lay. The interstices shall be filled with non-hygroscopic material.

6.5 INNER SHEATH (COMMON COVERING):

6.5.1 The laid up cores shall be provided with an inner sheath applied either by extrusion or by wrapping. **However, application of inner sheath by EXTRUSION shall be preferred.** It shall be ensured that it is as circular as possible. The thickness of inner sheath shall be as given in Table-5 of IS:7098(Pt.-I)/1988.

6.5.2 The inner sheath shall be so applied that it fits closely on the laid up cores and it shall be possible to remove it without damage to the insulation.

6.6. ARMOURING :

6.6.1 Application:- Armouring shall be applied over the inner sheath. The armour Strip shall be applied as closely as possible with a coverage of not less than 90%.

6.6.2 The direction of lay of armour shall be left hand. A Binder Tape may be provided on the armour.

6.6.3 Type of Armour & Dimension :- The armour shall consist of galvanized strips for all sizes with the dimensions as specified in Table-6 of IS:7098(Pt.-I)/1988.

6.6.4 Joints:- The joints in the armour Strips shall be made by brazing or welding and the surface irregularities shall be removed. A joint in any strips shall be at least 300 mm. from the nearest joint in any other armour strip in the completed cable.

6.7 OUTER SHEATH:

6.7.1 The outer sheath shall be applied by extrusion over armouring.

6.7.2 The colour of the outer sheath shall be black.

6.7.3 The minimum thickness of PVC outer sheath shall not fall below the nominal thickness (t_s) specified in Table-8 of IS:7098(pt.1)/1988.

7. TESTS AND TEST CERTIFICATES:

7.1 The cables should meet the requirement of all tests including optional tests as specified at Clause No.15.4 of IS:7098(Pt.1)/1988.

The following shall constitute Routine Test:

- i) Conductor resistance test.
- ii) High Voltage test.

The following shall constitute Acceptance Tests:

- i) Tensile test (for Aluminium).
- ii) Wrapping test (for Aluminium).
- iii) Conductor resistance test.
- iv) Test for thickness of Insulation & Sheath.
- v) Hot Set Test for Insulation.
- vi) Tensile strength & elongation at break of insulation & sheath.
- vii) Insulation resistance (Volume Resistivity) test.
- viii) High Voltage test.
- ix) Test for Armour:
 - a) Verification of Dimension of Wire / Strip.
 - b) Tensile Strength & elongation at break.
 - c) Uniformity of Zinc Coating.
 - d) Weight of Zinc Coating.
 - e) Winding Test on Armour.
 - f) Resistivity Test on Armour.

The following shall constitute Optional Tests:

- i) Cold Bend Test for outer sheath.
- ii) Cold Impact Test for outer sheath.

The following shall constitute Type Tests:

- a) Tests of Conductor:
 - i) Tensile test (for aluminium)
 - ii) Wrapping test (for aluminium)
 - iii) Conductor resistance test.
- b) Test for Armouring Wire / Strip.

- c) Tests for thickness of insulation and sheath.
- d) Physical tests for insulation:
 - i) Tensile strength and elongation at break.
 - ii) Ageing in air oven.
 - iii) Hot Set test.
 - iv) Shrinkage Test
 - v) Water Absorption (Gravimetric).
- e) Physical tests for Outer Sheath:
 - i) Tensile strength and elongation at break.
 - ii) Ageing in air oven.
 - iii) Loss of mass in air oven.
 - iv) Shrinkage Test.
 - v) Hot Deformation Test.
 - vi) Heat Shock Test.
 - vii) Thermal Stability.
- f) Insulation resistance (Volume Resistivity test)
- g) High voltage test.
- h) Flammability test.
- i) Any other test as per relevant ISS.

7.2 TYPE TESTS :

7.2.1 The material offered, shall be fully type tested as per relevant standard of specification of IS:7098 (Part.1/1988) amended up to date. **The bidder must furnish type test reports of similar rating & design of material as detailed at scheduled -A**

7.2.2 The bidder must also clearly indicate various testing facilities available at their works for testing the material as per relevant standards. In case of otherwise particulars of the place where such testing is proposed to be conducted during the course of inspection shall be indicated with the offer.

7.2.3 However, the purchaser reserves the right to demand repetition of same or all the type tests in presence of purchaser's representative.

7.2.4 The bidding firms (manufacturers) must have valid ISI license for the offered cable. The bidder shall furnish the details of ISI License granted to them.

8. INSPECTION (TEST BEFORE DISPATCH):

8.1 The inspection may be carried out by the purchaser at any stage of manufacturer. Acceptance of any equipment / material under this specification by the purchaser shall not relieve the supplier of his obligation of furnishing equipment in accordance with the specification

and shall not prevent subsequent rejection if the equipment/material is found to be defective.

- 8.2 The supplier shall keep the purchaser informed in advance about the manufacturing program so that arrangement can be made for inspection.
- 8.3 The acceptance tests as per IS:7098(Pt.I)/1988 shall also be conducted by the manufacturer before dispatch in the presence of our Representative/Inspecting Officer along with verification of lengths & weight and checking the manufacturing defects, if any of samples coils. The mass of Aluminium, XLPE, PVC & Filler in sample coils shall also be verified by the Inspecting Officer(s).

Cold bend/ cold impact test (IS:5831/1984) shall constitute the optional tests and shall be conducted on first lot and any from other lot of the offered cables of each size as per Clause No.15.4 of IS:7098(Pt.I)/1988.

- 8.4 The purchaser reserves the right to insist or witnessing the acceptance/routine tests of the bought out items.
- 8.5 The bidder shall furnish Packing list mentioning serial Nos. of Drums, length in each drum, gross weight of drum without lagging alongwith inspection offer duly signed by the authorized representative of the firm.** The purchaser reserves the rights to insist for witnessing the acceptance / routine tests of the bought out items.

8.6 At least 5% of total numbers of drums subject to minimum of 2 in any lot put up for inspection shall be selected at random to ascertain the length/ workmanship of cable by the following method :

“At the works of the manufacturer, the cable shall be transferred from one drum to another for checking any manufacturing defects in the cable drums selected for conducting acceptance tests, at the same time measuring its length with the help of the graduated pulley & cyclometer. The difference in the average length thus obtained from the declared length by the supplier in the packing list shall be applied to all the drums if the cable is found short during checking the sample lot(s)”.

- 8.7 The supplier shall present the latest Calibration Certificate(s) of testing instruments / equipments to be used for the testing of the material covered in the Purchase Order to the authorized inspecting officer/ inspecting agency of the purchaser. The testing instruments/ meters/ apparatus etc. should be got calibrated by the supplier from time to time from Govt. Laboratory or any independent test laboratory/house having valid accreditation from National Accreditation Board for Testing and Calibrating Laboratories for the testing equipments / original manufacturer having trace ability to NABL/NPL or equivalent.

The calibration certificate(s) should not in any case be older than one year at the time of presenting the same to the inspecting officer/ inspecting agency of the purchaser. The testing instruments/ equipments should be duly sealed by the Calibrating Agency and mention thereof shall be indicated in the calibration certificate(s).

9. TEST CHECKING OF MATERIAL AT STORES:

- (i) **Sample drums from the material received at stores shall be selected for testing at CTL as per sampling plan given hereunder in presence of firm's representative. The selected sample drum / drums shall be transported to CTL by concern S.S / ACOS of Nigam.**
- (ii) **The selected sample drum for CTL testing shall be identified by the seals provided by Inspecting Officer / Inspecting Agency during pre-dispatch inspection at firms works and these sealing details shall be invariably mentioned in the selection Memo by the nominated officers of Nigam.**
- (iii) The tests in the Nigam Testing laboratory (CTL) shall be conducted in the presence of representative of supplier for which a 7 days notice shall be issued through Fax / Speed Post stating Date & Time to the firm, so that supplier can depute their representative to witness the test . In case the supplier or his representative does not turn up the testing shall be proceeded & completed. **The payment shall be released only after receipt of successful test reports** for the samples selected at purchaser's stores for mandatory test checking on the samples to be selected from material received at Nigam's stores by random sample selection by the authorized committee as per CE(MM) order No.180 dt.11.4.
- iv) SAMPLING:

One number Drum out of each lot / sub-lot of 25 Nos. Drums or part thereof for the material received in Stores of Nigam.

v) TESTS:

The following tests shall be carried out as per relevant clause of latest IS on each selected drum by drawing sample of 10 Mtr. at CTL from random distance during re-winding:

- a) Rewinding test (Measurement of Length) & Checking of Manufacturing defects.
- b) Measurement of Resistance of conductor.
- c) Tensile strength & Elongation at Break Test for Insulation & Sheath
- d) Test for Thickness of Insulation & Sheath
- e) Hot Set Test
- f) Test for Armour:
 - i) Verification of Dimension of Wire / Strip.
 - ii) Tensile Strength & elongation at break.
 - iii) Uniformity of Zinc Coating.
 - iv) Weight of Zinc Coating.
 - v) Winding Test on Armour.
 - vi) Resistivity Test on Armour.
 - vii) Verification of armouring coverage i.e. not less than 90%
- g) Verification of Marking

In addition to above tests remaining acceptance tests as per relevant IS shall also be conducted at CTL provided the testing facility is available at CTL for these tests time to time. Only those tests shall be conducted for which testing facilities are available in NIGAM's Lab.

vi) **CRITERIA FOR ACCEPTANCE:**

- a) If the measured conductor resistance of the sample(s) exceeds beyond 2% as per the resistance specified in the contract, the material shall be rejected and the same shall have be replaced by the supplier.
- b) If the measured conductor resistance of the sample(s) exceeds the value specified in the contract but does not exceed by more than 2% of the resistance value specified in the contract, the material pertaining to the relevant lot / sub-lot to shall be accepted with a deduction @ 1.5% of the cost of cable for increase in resistance for every 1% or part thereof.
- c) If the sample(s) fails in any other test, the material contained in the pertinent lot/sub-lot shall be rejected and shall have to be replaced by the supplier.
- d) If the contractor / supplier fails to lift the material declared rejected or any part thereof from the consignee within a period of 15 days from the date of dispatch of information from the purchaser, the purchaser shall be entitled to effect recovery along with other actions**
- e) The results of measurement of length test shall be made applicable to all drums contained in each lot / sub lot by making deduction of less length of cable in a Sample Drum.**

10. **TEST CHARGES :**

All test charges incurred towards test checking of the material received in our stores shall be borne by the NIGAM.

11. **IDENTIFICATION:**

11.1 The manufacturer shall be identified through-out the length of cable as per Clause No.17.1 of IS:7098(Pt-I)/ 1988.

11.2 In order to distinguish these electric cables from telephone cables the word 'ELECTRIC' shall be indicated, printed or embossed throughout the length of the cable on outer sheath.

11.3 The cable code shall be used as per Clause No.17.3 of IS:7098(Pt-I)/1988.

11.4 The cable shall also be required to be embossed with the word ' Name of Manufacturer or trade name, Cable code, Voltage Grade, NAME OF DISCOM / TNTW, size of cable & year of manufacture' at every meter length for which no extra charges shall be paid. **The cable should be ISI**

marked & same should be embossed on the outer sheath of every meter of length of cable.

12. MARKING:

The progressive length of cable shall be marked on the outer sheath of every meter length of cable.

13 PACKING AND MARKING:

13.1 The cables shall be wound on non-returnable wooden drums conforming to IS:10418/1982 of suitable size and packed. The ends of the cable shall be sealed by means of non-hygroscopic sealing material. Only one cable length shall be supplied on a drum. The shaft diameter of Drum shall be as per relevant ISS but not less than 50 mm. The cable can also be supplied on M-Steel Drums as per relevant ISS as applicable.

13.2 The cable shall carry the following information stenciled / painted on the drum :

- i) Manufacturer's name, Brand name or trade mark.
- ii) Type of cable and voltage grade.
- iii) Number of Cores.
- iv) Nominal Cross-sectional area of the conductor.
- v) Cable Code.
- vi) Length of cable on the drum.
- vii) Approximate gross weight.
- viii) Year of manufacture.
- ix) BIS Certification mark.
- x) Name of the Consignee and full destination.
- xi) Bid number/Purchase Order No.
- xii) The word SUITABLE FOR OUTDOOR USE & LOW TEMPERATURE CONDITIONS.

14 STANDARD LENGTH:

14.1 The cables shall be supplied in the standard length of **250 Meters** for size 4CX400 Sqmm , 4CX300 Sq.mm and 4CX185 Sqmm & **500 Meters** for 4Cx120 Sq. mm, 4CX95 Sqmm and 4CX70 Sqmm.

14.2 A tolerance (+/-) 5% shall be allowed in standard length.

14.3 Only one cable length shall be acceptable by non-standard length measuring not less than 50% of standard length to complete the ordered quantity in each size.

15 QUANTITY:

- a) The quantities as mentioned in the schedule of requirement are tentative & these may increase/decrease as per the requirement of the Nigam **(Schedule-I)**.
- b) Details of offered quantity alongwith justification with reference to Qualifying Requirement shall be furnished in **Schedule-IV A**.

16 QUANTITY TOLERANCE:

quantity tolerance of (+/-) 2% shall be allowed in each size for completion of supply.

17 GUARANTEED TECHNICAL PARTICULARS:

The bidder shall furnish guaranteed technical particulars in the relevant **Schedule VA & VB**.

18 DRAWINGS & DOCUMENTATIONS:

The bidder is required to furnish the detailed constructional drawings of clearly showing shape of Core, Type, Size of Fillers / Interstices along with Center Filler etc. The calculations of weight of different components of the cable shall also be furnished. In absence of this, the bids are likely to be ignored. The drawings of drums shall also be furnished as per relevant applicable ISS.

Schedule-A

TYPE TEST CRITERIA:-

- 3.01 The bidder shall furnish valid and authenticated type test certificate from a Govt. approved / Govt. Recognized / NABL Accrediated laboratory / ILAC i.e. International laboratory Accrediation Corporation (In case of foreign laboratory) / of **similar rating and design** of tendered material / equipment. **The bid of the bidder be also considered for meeting the Type Test criterion if the bidder have the requisite Type Test conducted successfully on the samples selected from the 1st lot supplied to JDVVNL against previous tenders and furnish certified copy of such Type Test Reports with the Bid.** Such type test certificate should not be older than five years as on the date of bid opening For this purpose date of conducting type test will be considered.

The type test certificate by in house laboratory of tendering firm even if it is a Govt. approved / Govt. recognized / NABL accredited / ILAC accredited, shall not be accepted, in case of their own tender. This will not apply if tendering firm is Govt. company / public Sector undertaking.

3.02 The bidder should furnish documentary evidence in support of the laboratory whose type test have been furnished, that the said laboratory is a Govt. / a Govt. approved / a Govt. recognized / NABL accredited laboratory / ILAC accredited (in case of foreign laboratory).

3.03 The type test certificates shall be furnished either in original or copy duly attested by notary.

Schedule-VA

GUARANTEED TECHNICAL AND OTHER PARTICULARS FOR THE SUPPLY OF 4 CORE LT XLPE ARMoured CABLES

S. NO.	PARTICULARS	UNIT	4 CORE XLPE ARMoured CABLES IN SQ.MM					
			4CX400	4CX300	4CX185	4CX120	4CX95	4CX70
1	Manufacturer's name and works address							
2	Standard specification to which the material shall conform.		IS:7098(Part-I):1988 with latest amendment					

3	VOLTAGE GRADE	1100V					
4	NO. OF CORES	(4C)				(4C)	
5	CONDUCTOR DETAILS :						
	a) Nominal cross section area of :						
	I) Phase Conductor(sq.mm)	400300	185	120	9570		
	ii) Neutral Conductor (Sq.mm.)	400300	185	120	95	70	
	b) No.and size of strands(in mm) of :						
	I) Phase Conductor(sq.mm)	As per IS-8130/1984 with latest amendments					
	ii) Neutral Conductor (Sq.mm.)	As per IS-8130/1984 with latest amendments					
	c) SHAPE OF CONDUCTOR	To be furnished by the bidder					
	d) Whether compacted or non compacted	To be furnished by the bidder					
	e) Resistance						
	I) Phase Conductor(sq.mm)	0.0778	0.100	0.164	0.253	0.320	0.443
	ii) Neutral Conductor (Sq.mm.)	0.0778	0.100	0.164	0.253	0.320	0.443
6	INSULATION						
	I) Type	XLPE As per IS:7098(Part-I):1988 with latest amendment					
	ii) Colour	R,Y,B & neutral Black					
	iii) Thickness						
	A) Phase Conductor(sq.mm)	As per Table - 3 of IS-7098 (Part-I):1988 with latest amendments					
	a) Nominal (mm)						
	b) Minimum (mm)						
	B) Neutral Conductor (Sq.mm.)	As per Table - 3 of IS-7098 (Part-I):1988 with latest amendments					
	a) Nominal (mm)						
	b) Minimum (mm)						
7	Inner Sheath:						
	a) Material & Colour	To be furnished by bidder					
	b) Process of Application	To be furnished by bidder					
	c) Minimum thickness of inner sheath	As per Table - 5 of IS-7098 (Part-I):1988 with latest amendments					
8	Whether Binder Tape provided	As per IS:7098(Part-I):1988 with latest ammendment					

9	Armouring		As per IS:7098(Part-I):1988 with latest ammendment					
	l) Material							
	ii) Nominal Dimension of Armour							
	iii)Whether galvanised or not							
	iv) Total number of Armour strips							
10	Outer Sheath							
	l) Material		Extruded PVC ST-2 type as IS 5831:1984 with latest ammendment					
	ii) Thickness		As per Table - 8 of IS-7098 (Part-I):1988 with latest ammendments					
	a) Nominal (mm)							
	b) Minimum (mm)							
	iii) Standrad to which it conform		As per IS:7098(Part-I):1988 with latest ammendment					
11	a) Type and size of filler used		As per IS:7098(Part-I):1988 with latest ammendment					
	b) MIN. WT.OF FILLER IN KG./KM.		To be furnished by bidder					
12	MAX.OVERALL DIAMETER OF THE CABLE IN MM.		To be furnished by bidder					
13	Nature of Packing		Wooden drum					
14	TARE WEIGHT OF DRUM		To be furnished by bidder					
15	a) Minimum weight of Aluminium in Kg./Km. corresponding to nominal cross sectional area of conductor.(guaranteed)		4325	3244	2000	1297	1027	757
	b) Total weight armouring Kg/ Km.		To be furnished by bidder					
	c) Total weight of PVC contents Kg/ Km. (Inner / Outer Sheath / Filler)		To be furnished by bidder					
	d) Total weight of XLPE in Kg./Km.(Min.)		To be furnished by bidder					
	e) Total weight of finished cable Kg/Km.		To be furnished by bidder					
16	i)Standard length of cable	Metre	250 m	250m	250m	500m	500 m	500m
	ii)Tolerance.On Standard length		(±)5%					
17	Whether material bears BIS certification		YES , ISI MARKING embossed on outer sheath					

	mark		
18	BIS licence no. & validity		To be furnished by bidder
19	Embossing		As per specification of TNTW:
20	Any other particulars		

Schedule-VA

**GUARANTEED TECHNICAL AND OTHER PARTICULARS OF DRUM FOR SUPPLY OF
FOUR CORE LT XLPE INSULATED ARMOURED CABLES**

S. No.	PARTICULARS	4 CORE XLPE ARMOURED CABLES IN SQ.MM					
		4CX400	4CX300	4CX185	4CX120	4CX95	4CX70
A	Drum Size	AS PER IS:10418/1982 WITH LATEST AMENDMENTS					
B	Flange Diameter (d1) (mm)						
C	Barrel Diameter (d2) (mm)						
D	Centre hole Diameter (d3) (mm)						

E	Overall width (L1) (mm)
F	Traverse (L2) (mm)
G	Thickness of Flange
H	Barrel End (supporting disc or core segment)
a)	Diameter (mm)
b)	Thickness (mm)
I	Stretchers(Core Carrier Planks)
a)	Number (Min)
b)	Thickness x width (mm)
J	Barrel Battens thickness (Core Filler Planks)
K	Barrel Middle Supports (Middle Core discs)
L	Thickness of External Laggings. (mm)
DETAILS OF METAL COMPONENTS:	
M	Clamping Studs with Hexagonal Nuts
a)	Numbers
b)	Diameter (mm)
N	Square or Round Washers
a)	Numbers
b)	Diameter (mm)
O	M.S. Bushes

a)	Numbers
b)	Thickness of Sleeve (mm)
c)	Dimension of Sleeve (mm)
d)	Number of Bolts
e)	Diameter of Bolts
P	M.S./ C.I. Centre Plate
a)	Numbers
b)	Dimensions of Square/ Triangular equal sides (mm)
c)	Centre Plate Bolts.
Q	Numbers
i)	Diameter of bolts (mm)
ii)	Centre Hole Diameter (mm)

TECHNICAL SPECIFICATION FOR NFC TYPE ANCHOR (DEAD END) & SUSPENSION ASSEMBLIES FOR LT AERIAL BUNCHED XLPE INSULATED ALUMINIUM CONDUCTOR CABLES WITH BARE MESSENGER WIRE AS WELL AS INSULATED MESSENGER WIRE FOR OVER HEAD LINES SUITABLE FOR WORKING VOLTAGE UPTO AND INCLUDING 1100 VOLTS

1.0 SCOPE

1.1 This specification covers manufacture, testing before dispatch, supply and delivery F.O.R. Destination of anchor (dead end) & suspension assemblies suitable for LT Aerial Bunched XLPE Insulated Aluminum Conductor Cables with bare messenger as well as Insulated Messenger Wire for LT Overhead lines suitable for working voltage up to & including 1100 Volts.

2.0 REFERENCE STANDARDS:

The design, performance and test requirements shall conform to this specification and the following standards. However in case of any conflict, the requirements of this specification shall prevail.

S.No.	Standard	Details
1	NFC 33-040	Suspension Equipments
2	NFC 33-041	Anchoring Devices
3	NFC 33-003	Corrosion resistance
4	NFC 20-540	Climatic Ageing
5	IS 14255	LV Aerial Bunched Cables
6	IS 8130	Conductors for Insulated cables
7	IS 7098 Part 1	XLPE Insulated Cables for working voltages upto 3.3 KV
8	IS 398 Part IV	aluminum alloy conductors
9	ASTM A 480	Stainless Steel
10	REC 32/1984	REC Specification for Aerial Bunched cable for L T Line

The Devices shall also be compatible with the cables of sizes & dimensions as defined in the Cable Specifications for the cables with which they are intended to be used, and this specification.

3.0 CLIMATIC CONDITIONS:

S.No.	Particulars	Details
1	Peak ambient temperature in shade	50 deg.C
2	Maximum average ambient temperature in a 24 hours period in shade	50 deg.C
3	Min. ambient air temperature in shade	(-) 5 deg. C
4	Maximum temperature attainable by an object exposed to sun.	60 deg.C
5	Maximum relative humidity.	90%
6	Average number of thunder storm days per annum.	40
7	Average number of rainy days per annum.	100

S.No.	Particulars	Details
8	Average annual rain fall	10 to 100 cm
9	Number of months of tropical monsoon conditions.	4 months
10	Maximum wind pressure	100kg/mtr sq
11	Altitude not exceeding	1000 m

4.0 CABLE DATA

The standard sizes and characteristics of the phase and street lighting conductors, messenger wires shall be as specified in IS: 14255-1995.

S. No.	Description of Aerial Bunched Cable (Insulated or Bare Neutral Messenger)
1	3Cx25 (Phase) + 1x25 (Insulated or Bare neutral Messenger) + 1x16 mm ² (Street Lighting Cable)
2	3Cx35(Phase) + 1x25 (Insulated or Bare neutral Messenger) + 1x16 mm ² (Street Lighting Cable)
3	3Cx50 (Phase) + 1x35 (Insulated or Bare neutral Messenger) + 1x16 mm ² (Street Lighting Cable)
4	1Cx25 (Phase) + 1x25 (Insulated or Bare neutral Messenger) + 1x16 mm ² (Street Lighting Cable)

Table-1

5.0 THE ABC ACCESSORIES

The Accessories of LT XLPE Insulated Aerial Bunched Cables (ABC) are specified below:

- a) Their design should incorporate specific features to prevent damage to the insulation while meeting the required electrical, mechanical & thermal requirements.
- b) The accessories should provide "Double Insulation" so that a single point failure of insulation will not result in the system tripping.

S.No	Description	Application

a)	Anchoring Assembly (AA)	For fitting onto a pole for anchoring the end of a length of ABC, or for a major change in direction. The anchoring assembly consists of one wedge type anchoring clamp, one aluminium alloy pole bracket, Stainless Steel strap of 1.5 meter and two buckle for fixing the pole brackets with straps.
b)	Suspension Assembly (SA)	For supporting a length of ABC at an intermediate pole in a length, with small angle of deviation. The suspension assembly consists of one wedge type anchoring clamp, one aluminium alloy pole bracket, Stainless Steel strap of 1.5 meter and two buckle for fixing the pole brackets with straps.
c)	Service Clamps	To provide the service connections to consumers.
d)	Service Pole Brackets	To provide an anchoring point for service clamps

Table-2

6.0 Anchoring Clamp for Neutral Messenger:

Anchoring assemblies are used to firmly attach the messenger of ABC to a concrete or steel pole and transmit the mechanical tension.

- at the end of a run
- at a major change in direction of over 30 degrees.

The clamp should consist of an Aluminium alloy corrosion resistant casted body or climatically resistant polymer material, flexible rope sling ("bail") of stainless steel and self adjusting plastic wedges which shall anchor/hold the neutral messenger without damaging the insulation, if any.

- There shall be no loosable part in the process of clamping arrangement.
- Slip strength should be not less than 90% of the strength of the messenger.
- Mechanical strength should be not less than slip strength & no permanent deformation more than 10 mm should occur during slip test.

6.1 Anchoring Assembly

Each Anchoring Assembly shall include:

- One number pole bracket.
- One number wedge type tension clamp as described above

Anchoring assemblies shall be supplied in sets to ensure compatibility of the materials and to prevent corrosion or wear of moving parts.

- The above hardware/ accessories shall be suitable for use with LT Aerial Bunched XLPE Insulated cable conforming to IS: 14255/1995.

6.2 Pole Bracket for Anchoring Assembly

The pole bracket shall be made out of a single piece Aluminium alloy made of gravity die casting and further heat treated to required strength. Extruded aluminium brackets are not allowed due to sharp corners. The brackets shall be suitable for attachment to a pole by two stainless Steel straps of length 0.75 meter and width 20mm \pm 0.2 x 0.7mm \pm 0.05 and buckle as described later in this specification. The pole bracket should be designed with a closed hook; to ensure that Flexible rope (Bail) cannot slip out at any angle. The inner side of the bracket should be min 100 mm from the surface of the pole.

The pole bracket should be tested for the loads not less than slip strength of Clamp with the load applied at an angle of 45° from the normal to the surface of mounting of the bracket :-

Messenger Conductor Size Range (mm ²)	T-Start (1 Minute) (KN)	T-Final <30mm & no-break (KN)
25 - 70	12.0	15.0

Table : 3

6.3 Flexible Rope(Bail) of Anchor Assembly

- a) The Anchoring assembly shall be supplied with a stainless steel flexible Rope to connect the Tension Clamp to the pole bracket.
- b) The flexible Rope forming part of clamp should be of length to maintain at least 150 mm distance between bracket and body of clamp and shall have sufficient mechanical strength to withstand the mechanical test for the complete assembly tests in this specification, as specified in above Table.
- c) The rope should have sufficient flexibility to ease the torsional movement of the ABC System.

- d) The Rope should be pre-fitted with compression type end fittings which needs to be removable and re-fittable at one side of the clamp and locked at the other end of the anchoring clamp.
- e) A wear resistant moveable saddle should be un-loosably fitted on the Rope to prevent abrasion at the point of fitting into the tension bracket. Saddle to be made of plastic for insulation.
- f) Rope should have sufficient mechanical strength to with stand the mechanical test for the complete assembly tests in this specification.

6.4 Wedge Type Tension Clamp of Anchoring Assembly

- a) Wedge type clamps shall be used for clamping the messenger without damaging the insulation in case of insulated messenger or strands in the cable of bare messenger.
- b) The clamp shall be capable of clamping an uncut messenger so that it can continue without break to the connecting point or next span.
- c) The clamp shall be of aluminum or polymeric body with fully insulating type of mechanical and weather resisting thermoplastic wedges for both bare & insulated messenger. The insulating properties should meet the requirements of voltage test .
- d) No bolts or loose parts are allowed as part of the Clamping system.
- e) One tool is required for fitting of each sub lot/ lot of 1000 sets or part thereof .
- f) The clamp shall be self tightening and capable of holding without slippage the load specified as below:

Messenger Conductor Size Range (mm ²)		T start (1Minute) (KN)	T final (KN)
Section Area (mm ²)	Dia (mm)		
25 - 35	8 – 11	8.0	10.0

Table-4

7.0 Testing requirement of Anchoring Assembly (For Insulated or bare messenger)

The following tests are intended to establish design characteristics as per NFC-33-041:-

Sr	Test	Type Test	Acceptance Test	Routine Test

a	Visual		√	√
b	Dimensional		√	√
c	Mechanical & Slip strength	√	√	√
d	Voltage	√	√	
e	Corrosion	√		
f	Climatic	√		
g	Mechanical strength of Bracket & SS Strap with Buckle	√	√	√

7.1 Visual

Design aspects of the anchoring assembly needs to be visually verified as per the descriptions of this specification and criteria defined by the manufacturer in the quality plan and as accepted by customer. Following Mandatory marking should be available.

7.2 Marking

The marking allowing the identification of the samples shall be legible when examined with normal or corrected vision, without magnification.

- a) Manufacturer`s name or logo or trade name
- b) Month /year of manufacturing/ TNTW No.----/DDUGJY
- c) Product Reference

7.3 Dimensional

Overall dimensional to be verified against the GA Drawings. All dimensional requirement mentioned in this specification should be verified. The manufacturer may have his own design, provided the design is conforming to the technical requirements of this specification with minimum dimensions as shown in the specifications.

7.4 Mechanical & Slip Strength Test:

No continuous slippage of slippage of neutral messenger nor clamp break down should occur before the value specified in Table-4

After fitting the messenger in the clamp, load should be increased to 90% of breaking load of Messenger held for 1 minute.

7.7 Voltage Test

- Voltage test is carried out on anchor clamps to ensure no damage is caused to the insulated messenger and no separate earthing of pole is required in case of bare messenger.

- **A conductive** rod of dia. corresponding to the average dia. that can be accommodated in the clamp is fitted into the clamp, protruding by approx. 50mm at each end of the tightening piece .
- A power frequency voltage of 6 kV is applied for 1 minute between the rod and conductive part of the clamp or fixation point in absence of conductive part.
- No break down or flashover shall occur (tripping of voltage generator)

7.8 Corrosion test

This test is carried out on the anchoring assembly which is subjected to corrosion test as per NFC 33003 or equivalent IS Standard.

7.9 Climatic Ageing test

This test is carried out anchoring assembly which is subjected to corrosion test as per NFC 20540.

8.0 SUSPENSION ASSEMBLY FOR INSULATED OR BARE NEUTRAL MESSENGER:

Suspension Assembly is used for supporting an ABC by installation on the messenger at an intermediate point of support such as a pole. It can accommodate small angles of deviation upto 30 deg.

The clamp should be designed to hang L T AB cable with bare or insulated neutral messengers. The neutral messengers should be fixed by an adjustable grip device. A movable link should allow longitudinal and transversal movement of the clamp body.

- There should be no loosable part in the process of clamping arrangement.
- The clamp and the link should be made of Polymer to provide an additional Insulation between the cable and the pole to eliminate need for earthing.
- The clamps and movable links should be made of weather and UV resistant polymer.
- Clamps should be fixed to the pole by aluminium bracket. Bracket should be made of corrosion resistant aluminium alloy made out of gravity die casting process and further heat treated to required strength. Extruded aluminum brackets are not allowed due to sharp corners. Brackets should be suitable for fixing to pole by means of two S S Strap of 20mm \pm 0.2 x 0.7mm \pm 0.05 mm and SS Buckles.

Each Suspension Assembly shall consist of:

- One number Suspension Bracket.
- One number moveable (articulated) connecting link.
- One number Suspension Clamp.

Suspension Assemblies shall be supplied in sets to ensure compatibility of the materials against corrosion or wear of rotating/moving parts.

- Ultimate tensile strength of the clamp should not be less than 90% of messenger strength in direction perpendicular to the direction of the messenger.
- The above hardware/ accessories shall be suitable for use with LT Aerial Bunched XLPE Insulated cable conforming to IS: 14255/1995.

8.1 Suspension Clamp of Suspension assembly:

- Suspension Clamps are used for locking the messenger of the ABC Bundle without damaging the insulation if any or allowing the messenger to become dismounted from the fitting.
- The suspension clamp shall be made fully of insulating type of mechanically strong and weather resistant plastic.
- The suspension clamp shall be suitable for messenger wire sizes from 16 to 35 sq mm shall be capable of holding the neutral messenger up to the vertical load value mentioned in table 5 below
- Suspension Clamps for bare messengers shall be different from and easily distinguishable from those for insulated messengers
- One tool is required for fitting of each sub lot/ lot of 1000 sets or part thereof .
- There should be no loosable parts in the Suspension clamp.
- The suspension clamp shall be unloosably fitted to the suspension assembly.

Messenger Conductor Size Range (mm ²)		T start (1Minute) (KN)	T final (1Minute) (KN)
Section Area (mm ²)	Dia (mm)		
25 - 70	6 - 14	10	12.0

Table-5

8.2 Movable (articulated) link of Suspension assembly.

Movable links are used between the suspension bracket and the suspension clamp to allow a degree of movement and flexibility between the two.

- Movable links should be made fully of insulating type of mechanically strong and weather resistant plastic.
- The movable link shall be unloosably fitted to the suspension assembly.

8.3 Suspension Bracket of Suspension assembly

The Suspension Bracket shall be made from single piece aluminium alloy suitable for attachment to a pole by

- Two stainless steel straps of length 0.75 meter and width 20mm ± 0.2 x 0.7mm ± 0.05 mm and S S buckles.

The Suspension Bracket shall be provided with an upper bulge to prevent the clamp from turning over on the Bracket for more than 45° from the horizontal or to within less than 60 mm from the pole. The Suspension Bracket should be so designed to ensure that the Movable link cannot slip out of it.

9.0 TESTING REQUIREMENTS OF SUSPENSION ASSEMBLY

Following tests are intended to establish design characteristics as per NFC 33-040.

S.No.	Test	Type Test	Acceptance Test	Routine Test
a	Visual		√	√
b	Dimensional		√	√
c	Mechanical & Slip strength	√	√	√
d	Voltage	√	√	
e	Corrosion	√		
f	Climatic	√		
h	Mechanical strength of Bracket & SS Strap with Buckle	√	√	√

9.1 Visual

Design aspects of the suspension assembly needs to be visually verified as per the descriptions of this specification and criteria defined by the manufacturer in the quality plan and as accepted by customer. Following Mandatory marking should be available.

9.2 Marking:

Following Mandatory marking should be available:-

- a) Manufacturer`s name or logo or tradename
- b) Month/ year of manufacturing/TNTW No.-----/DDUGJY
- c) Product Reference

9.3 Dimensional

Overall dimensional to be verified against the GA Drawings. All dimensional requirement mentioned in this specification should be verified. The manufacturer may have his own design, provided the design is conforming to the technical requirements of this specification with minimum dimensions as shown in the specifications.

9.4 MECHANICAL AND VOLTAGE TEST

a) Mechanical Strength Test:

No continuous slippage of slippage of neutral messenger nor clamp break down should occur before the value specified in Table-5.

b) Longitudinal Slip test :

There should not be any slip of more than 3 mm in the messenger below 300 N.

c) Voltage Test:

Clamp subjected to a voltage test of 6KV between the conductive parts / fixation and a copper foil which is covered over the maxi allowable cable placed inside the groove of the clamp.

No break down or flashover shall occur (tripping of voltage generator).

9.5 Corrosion Test

This test is carried out on the suspension assembly which is subjected to corrosion test as per NFC 33003 or equivalent IS Standard.

9.6 Climatic Ageing test

This test is carried out suspension assembly which is subjected to corrosion test as per NFC 20540.

10.0 Stainless Steel Strap and Buckles :

The stainless steel strap shall consist of:

- a) Stainless steel strap of size 20mm \pm 0.2 x 0.7mm \pm 0.05 mm and shall have tensile strength of 7.5KN min., elongation 30% Min, finish 2B, and the stainless steel material shall be of high mechanical strength, corrosion and wear resistant as per ASTM SS 202.
- b) Tensile strength of strap is to be min 7.5KN to be tested on a loop with buckle. Number of loops for mounting the bracket on pole to be allocated as per load requirement for dead-end and suspension clamp specified in this specification.
- c) Min two loops of 0.75 meter each with one buckle to be considered for attaching the brackets to the poles. For dead-end or suspension pole bracket a total of 1.5 meter of SS Strap and two buckle are required.
- d) The SS Strap should be engraved with the name of the Manufacturer, month and year of manufacturing and length at a distance of approximate 250 mm for traceability.
- e) The S S buckle to suit above strap shall be used to tension & fix it. It should have a slot width of not less than 20.5 mm x 1.5 mm.
- f) The Buckle should be made from ASTM SS 304 of thickness not less than 1.2 mm.
- g) S S Strap must be supplied in 50 meter roll in plastic dispenser casing with indication of remaining length.
- h) Buckles should be supplied in plastic bags containing 100 pcs per bag.

11.0 TEST REQUIREMENTS FOR STAINLESS STEEL STRAP AND BUCKLES :

Type tests on SS Straps and Buckles shall consist of Chemical Analysis Test Report of Composition. In addition the SS Strap should have been type tested for Tensile Strength and Ultimate Elongation.

S. No.	Test	Type Test	Acceptance Test	Routine Test
1	Visual		√	√
2	Dimensional		√	√
3	Tensile	√	√	√
4	Chemical and Mechanical Properties	√		

11.1 Visual

Design Aspects of the Stainless Steel straps needs to be visually verified as per the descriptions of this specification and criteria defined by the manufacturer in the quality plan and as accepted by customer. Following Mandatory marking should be available.

- a) Manufacturer`s name or logo or tradename
- b) Month and year of manufacturing
- c) Product Reference

11.2 Mechanical & Voltage Tests :

a) Mechanical Strength Test:

One loop of SS strap with a length of 0.75 meter and strapped with a buckle should withstand a min load of 7.5 kN.

12. TESTS AND TEST CERTIFICATES:

The Hardwares / Accessories should meet the requirement of all tests as specified in respective NFC standards alongwith other relevant standards and their latest amendments.

The bidder shall furnish valid and **authenticated** type test certificates from **CPRI, Banglore / ERDA, Vadodara / ILAC i.e. International Laboratory Accredited Cooperation (in case of foreign laboratory) only**. Such type test certificates should not be older than **05 years** as on the date of bid opening. For this purpose date of conducting type test will be considered.

The type test certificate by in house laboratory of tendering firm even if it is a ILAC accredited, shall not be accepted, in case of their own tender.

The bidder should furnish documentary evidence in support of the laboratory whose type test have been furnished, that the said laboratory is a ILAC accredited (in case of foreign laboratory).

The type test certificates shall be furnished either in original or copy duly attested by notary.

The bids of only those bidders shall be considered to be meeting the type test criteria who furnishes complete type test certificate with the bid as per above provision.

Only those bids which accompanied with requisite type test(s) certificate(s) not older than five years as on the date of bid opening, shall be treated as responsive.

13. TEST CHECKING OF MATERIAL AT STORES:

The material received in the stores of the NIGAM shall be subjected to the test checking at stores before final acceptance of the material, the procedure for the same shall be as under :

13.1 SAMPLING

One sample out of each sub lot/ lot of **1000 sets** or part thereof from each inspected lot of each type, received in stores shall be selected for test checking of material and shall be got tested. The selection of sample from the material received at stores shall be done as soon as material is received in stores without the presence of the representative of the supplier. However, testing of sample(s) at CTL shall be carried out in the presence of representative of the supplier after identification / confirmation by him that sample so selected belongs to them. In case the supplier disputes that the selected samples does not pertain to them, then fresh sample shall be selected in the presence of the representative of the supplier and test(s) be carried out.

13.2 TESTS

The following tests shall be carried out on the above items :

- a) Visual examination, verification of dimensions, weight & marking.

The other test as per NFC/IS/REC/ Specification may also be carried out on Suspension & Dead End Clamp subject to availability of testing facility for the same at CTL , Jodhpur.

Test of the material shall be got done at the test laboratory of the NIGAM i.e CTL, Jodhpur in the presence of representative of supplier. For witnessing of the testing, clear 7 (seven) days notice shall be given to the supplier by fax/ speed post stating date, time & place where the test is to be conducted. In case the supplier do not attend for witnessing the testing, the testing shall be proceeded and completed and action be taken as per the contract.

The Officer Incharge of Central Testing Lab (CTL) Jodhpur shall send copies of test reports to the purchaser, consignees and the supplier.

13.3 CRITERIA FOR ACCEPTANCE

- a) Visual examination , verification of dimensions, weight and marking.
As per Specification/ GTP/ Approved drawing.

13.4 TEST CHARGES :

All test charges incurred towards test checking of the material received in our stores shall be borne by the NIGAM except that of personal expenses of the representative of the supplier for witnessing the tests.

14. PACKING, MARKING AND FORWARDING:

- 14.1 All hardware fittings shall be packed in suitably sized strong and weather resistant wooden cases/crates. The gross weight of the packing shall not normally exceed 50 Kg.to avoid handling problems.
- 14.2 Suitable cushioning, protective padding, or spacer shall be provided to prevent damage to or deformation of the hardwares during transit and handling.
- 14.3 All identical items shall be dispatched to destination duly assembled and packed. Bolts, nuts, washers, etc. shall be packed duly installed and assembled with the respective parts and suitable measures shall be taken to prevent their transit loss.
- 14.4 All packing cases shall be marked legibly and correctly so as to ensure their safe arrival at their destination and to avoid the possibility of goods being lost or wrongly dispatched on account of faulty or illegible markings. Each wooden case/crate shall have all the markings stenciled on it in indelible ink.

15. GUARANTEED TECHNICAL PARTICULARS:

The tenderer shall furnish guaranteed technical particulars in the schedule–A with drawing .

16. DEMONSTRATION & INSTRUCTION MANUAL:

The successful bidder shall submit the Instruction Manual for erection of Aerial Bunched Cable and Hardware to the sub-division at the time of demonstration of erection of LT Aerial Bunched Cable with Hardware.

The successful bidder shall give free of cost demonstration for erection of Aerial Bunched Cable with Suspension/Dead End Clamp, If asked by Circle Superintending Engineer, in any Sub Division of their Circle, during course of supply. The required Suspension/Dead End Clamp and LT AB Cable for demonstration shall be provided by Nigam.

SCHEDULE-A

GUARANTEED TECHNICAL AND OTHER PARTICULARS

A. Suspension and Dead End Clamp Assembly:

S. No.	Particulars	
1	Name of bidder	
2	Address of Manufacturer of ABC Accessories	
3	Works address	
4	a) Is Manufacturer of Accessories an ISO 9001-2000 Company	
	b) Copy of ISO Certificate enclosed	
5	Are GA drawings enclosed for a) Anchor Clamps b) Suspension Clamps	
6	Are experience certificate enclosed for a) Anchor Clamps	

S. No.	Particulars	
	b) Suspension Clamps	
A.	Anchor Assembly	
i	Type of Clamp	
ii	Material of clamp	
iii	Standard	
iv	Product Reference and Range of messenger size	
v	Type of design	
vi	Installation mode (with / without disassembly)	
vii	Any bolts or nut used in the design?	
viii	Type & grade Metallic / Nonmetallic Material	
ix	Marking	
x	Dimensions (mm)	
xi	Weight (Kg)	
xii	Minimum Breaking Load (KN) (Acceptance test)	
xiii	Di-Electric test (Min 6 KV AC for 1 minute) (Acceptance test)	
xiv	Can it accommodate uncut messenger	
xv	Maximum load holding capacity (Kg.)	
xvi	Whether the following type test report as per relevant NFC standard furnished a) Voltage with stand test report as per NFC. b) Corrosion Resistance Report as per NFC. c) Climatic Ageing report as per NFC. d) Mechanical Test	
B	Bracket	
i	Is the Material of bracket is die casted and heat treated aluminium alloy (Yes / No)	
iii	Dimensions (mm)	
iv	Weight (Kg)	
v	Minimum Breaking Load (KN) (Acceptance test)	

S. No.	Particulars	
C	Suspension Assembly	
i	Type of Clamp	
ii	Standard	
iii	Type Reference and Range of messenger size	
iv	Installation mode (with / without disassembly)	
v	Is bracket & movable link included	
vi	Type & grade Suspension Clamp	
vii	Is the Material of bracket is die casted, heat treated aluminium alloy (Yes / No)	
viii	Marking	
ix	Min Breaking Load (KN) (Acceptance test)	
x	Di-Electric test (Min 6 KV AC for 1 minute) (Acceptance test)	
D	<u>SS Strap</u>	
i	Material composition	
ii	Tensile strength per loop fitted with one number buckle	
iii	Width of Strap	
iv	Thickness of Strap	
v	Marking on the strap for manufacturing date, name of manufacturer and length of 250mm (yes/No)	
vi	Supplied in a plastic dispensable casing for 50 mteres (Yes/No)	
	<u>SS Buckle</u>	
i	Material composition	
ii	Weight of the material	
iii	Tensile strength (Buckle assembled with one loop of SS Strap_	
iv	Supplied as a box of 100 nos each	
v	Is moveable link provided	

S. No.	Particulars	
vi	Material of moveable link	
vii	Material of Suspension Clamp	
vii	Range of conductor size (mm. Sq.) which suspension clamp can accommodate (mm. Sq.)	
viii	Max. longitudinal load sustained by clamp	
ix	Whether the following type test report as per relevant NFC standard furnished a) Voltage with stand test report as per NFC. b) Corrosion Resistance Report as per NFC. c) Climatic Ageing report as per NFC. d) Mechanical Test	

TECHNICAL SPECIFICATION FOR SUPPLY OF L.T. INSULATION PIERCING CONNECTORS SUITABLE FOR LT XLPE INSULATED AERIAL BUNCHED CABLES WITH BARE MESSENGER WIRE FOR LT OVER HEAD LINES SUITABLE FOR WORKING VOLTAGE UPTO & INCLUDING 1100 VOLTS AGAINST

1. SCOPE :

This specification covers manufacture, testing before dispatch, supply and delivery F.O.R. Destination of L T Insulation Piercing connector suitable for LT XLPE Insulated Aerial Bunched Cables with bare Messenger Wire for LT Overhead lines suitable for working voltage up to & including 1100 Volts as per relevant NFC Standard.

The Insulation Piercing Connectors shall be supplied along with Nuts, Bolts, Washers.

2. APPLICABLE STANDARDS:

Unless otherwise stipulated in this specification the following standards with latest amendments shall be applicable :

S.No.	Particulars	
1	NFC - 33-020	Insulation Piercing Connectors
2	NFC - 33-209	LV Aerial Bunched Cable
3	NFC - 33-004	Electrical Ageing Test
4	NFC - 20-540	Environment Testing for outdoor
5	IS 14255	LV Aerial Bunched Cable

3. CLIMATIC CONDITIONS:

S.No.	Particulars	Details
1	Peak ambient temperature in shade	50 deg.C
2	Maximum average ambient temperature in a 24 hours period in shade	50 deg.C
3	Min. ambient air temperature in shade	(-) 5 deg. C
4	Maximum temperature attainable by an object exposed to sun.	60 deg.C
5	Maximum relative humidity.	90%
6	Average number of thunder storm days per annum.	40
7	Average number of rainy days per annum.	100
8	Average annual rain fall	10 to 100 cm
9	Number of months of tropical monsoon conditions.	4 months

S.No.	Particulars	Details
10	Maximum wind pressure	100kg/mtr sq
11	Altitude not exceeding	1000 m

4. GENERAL REQUIREMENTS:

The L.T. Insulating Piercing Connectors are used for making Tee or Tap off connections to LT XLPE Insulated Aerial Bunched Cables suitable up to 1.1 KV, service voltage 0.6 KV. The L.T. Insulation Piercing Connectors are designed to make a connection between the uncut main conductor & a branch cable conductor without removing the insulation and with single tightening. The IPC will first pierce the insulation, then make good electrical contact between the main & the branch conductor while simultaneously insulating & sealing the connection. The teeth of IPC shall be compatible with aluminum phase conductor or aluminum alloy messenger. Exposed metallic parts to be potential free during & after connector mounting.

The performance/ test requirements of insulation piercing connectors shall be as per NFC Standards 33-020.

The Insulation Piercing Connectors must be equipped with shear heads with minimum & maximum shearing torque as indicated by the manufacturer and within the range specified in NFC 33-020.

The L.T. Insulation Piercing Connectors shall be suitable for LT XLPE Insulated aerial bunched cable of following type & Size:

Type	Main Cable	Tap Off cable	End Cap suitable for Sealing Branch
A	16-50 Sq.mm	2.5-10 Sq.mm	2.5-10 Sq.mm.
B	16-50 Sq.mm	16-50 Sq.mm	16-50 Sq.mm

The Insulation Piercing Connectors must be suitable for application by one worker working alone with a 17mm/ 13mm wrench. Suitable wrenches for installing the connectors shall be included in the scope of supply at the rate of 1 Set for each 1000 Pieces of Connectors ordered (Fraction of 1000 Pieces to be rounded down) The Insulation Piercing Connectors shall be water proof & the water tightness and shall be ensured by appropriate elastomer material & not by grease, gel or paste alone. The Connector shall be provided with removable end cap for sealing cut end of the branch cable enabling tapping on both sides of the connector being in its vertical position with bolt head upward. The end cap shall be rigid of slide type enabling easy positioning and un-loosable

after the tap cable is positioned. The end cap shall be equipped with a water tightness seal. Rubber seal around piercing teeth shall be compatible with grease used. Rubber seal shall be designed in a manner to provide proper sealing around the piercing & to avoid the damage to conductor insulation beyond piercing point. Rubber parts shall comprised of material that exhibit resistance to aging caused by heating or other weather conditions.

All the insulating material used shall be UV resistant. Metallic parts shall be hot dip galvanized or of Stainless steel.

The Insulation Piercing Connectors shall have good finish and shall be free from all flaws, sharp edge and suitably rounded off.

The Insulation Piercing Connectors and its components shall meet the following tests in accordance with the requirements & test methods of NFC 33 – 020:

- a) Mechanical Tests
- b) Voltage & water tightness test
- c) Electrical Ageing Test
- d) Corrosion Resistance Test
- e) Climatic Ageing Test

The above hardware/ accessories shall be suitable for use with LT XLPE Insulated PVC sheathed Aerial Bunched Cable conforming to IS:14255/1995 of following sizes:

S.No.	Designation of finished cable
-------	-------------------------------

1	1CX25+25 mm ² .
2	3CX16+25 mm ² .
3	3CX25+25 mm ²
4	3CX50+35 mm ² .
5	3CX35+25 mm ²

Note:- The first part of the designation refers to the number and size of the phase conductor and the last to the size of messenger wire. The sizes shown are the nominal cross sectional area of the conductors.

5.0 TYPE TESTS & TESTS CERTIFICATES:

The bidder shall furnish valid and **authenticated** type test certificates from **CPRI, Banglore / ERDA, Vadodara / ILAC i.e. International Laboratory Accredited Cooperation (in case of foreign laboratory) only**. Such type test certificates should not be older than 5 years as on the date of bid opening. For this purpose date of conducting type test will be considered.

The type test certificate by in house laboratory of tendering firm even if it is a ILAC accredited, shall not be accepted, in case of their own tender.

The bidder should furnish documentary evidence in support of the laboratory whose type test have been furnished, that the said laboratory is a ILAC accredited (in case of foreign laboratory).

The type test certificates shall be furnished either in original or copy duly attested by notary.

The bids of only those bidders shall be considered to be meeting the type test criteria who furnishes complete type test certificate with the bid as per above provision.

Only those bids which accompanied with requisite type test(s) certificate(s) not older than five years as on the date of bid opening, shall be treated as responsive.

The Insulation Piercing Connectors should meet the requirement of all tests as specified in respective NFC standard NFC-33-020 along with other relevant

standards and their latest amendments. For ready reference, the applicable tests are reproduced below :

Type Tests:

Insulation Piercing Connectors

S. No.	Clause No. of NFC	Description of Test
1	2.3.1	Electrical continuity
2	2.3.1	Shearhead
3	2.3.1	Mechanical Behavior
4	2.3.2	Mechanical strength of main core
5	2.3.2	Mechanical strength of Tap core
6	2.4	Voltage and water tightness
8	2.6	Climatic Ageing
9	2.7	Corrosion Test
10	2.8	Electrical Ageing

The bidder must also clearly indicate various testing facilities available at their works for testing the material as per relevant standard. In case of otherwise particulars of the place where such testing is proposed to be conducted during the course of inspection shall be indicated.

6.0 INSPECTION:

The inspection may be carried out by the purchaser at any stage of manufacture. The successful bidder shall grant free access to the purchaser's representative at reasonable time when the work is in progress. Inspection and acceptance of any equipment / material under this specification by the purchaser shall not relieve the supplier of his obligation of furnishing equipment in accordance with the specification and shall not prevent subsequent rejection if the equipment / material is found to be defective.

The acceptance tests shall also be conducted on each offered lot by the manufacturer before dispatch in the presence of purchaser's authorized representative / inspecting officer/ agency as per Clause No.1.27 " Inspection

and testing" of "General Condition of Contract" Section-II. The acceptance tests shall be carried out as per relevant NFC standards and GTP furnished by the bidder, whichever is more stringent..

7.0 Acceptance Tests :

The Acceptance Tests for Insulation Piercing Connectors shall consist of the following:

For Insulation piercing Connectors. (NFC 33-020)

S. No.	Clause No. of NFC	Description of Test
1	3	Marking as per clause 3
2	2.3.1	Electrical continuity
3	2.3.1	Shearhead
4	2.3.1	Mechanical strength
5	2.4	Voltage and water tightness

The supplier shall present the latest calibration certificates of testing instruments / equipments to be used for the testing of the material covered in the purchaser order to the authorized inspection officer/inspecting agency of the purchaser. The testing instruments/meters/ apparatus etc. should be got calibrated by the supplier from time to time from NABL accredited laboratory or NPL for Indian Bidders or Nationally accredited test laboratory for foreign bidders. The calibration certificate should not be in any case be older than 1 year at the time of presenting the same to the inspecting officer/ inspecting agency of the purchaser. The testing instruments / equipments should be duly sealed by the calibrating agency and mention their of shall be indicated in the calibration certificates.

8. TEST CHECKING OF MATERIAL AT STORES

The material received in the stores of the NIGAM shall be subjected to the test checking at stores before final acceptance of the material, the procedure for the same shall be as under :

8.1. SAMPLING

One sample out of each sub-lot / lot of 5000 Nos. or part thereof for Type-A connectors and one sample out of each sub-lot / lot of 1000 Nos. or part thereof for Type-B connectors from each inspected lot received in stores shall

be selected for test checking of material and shall be got tested. The selection of sample from the material received at stores shall be done as soon as material is received in stores without the presence of the representative of the supplier. However, testing of sample(s) at CTL shall be carried out in the presence of representative of the supplier after identification / confirmation by him that sample so selected belongs to them. In case the supplier disputes that the selected samples does not pertain to them, then fresh sample shall be selected in the presence of the representative of the supplier and test(s) be carried out.

8.2 TESTS

The following tests shall be carried out on the above items :

- i) Visual Examination, verification of dimensions, marking.
- ii) The other acceptance tests as per NFC Standard / specification may also be carried out subject to availability of testing facility for the same at CTL, Jodhpur.

8.2.1 Test of the material shall be got done at the test laboratory of the NIGAM i.e CTL, Jodhpur in the presence of representative of supplier. For witnessing of the testing, clear 7 (seven) days notice shall be given to the supplier by fax/ speed post stating date, time & place where the test is to be conducted. In case the supplier do not attend for witnessing the testing, the testing shall be proceeded and completed and action be taken as per the contract.

8.2.2 The witnessing officers of the NIGAM or as designated by the purchaser shall send copies of test reports to the purchaser, consignees and the supplier.

9. CRITERIA FOR ACCEPTANCE

- i) Visual Examination, verification of dimensions, marking.
- ii) The other acceptance tests as per NFC Standard / specification may also be carried out subject to availability of testing facility for the same at CTL, Jodhpur.

As per NFC-33-020/1998 for the above test (with latest amendment) /Specification.

10. TEST CHARGES :

All test charges incurred towards test checking of the material received in our stores shall be borne by the NIGAM.

11. EMBOSSING & IDENTIFICATION:

It should be provided in each piece as per Clause No.3 of the relevant NFC standards.

12. PACKING, MARKING & FORWARDING:

All Insulation Piercing connectors shall be packed in Cardboard Cartons. The gross weight of the packing shall not normally exceed 50 Kgs. to avoid handling problems.

Suitable cushioning, protective padding or spacer shall be provided to prevent damage to or deformation of the hardware during transit and handling.

All identical items shall be dispatched to destination duly assembled and packed. Bolts, Nuts, Washers etc. shall be packed duly installed and assembled with the respective parts and suitable measures shall be taken to prevent their transit loss.

All packing cases shall be marked legibly and correctly so as to ensure their safe arrival at their destination and to avoid the possibility of goods being lost or wrongly dispatched on account of faulty or illegible marking. Each case / crate shall have all the markings stenciled on it in indelible ink.

13. GUARANTEED TECHNICAL PARTICULARS:

The bidder shall furnish guaranteed technical particulars in the schedule-Bwith drawing.

.14. DEMONSTRATION & INSTRUCTION MANUAL:

The successful bidder shall submit the Instruction Manual for erection of Aerial Bunched Cable and Hardware to the sub-division at the time of demonstration of erection of LT Aerial Bunched Cable with Hardware.

The successful bidders shall give free of cost demonstration for erection of Aerial Bunched Cable with Insulation Piercing Connector, if asked by Circle Superintending

Engineer, in any Sub Division of their Circle, during course of supply. The required I.P. Connector and LT AB Cable for demonstration shall be provided by Nigam.

Schedule-B

B. Insulation Piercing Connectors Type-A and Type-B:

Sl. No.	Particulars	Type-A	Type-B
1.	Name of Manufaturer & Address		
2.	Works's Address		
3.	Is Manufacturer of Accessories an ISO 9001 – 2000 Company.		
	Copy of Certificate enclosed		
	Are GA drawings enclosed?		
	Are experience certificates enclosed?		
4.0	Insulation Piercing Connectors (provide info separately for each size offered)		

	Type Number & Size Range		
4.1	Is any metallic part carrying potential in operation exposed during installation ? Metal used for teeth.		
4.2	Are end caps for branch cable ? Slide on Type Rigid		
4.3	Are torque limiting shear heads provided on tightening bolts?		
4.4	Range of sizes accommodated for Branch & Main (fill 4.5.1 to 4.7.5 for each size of connector)		
4.5.1	Rated tightening torque (Nm)		
4.5.2	Min Shear head breaking torque (Nm) Max Shear head breaking torque (Nm)		
4.6.2	Max. Tensile load for no breakdown of main conductor (for each cross-section). Kg.		
4.6.3	Max. tensile on Branch conductor for no slippage / break Kg.		
4.7	Voltage withstand under water immersion		
4.8	Marking on IPC	As per Clause no.3 of NFC	

TECHNICAL SPECIFICATION OF P.G. CLAMPS FOR DOG, RABBIT & WEASEL CONDUCTOR AND T-CLAMP FOR PANTHER CONDUCTOR SCOPE

This specification covers the manufacture, testing before despatch and delivery at our Stores/ Site of P.G. Clamps for Dog, Rabbit, weasel Conductor and T-clamp for Panther Conductor as detailed hereunder:-

MATERIAL:-

All material used shall conform to the relevant ISS. All aluminum and aluminum alloy used in the manufacture of the connector(s) shall conform to designation 'A6' of IS:617 (1975) Latest amended and IS:1367 (latest amended). Non ferrous alloy bolts, nuts and spring washers shall conform to the relevant Standards.

The material used in the manufacture of clamps shall be Aluminum alloy 4600 of IS:617-1994 as amended and shall be gravity die casting process only.

Steel Bolts and Nuts shall conform to IS:1368-1992 & IS:1367/1979-80 (with latest amendment, if any)

All ferrous metal parts intended for outdoor use except those made of stainless steel shall be protected by hot dip galvanizing in accordance with IS:2633-1986.

The temperature rise of power connectors above a reference ambient temperature of 40 Deg. C when carrying rated current as above shall not exceed 45 Deg. C to fulfill the requirement of Cl.6 IS:5561(1970).

GENERAL REQUIREMENTS:-

The power connectors shall be smooth and free from cavities, blow-holes and other defects and such adverse effects like sharp radii of curvature, ridges & excrescence which might lead to localized pressure or damage to conductor in service. Power connectors shall be so designed and proportioned that they are capable of safely withstanding stresses to which they may be subjected (including these due to short circuit and climatic conditions) and that the effect of vibrations, both on the conductor and the connector itself are minimized. Sufficient contact pressure should be maintained at the joint by the provision of the required number of bolts or other fixing arrangements. But the contact pressure should be evenly distributed by the use of pressure plates, washers or suitable saddles of adequate area & thickness.

LIMITS OF TEMPERATURE: The limits of temperature rise specified are based on the following reference ambient temperatures:-

- a) Maximum ambient air temp : 50 Deg. C.
- b) Maximum daily average ambient temp : 32.5 Deg. C.
- c) Maximum yearly average ambient temp. : 32 Deg. C.

The temperature rise of power connectors above a reference ambient temperature of 40 Deg. C when carrying rated current as above shall not exceed 45 Deg. C to fulfill the requirement of Cl.6 IS:5561(1970).

DIMENSIONAL REQUIREMENT FOR P.G. CLAMPS :-

S.No.	Particulars	PG Clamps For ACSR Rabbit	PG Clamps For ACSR Weasel
1	Length	75 mm	75 mm
2	Thickness of Mettalic Parts (Min.)	8 mm	8 mm
3	Short circuit level for 1 sec.	12.5 kA	12.5 kA
4	Rated current Amp.	200	160
5	Weight (-2%)	Al 0.125 Steel 0.045 Total 0.170	Al 0.115 Steel 0.05 Total 0.165

Note:- Bidders are requested to quote alternative prices for P.G. Clamps suitable for ACSR Dog to Dog for the Type `A` & Type `B`.

TYPE TESTS:-

a) The bidder shall furnish valid and authenticated type test certificate from a Govt. approved/ a Govt. recognized/ NABL accredited laboratory/ ILAC i.e. International Laboratory Accredited laboratory / ILAC i.e International Laboratory Accreditation Corporation (In case of foreign laboratory) of similar rating and design of tendered material. Such type test certificates should not be older than five years as on the date of bid opening. For this purpose date of conducting type tests will be considered.

b) The type test certificates by in house laboratory of bidding firm even if it is a Govt approved/ Govt recognized/ NABL accredited Laboratory / ILAC accredited, shall not be accepted, in case of their own bid. This will not apply if bidding firm is Govt. Company/ Public Sector Undertaking.

c) The bidder should furnish documentary evidence in support of the laboratory whose type test have been furnished, that the said laboratory is a Govt/ a Govt. approved/ a Govt. recognized/ NABL accredited laboratory/ ILAC accredited (in case of foreign laboratory)

d) The type test certificates shall be furnished either in original or duly attested by notary.

e) The bids of only those bidders shall be considered to be meeting the type test criteria who furnishes complete type test certificates with the bid as per above provision.

f) However, in the following cases the Bidder is not in a position to furnish Type Test Certificate as mentioned above, the bid of the bidder may be considered meeting the type test criteria if the bidder furnishes an undertaking stating that valid type test certificate from a Govt. approved / Govt. recognized / NABL Accredited laboratory / ILAC Accredited laboratory shall be furnished from first lot received in Nigam store (without asking any delivery extension) along with bank guarantee with the technical bid from a Nationalized / Scheduled Bank in prescribed proforma at Schedule-III C or DD / Pay Order amounting to Rs. 50,000.00 (Rs. Fifty Thousand only) . The initial validity of bank guarantee shall be nine months with claim period of three months in addition

- i) Where a new Rajasthan based firm is participating & is technically competent.
- ii) Where one or more type test(s) is/ are older than 3 years.
- iii) Where Rajasthan/out side Rajasthan firm furnishes requisite type test report of higher rating material.

e) Following type test shall be conducted on Clamps :-

- a) Tensile test
- b) Temperature test.
- c) Resistance test.
- d) Dimensional test.
- e) Galvanizing test
- f) Short circuit test

The short circuit test shall be accompanied with the detailed dimensional drawing duly signed by the testing agency.

INSPECTION AND TESTING

i) The material shall be tested and inspected by an authorized inspecting officer of the Nigam before despatch. Samples shall be drawn for inspection/ testing as per provisions of relevant ISS/Purchase Order. The purchaser reserves the right to get the material tested in any testing laboratory before despatch.

ii) The suppliers should satisfy themselves that the stores are in accordance with the terms of the contract and fully confirm to required specifications by carrying out a thorough pre-inspection of each quota before tending the same for inspecting to the inspecting officer nominated by the purchaser. Such pre-inspection on the part of the suppliers would minimize the chances of rejection in inspection. The following shall constitute Acceptance Tests:-

- i) Tensile Test.
- ii) Resistance Test.
- iii) Dimensional Check.
- iv) Galvanizing Test, where applicable.

In the event of order temperature rise test shall be carried out once on one Clamp of each type from the first offered lot in the presence of Purchaser's representative without extra charges.

The following shall constitute Routine Tests:-

- i) Visual inspection.
- ii) Dimensional check.

TEST CHECKING OF MATERIAL AT STORES:-

The material received in the Stores of the Nigam shall be subjected to the test checking at Stores before final acceptance of the material. The procedure for the same shall be as under:-

A) Sampling:-

One sample out of each sub lot/ lot of 1,000 Nos. or part thereof from each inspected lot of each type of clamp received at Stores shall be selected for test checking of material & shall be got tested. The selection of sample from the material received at stores shall be done as soon as material is received in stores without the presence of the representative of the supplier. However, testing of sample(s) at CTL shall be carried out in the presence of representative of the supplier after identification / confirmation by him that sample so selected belongs to them.

B) Tests:-

The following tests shall be carried out on the above items:-

- a. Visual Examination, Verification of Dimension, weight and marking as per ISS/ Specification.
- b. Tensile Test
- c. Resistance Test
- d. Galvanizing test

Testing of the material shall be got done at the test laboratory of the NIGAM i.e. at CTL in the presence of the representative of the supplier.

For witnessing of testing, clear 7 days notice shall be given to the supplier by fax / speed post stating date, time & place where the test is to be conducted. In case the supplier do not attend for witnessing the testing, the testing shall be proceeded and completed and action be taken as per the contract.

The Officer Incharge of Central Testing Lab (CTL) Jaipur shall send copies of test reports to the purchaser, consignees and the supplier.

C) CRITERIA FOR ACCEPTANCE

- a) Visual Examination, Verification of Dimension, weight and marking: As per ISS/ Specification
- b) Tensile Test AND
- c) Resistance Test:-

In case of failure of sample in Tensile Test & Resistance test, the material contained in the lot/ sub-lot to which the sample belongs shall be rejected. The rejected material shall have to be replaced by the supplier free of cost.

d) Galvanizing Test:

i) The sample(s) shall be first tested for (n-2) number of dips where(n) is specified number of dips in the contract. If the sample(s) does not pass the uniformity of Galvanization Test for (n-2) dips, the material shall be rejected and the material relating to relevant lot/ sub-lot to which sample(s) pertains shall have to be replaced by the supplier free of cost.

ii) If the sample has passed the uniformity of Galvanization Test for (n-2) dips, then it shall be tested for (n-1) dips. If the sample has not passed the uniformity of Galvanization Test with (n-1) dips, then material pertaining to relevant lot/ sub-lot shall be accepted with a deduction @ 10% of cost of material.

iii) If the sample has passed the uniformity of Galvanization Test with (n-1) dips, then sample shall be tested for last one dip of one minute to complete the test for 'n' dips. If the sample does not pass the uniformity of Galvanization Test with 'n' dips, then the material pertaining to relevant lot/sub-lot shall be accepted with a deduction @ 5% of cost of material.

D) TEST CHARGES :

All test charges incurred towards test checking of the material received in our stores shall be borne by the NIGAM except that of personal expenses of the representative of the supplier for witnessing the tests.

E MARKING

The items to be supplied shall be indelibly marked with suitable marks so as to identify the same. The Clamps shall be marked with 'Rated Normal Current' and name of the 'Conductor' for which the same is suitable viz. Panther to Panther, Dog to Dog, Rabbit to Rabbit and weasel to Weasel.

TECHNICAL SPECIFICATION AND OTHER REQUIREMENT FOR 11 KV DROP OUT FUSE CUM ISOLATOR WITH PORCELAIN INSULATORS

1.0 SCOPE:

This specification covers design, manufacture, assembly testing at manufacturer's works, packing and delivery at site(s)/store(s) of Nigam with accessories of 11 KV, outdoor, open, expulsion type Drop Out Fuse Cum Isolator required for installation at 11KV side of Distribution Transformers in Jaipur Discom.

2.0 STANDARDS :

Unless otherwise specified elsewhere in this specification, the rating as well as performance and testing of the isolators shall conform to the latest revisions and amendments of the following standards available at the time of placement of order.

Sl. No.	Standard No.	Title
1.	IS:9385	Expulsion high voltage fuses for above 1000 Volts.
2.	IEC:60129	- do -
3.	IS:2544	Insulators.
4.	IS:5350	Insulators.
5.	IS:2629/1985	Recommended practice for hot dip galvanizing of iron and steel.
6.	IS:4759/1996	Hot dip galvanization coating on structural steel.
7.	IS:2633/1986	Method of testing uniformity of coating on Zinc coated articles.
8.	IS:1573/1986	Electroplated coatings of zinc on iron and steel.
9.	IS:6735/994	Spring washers.
10.	IS:2016/1967	Plain washers.
11.	IS:5561/1970	Electrical power connectors. (Terminal connectors) Indian Electricity Rules.
12.	IS:9530/1980	Recommended practice for silver plating.
13.	BS:2816/1964	Testing of silver plating thickness
14.	IS:5925/1970	Recommended practice for silver plating for General engineering purposes.

3..0 PRINCIPAL PARAMETERS :

The equipment covered in this specification shall meet the technical requirements listed below :

S.NO.	Particulars	11 KV Drop Out Fuse Cum Isolator
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A) PARTICULARS OF SYSTEM:

i) Nominal system voltage :KV(rms)	11
ii) Highest system voltage :KV(rms)	12
iii) Rated Frequency. :Hz.	50
iv) Number of poles.	1

v) System Neutral Earthing
B) Service conditions

Effectively earthed
As per clause No.3.0

5.0 GENERAL TECHNICAL REQUIREMENTS :

5.1 The values of the Parameters/Particulars mentioned below shall not be less than the specified against each.

S.No.	Parameter	Value
1.	Rated Voltage	12kV
2.	Rated Current	100Amps
3.	Lightning impulse withstand voltage	
	a) To earth and between poles	75 kV (Peak)
	b) Across the isolating distance of fuse base	85 kV (Peak)
4.	Rated one minute power frequency withstand voltage (Dry & wet) values for the fuse base	
	a) To earth and between poles	28 kV (rms)
	b) Across the isolating distance	32 kV (rms)
5.	Temperature rise limit (in Air)	
	a) Copper contacts silver faced	55 oC
	b) Terminals	40 oC
6.	Rated breaking capacity	8 kA (Asymmetrical)
7.	Minimum Isolating Distance	200 mm
8.	Creepage Distance (between Top/bottom Live-Parts to center of Insulator)	320 mm (minimum)

5.2 GENERAL REQUIREMENT /CONSTRUCTIONAL DETAILS

5.2.1. The mounting Holes and fixing of 11 KV Drop out Fuse Cum Isolator shall be such that a person standing at the ground level cannot access the fuse and they can not drop down by wind pressure etc.

5.2.2. Fuse shall be enclosed in a protected enclosure such that the element does not come in contact with ambient conditions.

5.2.3. An insulating material handle / operating rod shall be used for pulling in and out of the fuse from the base for replacement and isolation purpose.

5.2.4 Fuse unit shall be hinged at one end and it shall be able to pull fuse for isolating the Transformer from HT side easily.

5.2.5 The Drop out fuse cum Isolator shall be of single vent type (downward) having a front connected fuse carrier suitable for angle mounting. The mounting arrangement shall be so designed that the Drop out fuse cum Isolator cutout when installed is at 15-20 degree to the vertical plane.

5.2.6 All ferrous parts shall be hot dip galvanized in accordance with the latest version of IS: 2633 and Nuts & bolts should conform to IS:1364. The Spring washers should be electro-galvanized.

5.2.7 The E.C. Grade copper strips and copper alloy used for current carrying parts should be of size 38 X 2 sq.mm. minimum.

5.2.8 The current density for Copper / Copper alloy should be less than 2.5 A/mm² and for Aluminium it should be less than 1.0 A/mm².

5.2.9 No negative tolerance is allowed for current carrying parts.

5.3. FUSE BASE TOP ASSEMBLY :

5.3.1 The top current carrying parts shall be made of a highly conductive copper alloy and the contact portion shall be smooth and silver-plated for corrosion resistance and for efficient current flow. The contact shall have a socket cavity for latching and holding firmly the fuse carrier until the fault interruption is completed within the fuse or it is pulled down by operating rod for Isolation purpose.

5.3.2 The top contact shall be actuated by a strong stainless steel spring, which keeps it under sufficient pressure to maintain a firm contact with the fuse carrier during all operating conditions. The spring shall also provide flexibility and absorbs most of the stresses when the fuse carrier is pushed into the closing position. The spring should have outer dia (OD) of 33mm and inner dia (ID) of 27 mm i.e. the wire used in spring should be of diameter 3 mm. The number of turns in spring should be 4(Four).

5.3.3 The top fixed contact of current carrying part of the assembly shall be made from electrolytic copper strip with reverse loop type spring loaded design to help constant pressure on moving top contact.

5.3.4 The top contact assembly shall have a robust galvanized steel hook to align and guide the fuse carrier into the socket latch even when the fuse carrier is closed at an off-centre angle.

5.3.5 The top assembly shall have aluminum alloy terminal connector suitable for weasel/ Rabbit ACSR conductor. The top assembly shall be robust enough to absorb bulk of the forces during the fuse carrier closing and opening operations and shall not overstress the spring contact. It shall also prohibit accidental opening of the fuse carrier due to vibrations or impact.

5.3.6 The top assembly shall have MS hot dip galvanized Arcing Horn of diameter 10 mm.

5.4. FUSE BASE BOTTOM ASSEMBLY :

5.4.1 The conducting parts shall be made of high strength highly conductive copper alloy and the contact portion shall be silver plated for corrosion resistance and shall provide a low resistance current path from the bottom fuse carrier contacts to the bottom terminal connector.

5.4.2 The bottom assembly shall have hinge contacts made from highly conductive, anti-corrosive copper alloy and shall accommodate and make a firm contact with the fuse carrier bottom assembly. The fuse carrier shall be placed easily in or lifted from the hinges without any maneuvering. In addition, the bottom assembly shall perform the following function:-

a) When opened manually or after fault interruption the fuse carrier shall swing through 180 degree vertically downwards and its further travel shall be prevented by the fuse base bottom assembly.

b) The fuse carrier shall be prevented from slipping out of the self locking hinges during all operating conditions and only when the fuse carrier has reached its fully open position can it be removed from the hinge support.

5.5 FUSE CARRIER TOP ASSEMBLY :

5.5.1 The fuse carrier top contact shall have a solid replaceable cap made from highly conductive, anti-corrosive copper alloy dully die cast and the contact portion shall be smooth & silver plated to provide a low resistance current path from the fuse base top contact to the fuse link. It shall make a firm contact with the button head of the fuse link and shall provide a protective enclosure to the fuse link to check spreading of arc during fault interruptions.

5.5.2 The fuse carrier shall be provided with a die cast copper alloy opening eye (pull ring) suitable for operation with a hook stick from the ground level to pullout or close in the fuse carrier by manual operation.

5.6 FUSE CARRIER BOTTOM ASSEMBLY :

5.6.1 The fuse carrier bottom assembly shall be made of Die cast copper alloy casting with silver plating at the contact points to efficiently transfer current to fuse base. It shall make smooth contact with the fuse base bottom assembly during closing operation.

5.6.2 The bottom assembly shall have a lifting eye for the hook stick for removing or replacing fuse carrier.

5.6.3 The bottom assembly shall have a suitable stainless steel spring actuated ejector which shall perform the following functions:

a) It shall keep the fuse link in the centre of fuse tube and keep it tensioned under all operating conditions.

b) It shall be capable of absorbing the shock when the fuse carrier is pushed into the closed position and shall not allow the fuse link to be damaged. This is especially important when the fuse links is of low-ampere rating.

c) The ejector at the instant of interruption shall retain the fuse carrier in the closed position long enough to ensure that the arc is extinguished within the fuse tube thereby excluding the possibility of arcing and subsequent damage at the contact surfaces.

d) The ejector shall help the fuse link separation after fault interruption, allowing the fuse carrier to drop out and clearing the pigtail of the blown fuse link through the bore of fuse tube.

5.6.4 The bottom assembly shall have a ejector assembly made from stainless steel sheet with stainless steel springs so that life long performance can be achieved.

5.6.5 The M.S. Sections used for mounting clamps or any other parts shall not be less than 6 mm thick duly hot dip galvanized.

5.6.6 The guiding / Arching horns shall not be less than 8 mm dia.

5.7 FUSE BASE (SOLID CORE PORCELAIN INSULATOR)

5.7.1 The fuse base shall be a bird-proof single unit solid core porcelain insulator. **The insulator shall be so designed that creepage distance should not be less than 320 mm.** The solid core porcelain Insulator should be of manufacturer / make used by PGCIL or NTPC or NHPC in their works / projects executed / supervised or consulted by them. The insulator should be duly type tested by CPRI/ any NABL accredited lab. The type test reports should be accompanied with the detailed drawing of type tested insulator duly signed by the same signatory who has signed type test reports.

5.7.2 **The top and bottom assemblies and the middle clamping hardware shall be suitably clamped with the Insulator.** For porcelain insulators, the beam strength shall not be less than 1000 kg.

5.8 FUSE TUBE

The fuse tube shall be made of fiberglass coated with ultraviolet inhibitor on the outer surface and having arc quenching bone fiber liner inside. The tube shall have high bursting strength to sustain high pressure of the gases during fault interruption. The

diameter of the fuse tube shall be **25 mm OD X 14 mm ID**. The solid metallic cap of the fuse carrier shall clamp the button head of the fuse link, closing the top end of the fuse tube and allowing only the downward venting during fault interruption. **The thickness of bone fiber liner should be 2.25 mm minimum.**

5.9 MOUNTING ARRANGEMENT

The Drop out fuse cum Isolator shall be provided with a suitable arrangement for mounting these in such a way that the centre line of the fuse base is at an angle of 15 Deg. to 20 Deg. from the vertical as shown in enclosed drawing and shall provide the necessary clearances from the support. Mounting arrangement shall be made of high strength galvanized steel flat of size 50x6 mm having length of 150 mm. Two holes of 14 mm dia should be made on the flat at the distance of 50 mm centre to center for fixing the Drop out fuse cum Isolator on structure of Distribution Transformer. The flat should be suitably clamped at the centre of the porcelain insulator. The flat shall be robust enough to sustain the various stresses encountered during all operating conditions of the Drop out fuse cum Isolator.

5.10 TERMINAL CONNECTORS :

The Drop out fuse cum Isolator shall be provided with two Nos. duly die casted Aluminum alloy (alloy designation 2280 (A-11) as per IS: 617-1975) terminal connectors at top and bottom of fuse base assemblies to receive ACSR conductors (Weasel/Rabbit) of diameters between 6.3mm to 10.05mm. These terminals shall be easily accessible irrespective of the cut-out location with respect to the pole. The terminal connectors should meet the test requirements of REC construction standard E-30.

5.11 FUSE ELEMENT :

5.11.1 The fuse element shall be button head type suitable for operating on the power frequency of 11kV Drop out fuse cum Isolator. The rating of the fuse element shall be 1.5 Amp to 5.0 Amp. Fuse Elements should generally comply with the ISS:9385 (Pt. II) /1980, except as modified / laid down hereunder :

- a) Fuse element shall be of fast blowing type having fusing factor of 1.15 to 1.20.
- b) Fuse element should blow within range of 15 to 25 seconds at 60% overload current. The fuse element should not blow in continuous operation at 10% over load.
- c) The fuse element should be strong enough to withstand the pull of DO fuses. As such they should properly crimped preferably by 3 fold crimping with silver / tin coated wires. The minimum pull the element be capable to sustain shall be 7Kgs. The length of fuse element should be suitable for use in 11kV Drop out fuse cum Isolator The strands use at the end should be made of silver / tin coated copper wire so as to withstand minimum pull for adequate current carrying capacity. Overall length of fuse element of 11KV shall be

minimum 14" (Inch). Time current characteristics of fuse element shall indicate the above characteristics of fuse element. The tenders without time current characteristics shall not be considered. All non metallic parts shall be constructed of the insulated materials. The materials shall be non-hygroscopic, except that tubular linings of the link, enclosing the fuse elements, need not be non-hygroscopic.

5.11.2 TIME CURRENT CHARACTERISTICS AND DRAWINGS FOR FUSE ELEMENTS :

Time current characteristics along with the copy of the drawings duly attested by the testing authority for the equipments in respect of which the test certificates has been issued by them for all the rating of fuse elements should be furnished along with the tender. In absence of the type test certificates and drawings as stated above, the tender offer will not be considered.

5.11.3 The fuse element shall be one of the makes being used by PGCIL or NTPC or NHPC in their works / projects executed / supervised or consulted by them. The bidder shall furnish attested copies of required documents/ Purchase Orders/ Specification in support of above.

5.12 OPERATING ROD :

The operating rod should be of suitable material (fiber glass) for lifting of fuse carrier after expulsion of fuse and opening of fuse carrier for isolation purpose. The upper end of operating rod should be so designed that it should be capable of lifting the fuse carrier from fuse base bottom assembly (removing of fuse carrier from Drop Out) and pulling the fuse carrier from the fuse base top assembly for isolation purpose. Also the upper end of operating rod should have the provision for placing and inserting the fuse carrier assembly in the drop out fuse set after replacement of fuse or for re-energisation of line. The operating rod should be folding (four steps) type and should be according to the relevant Indian Standards. The Operating Rod shall be one of the makes being used by PGCIL or NTPC or NHPC in their works / projects executed / supervised or consulted by them. The bidder shall furnish attested copies of required documents/ Purchase Orders/ Specification in support of above.

9.0 TESTS :

9.1 TYPE TESTS

i) The bidder shall furnish with their bid valid attested copy of type test reports for completely assembled 11 KV Drop Out Fuse cum Isolator from CPRI / NABL accredited independent test laboratory with detailed dimensional drawings with complete details of

bill of material, weight etc. on A-3 size paper duly signed and stamped by the testing agency with mention of relevant type test report number on the drawing.

ii) Bidder should also furnish documentary evidence in support of laboratory (Other than CPRI) whose Type Test reports have been furnished that the said laboratory is NABL accredited laboratory.

iii) Such type test certificates should not be older than three years as on the date of bid opening.

vi) The Purchaser reserves the right to ask the firm to show the original type test report as and when required.

vii) During type tests the Drop Out cum Isolator shall be mounted on its own support structure or equivalent support structure and installed with its own operating mechanism.

viii) The type test reports for bought out items i.e. solid core Insulator, fuse element and Terminal connector carried out from CPRI / NABL accredited Lab should preferably be furnished alongwith the tender. If the tenderer is not in a position to furnish Type Test reports of bought out items, with the bid, the same should be furnished within fifteen days from the date of receipt of Purchase Order or before furnishing of drawings for approval whichever is earlier.

ix) The following type tests are to be conducted on completely assembled 11 KV Drop Out Fuse cum Isolator, Solid core Insulators, Fuse Element and Terminal Connectors.

(A) FOR COMPLETELY ASSEMBLED DROP OUT CUM ISOLATORS:

1. Verification of Dimensions.
2. Dielectric tests (rated impulse withstands and rated one minute power frequency with stand test voltage).
3. Temperature Rise Test: The above tests shall be carried out in accordance with IS :9385 Part I & II for porcelain Fuse Base only
4. Beam strength test for Solid core insulator.

(B) FOR SOLID CORE PORCELAIN INSULATORS:

1. Verification of dimensions.
2. Temperature Cycle Test
3. Beam strength Test..
4. Porosity Test.

(C) FOR FUSE ELEMENT:

1. Physical Verification as per G.T.P./ Type Test /Approved Drawing.
2. Time current characteristics.
3. Breaking Test.

(D) FOR TERMINAL CONNECTORS:

1. Temperature rise test.
2. Short time current test.

9.2 TEST BEFORE DESPATCH : The 11 KV Drop Out Fuse shall be subjected at manufacturer's works (The insulators and Fuse Elements shall be tested at their manufacturer's works) to the following tests as per ISS.

A. ROUTINE TESTS :

1. Routine mechanical test.
2. Routine electrical tests.
3. Tests as per IS:9385.

B. ACCEPTANCE TESTS :

The following acceptance tests shall be got conducted in presence of purchaser's representative as per relevant standards at the place of manufacturer before dispatch without any extra charges.

a) For completely assembled 11 KV,100 AMP Drop Out Fuse cum Isolator:

The following acceptance tests are to be carried out on completely assembled 11 KV, 100 AMP Drop Out Fuse cum Isolator:

1. Verification of dimensions.
2. Temperature rise test on one sample per lot.
3. Galvanizing Test (Uniformity of Zinc coating)
4. Mechanical operation test (50 operations) on one sample at random form each lot.
5. Dielectric Test (One Minute Power frequency withstand test)

b) For Solid Core Porcelain Insulators

The following acceptance tests are to be carried out on insulators at original manufacturer's works, as per IS:2544 and sampling will also be as per same IS.

1. Verification of dimensions.
2. Temperature Cycle Test
3. Beam strength Test..
4. Porosity Test.

c) For Fuse Elements:

1. Physical Verification as per G.T.P./ Type Test /Approved Drawing.
2. Time current characteristics.
3. Breaking Test.

d) Manufacturer's Test Certificates/ invoices:

Manufacturer's test certificates/ invoices shall be furnished for following items at the time of inspection to Inspecting Officer who shall attach the same with Inspection report .

- i) Hard drawn electrolytic Grade copper
- ii) Stainless steel & M S Hot Dip galvanized fasteners.
- iii) Fiber Glass tube
- iv) Operating Rod
- v) Mild steel

11.0 TEST CHECKING OF MATERIAL AT STORES

The material received in the stores of the NIGAM shall be subjected to the test checking at stores before final acceptance of the material, the procedure for the same shall be as under :

11.1 SAMPLING

One sample out of each sub lot/ lot of **(500 sets)** Five Hundred sets or part thereof from each inspected lot received in stores shall be selected for test checking of material and shall be got tested. The selection of sample from the material received at stores shall be done as soon as material is received in stores without the presence of the representative of the supplier. However, testing of sample(s) at CTL shall be carried out in the presence of representative of the supplier after identification / confirmation by him that sample so selected belongs to them.

11.2 TESTS

The following tests shall be carried out on the above items :

- a) Visual examination , verification of dimensions, weight of non-ferrous parts (i.e. Copper and Aluminum Alloy) and marking as per PO/ GTP/ Approved drawing.
- b) Checking of current carrying parts as per approved drawings.
- c) Insulators :
 - i) Beam strength test.
 - ii) Porosity test
- d) All galvanized parts. - Uniformity of galvanization test.

However, only those tests shall be conducted for which facility is available in CTL.

For witnessing of the testing, clear 7 (seven) days notice shall be given to the supplier by fax/ speed post stating date, time & place where the test is to be conducted. In case the supplier do not attend for witnessing the testing, the testing shall be proceeded and completed and action be taken as per the contract.

The Officer Incharge of Central Testing Lab (CTL) Jaipur shall send copies of test reports to the purchaser, consignees and the supplier.

11.3 CRITERIA FOR ACCEPTANCE

- a) Visual examination , verification of dimensions, weight and marking.

As per Specification/GTP/Approved drawing.

- b) Checking of current carrying parts as per approved drawings.

If the dimensions of the current carrying metal part are in conformity with approved drawings, the material shall be accepted. When the dimensions of above parts are less then those minimum specified in the approved drawings but upto a limit of 5%, the material contained in the Lot / Sub-lot to which the sample belong shall be accepted subject to the conditions that the current density in above part is inconformity with contract and deductions at the rate of 2% cost of above parts for every 1% or part thereof reduction in weight due to less dimensions. The deduction shall be made for weight of above parts calculated on the basis of dimensions observed and found less. The weight shall be compared with one calculated on the basis of the minimum dimensions for the parts approved in the drawings. The rates for reduction shall be taken from the relevant IEEMA circular applicable on the date two month prior to the date of supply. When the dimensions are less than more than 5% as compared to the dimensions as per approved drawings, the material contain in the lot/ sub-lot to which the sample belongs shall be rejected and shall have to be replaced by the supplier.

- c) Insulators : i) Beam Test at 1000Kg.
 ii) Porosity test

In case of failure of any of samples in any of the above test , the material contained in the lot / sub lot received in the stores to which the sample(s) belong shall be rejected. The rejected material shall have to be replaced by the supplier free of cost.

- d) All galvanized parts. - Uniformity of galvanization test.

i) The sample(s) shall be first tested for (n-2) number of dips where n is specified No. of dips in the contract. If the sample does not pass the uniformity of galvanization test for (n-2) dips, the material shall be rejected and the material relating to relevant sub-lot/

lot to which the sample(s) pertains shall have to be replaced by the supplier free of cost.

ii) If the sample has passed the uniformity of galvanization test for (n-2) dips, then it shall be tested for (n-1) dips. If the sample has not passed the uniformity of galvanization test with (n-1) dips, the material pertaining to relevant lot/sub-lot shall be accepted with a deduction @ 4% of cost of galvanized material parts.

iii) If the sample passed the uniformity of galvanization test with (n-1) dips, then sample shall be tested for last one dip of one minute to complete the test for `n' dips. If the sample does not pass the uniformity of galvanization test with `n' dips, then the material pertaining to relevant lot/sub-lot shall be accepted with a deduction @ 2% of cost of galvanized material parts.

iv) If the sample(s) have passed the test with number of dips as specified in the contract (n), then material pertaining to relevant lot/sub-lot shall be accepted.

11.4 TEST CHARGES :

All test charges incurred towards test checking of the material received in our stores shall be borne by the NIGAM except that of personal expenses of the representative of the supplier for witnessing the tests.

12.0 TESTS ON BOUGHT OUT ITEMS

Tests are not required to be performed on general bought out equipments like Nuts and Bolts, Washers etc. at the works of manufacturer except operational tests. Furnishing Test Certificate from the original equipment manufacturers shall be deemed to be satisfactory evidence. Inspection of the tests at Sub-contractors works will be arranged by the supplier whenever required.

13.0 TOLERANCE :

Tolerance shall be allowed as per respective /relevant Indian Standards unless otherwise specified. However, no negative tolerance shall be allowed on current carrying parts.

14.0 OPERATIONS AND MAINTENANCE INSTRUCTION MANUALS:

The successful tenderers shall have to supply one sets of operations and maintenance instruction manuals per set of 11 KV Drop Out along with the erection manual and requisite detailed drawings of the equipments covered by this specification.

15.0 NAME AND RATING PLATE :

All items of the equipments included in this specifications shall be provided with a weather and corrosion proof name and rating plate in according with the provision of the IS:9385.

All the current carrying parts should be provided with indelible embossing/ precast marking of Trade mark of bidder/ supplier. The Insulators, Fuse Element and Operating Rod should also have marking of Trade mark of manufacturer of the item.

GUARANTEED TECHNICAL PARTICULARS FOR 11KV DROP OUT FUSE CUM ISOLATOR

(To be filled by the tenderer)

1.	Manufacturer's Name and Country of Manufacture	
2	Manufacturer's Type/Designation/Installation	
3.	Standard(s) according to which the 11 KV Drop Out Fuse are manufactured	
4.	Operating Voltage (KV)	
5.	Rated Voltage (KV)	
6.	Continuous Current (Amps.)	
7.	Type of Mounting	
8.	Rated Frequency (Hz)	
9.	Insulation Level (KV)	
10.1	1 Min Power frequency withstand voltage across isolating distance of fuse base.	
10.2	1 Min Power frequency withstand voltage to Earth and between poles.	
10.3	Lightening Impulse Withstand voltage to earth and between Poles (Peak).	
10.4	Lightening impulse Voltage across isolating distance of fuse base (Peak).	
11.	Temp. Rise Limit (for Cu. Contacts silver faced) Deg.C (in Air)	
12.	Temp. Rise for terminals in Deg.C (in Air)	
13.	Min. Isolating distance in mm	
14.	Creepage Distance for insulators in mm	
15.	Type of insulator	
16.	Type of fuse / rating.	
17.	Material of Fuse Tube	
18.	Fuse tube ID/OD in mm.	
19.	Rated Breaking capacity KA (asymmetrical)	
20.	Fuse base top current carrying part.	
21.	Environmental protection for current carrying parts.	
22.	Material for Fuse base bottom assembly.	
23.	Material for Fuse base top assembly.	

24.	Material for Fuse carrier top assembly.	
25.	Material for Fuse carrier bottom assembly.	
26.	Material of spring.	
27.	Material of contacts.	
28.	Details of terminal connectors i) Incoming	
	ii) Outgoing	
29.	Details of Anticorrosive Property (Fe Parts)	
30.	Details of Anticorrosive Property (Non-Fe Parts)	
31.	Applicable Standards.	
32.	Name of Manufacturer of Fuse Element.	
33.	Material of the fuse elements :	
34.	Rating of fuse element.	
35.	i) No. of strands in tail wire. ii) No. & size of wires in each strand. iii) Material of wire.	
36.	Fusing factor : (enclose time/ current/ characteristics)	
37.	Pull load of fuse elements.	
38.	Minimum time required to blow the fuse element at 60% over load currents.	
39.	Marking on fuse element.	
40.	IS : reference No. to which fuse element conform :	
41.	Total weight of MS Galvanised parts	
42.	Total weight of copper alloy parts	
43.	Total weight of Aluminium parts	

GUARANTEED TECHNICAL PARTICULARS FOR 11 KV DROP OUT FUSE CUM ISOLATOR

S.NO.	DESCRIPTION	11 KV DROP OUT FUSE CUM ISOLATOR
1.	Manufacturer's Name and Country of Manufacture	
2	Manufacturer's Type/Designation/Installation	Expulsion Type
3.	Standard(s) according to which the 11 KV Drop Out Fuse are manufactured	IS:9385 (Part.I to III) & as per Tech. Specification of TN-4185
4.	Operating Voltage (KV)	11 KV
5.	Rated Voltage (KV)	12 KV
6.	Continuous Current (Amps.)	100 Amps
7.	Type of Mounting	Horizontal Upright
8.	Rated Frequency (Hz)	50 Hz
9.	Insulation Level (KV)	As per IS
10.1	1 Min Power frequency withstand voltage across isolating distance of fuse base.	32 KV
10.2	1 Min Power frequency withstand voltage	28 KV

S.NO.	DESCRIPTION	11 KV DROP OUT FUSE CUM ISOLATOR
	to Earth and between poles.	
10.3	Lightening Impulse Withstand voltage to earth and between Poles (Peak).	85 KV Peak
10.4	Lightening impulse Voltage across isolating distance of fuse base (Peak).	75 KV Peak
11.	Temp. Rise Limit (for Cu. Contacts silver faced) Deg.C (in Air)	55° C
12.	Temp. Rise for terminals in Deg.C (in Air)	40° C
13.	Min. Isolating distance in mm	As per G.A. Drawing (200 mm)
14.	Insulator	
	a) Type of Insulator	Single Unit Solid Core
	b) Make of Insulator	Any make approved by PGCIL/NHPC/NTPC
	c) Creepage Distance in mm	320 mm
	d) Beam Strength	1000 Kg or more
15.	Fuse	
	a) Type of fuse	Expulsion Type
	b) Make of fuse	Any make approved by PGCIL/NHPC/NTPC
	c) Rating	1.5/1.0/3.0 Amp
16.	Rating of fuse element.	1.5 Amp (1 Amps+3 Amp Spare)
17	i) No. of strands in tail wire. ii) No. & size of wires in each strand. iii) Material of wire.	As per Spec Silver/ Tin Coated wire
18	Fusing factor : (enclose time/ current/ characteristics)	As per Type Test
19	Pull load of fuse elements.	7 Kg
20.	Fuse Tube	
	a) Material	Fiber Glass with UV inhibitor on the outer surface and arc quenching bone fiber liner inside.
	b) Fiber Glass Tube OD in mm	25 mm
	c) Fiber Glass Tube ID in mm	14 mm
	d) Thickness of bone fiber	2.25 mm(min.)
21	Rated Breaking capacity KA (asymmetrical)	AS per ISS/ Specification
22	Fuse base top current carrying part.	Brass/ Gun Metal
23	Environmental protection for current carryi parts.	N.A.
24	Material for Fuse base bottom assembly.	Highly conductive copper Alloy silver plated at contact points
25	Material for Fuse base top assembly.	Highly conductive copper Alloy silver plated at contact points
26	Material for Fuse carrier top assembly.	Die Casted Copper Alloy silver plated at contact points

S.NO.	DESCRIPTION	11 KV DROP OUT FUSE CUM ISOLATOR
27	Material for Fuse carrier bottom assembly.	Die Casted Copper Alloy silver plated
28	Spring	
	a) Material	SS – Stainless Steel.
	b) OD in mm	33 mm
	c) ID in mm	27 mm
	d) Diameter of wire in mm	3 mm
	e) No. of turns	4 No.
29.	Material of contacts.	HDE Copper
30	Details of terminal connectors	Suitable for Rabbit/ Weasel Conductor
	i) Incoming	
	ii) Outgoing	Suitable for Rabbit/ Weasel Conductor
31	Details of Anticorrosive Property (Ferrous Parts)	Bolts & Nuts as per IS:1364 and all other Hot Dip Galvanized as per IS:2633
32	Details of Anticorrosive Property (Non-Ferrous Parts)	Silver Plated
33	Applicable Standards.	IS:9385 Part 1 & 2
34	Name of Manufacturer of Fuse Element.	PGCIL/ NTPC/ NHPC approved
35.	Minimum time required to blow the fuse element at 60% over load currents.	15 to 25 Sec.
36.	Marking on fuse element.	Manufactures mark
37	IS : reference No. to which fuse element confirm :	IS-9385 (Pt-II)
38.	Total weight of MS Galvanised parts	1.600 ± 10%
39.	Total weight of copper alloy parts	0.800 ± 10%
40.	Total weight of Aluminium parts	0.130 ± 10%

SECTION-III

TECHNICAL SPECIFICATION FOR ACSR WEASEL AND AAA CONDUCTOR (EQUIVALENT TO WEASEL) AGAINST TN-1207

1. SCOPE

1.1 This section provides for manufacture, testing before **dispatch, supply and delivery anywhere in Rajasthan in the stores of JVVNL / AVVNL / JDVVNLF.O.R** Destination of Aluminum Conductor, Galvanized Steel reinforced (ACSR) and all Aluminum Alloy Conductor (AAAC) for satisfactory operation in various lines and sub-stations. The conductor should conform to latest IS. The requirement of various type of Conductor shall be as per Schedule of Requirement Annexed with this Section at Schedule-I. It may be noted that the requirement indicated in the Schedule is tentative and may vary at the time of placement of order.

1.2 Aluminum Conductor with galvanized Steel re-enforcement shall be conforming to IS: 398(Pt.2)/1996 and All Aluminum Alloy Conductor conforming to IS-398 (Part.4)/1994 with latest amendments if any, supplied on non returnable strong wooden drums generally conforming to IS: 1778/1981 (Latest).

The bidders should be a manufacturer of offered Conductor. The Offers from sole selling agents / authorized dealer shall not be entertained. The firms (manufacturers) must posses valid ISI License for the offered Conductor. The technical bid of the bidders shall be considered for opening in absence of non-furnishing of above required ISI License along with the bid. However, price bid of the responsive bidders shall only be opened if bidder furnishes above required ISI License up to the official working hours of one working day prior to the scheduled / notified date of opening of price bid, failing which price bid of the bidder shall not be opened. The bids from trading firms shall not be considered.

2. CLIMATIC CONDITIONS:

S. No.	Particulars	Value
1.	Peak ambient temperature in shade	50 deg C
2.	Maximum average ambient temperature in a 24 hours period in shade	40 deg C
3.	Min. ambient air temperature in shade	(-) 5 deg.C
4.	Maximum temperature attainable by an object exposed to sun.	60 deg.C
5.	Maximum relative humidity	100%
6.	Average number of thunderstorms days per annum	40
7.	Average number of rainy days per annum	100
8.	Average annual rainfall	10 to 100 cm
9.	Number of months of tropical Monsoon conditions	4 months
10.	Maximum wind pressure	100 Kg/sq mtr
11.	Altitude not exceeding	1000 M

3. GENERAL TECHNICAL REQUIREMENT OF ACSR CONDUCTORS:

The technical particulars shall be furnished strictly in the Performa attached at Schedule-V-A of this specification. The specific values must be indicated against each column and no 'dash', 'dot', 'blank' or as per IS word should be indicated in this schedule. The technical suitability shall be adjudged from the values furnished in the clause 3.2 "PRINCIPAL PARAMETERS".

The ACSR conductor shall comply in all respect with IS: 398(Part.2)/1996 with latest amendment, if any from the date of its applicability. Any departure from the standard be indicated in Schedule-III.

3.1 MATERIAL

The material offered shall be of the best quality and workmanship. The conductor shall be constructed from hard drawn aluminum and galvanized steel wires which have the mechanical and electrical properties specified in Tables 1 & 2 of IS:398(Part.2)/1996 with latest amendment, if any, The Zinc coating on the galvanized steel wires may be applied in accordance with IS:4826/1979 with latest amendment if any. The EC Grade Aluminum rods for use in the manufacture of Aluminum Wires shall conform to IS:5484/1978 amended up to date. The zinc used for galvanizing shall be Electro type High Grade Zinc not less than 99.95 percent purity. It shall conform to and satisfy all the requirements of IS:209/1992 amended up to date. Galvanized Steel Wire should comply mechanical properties as per Table 2 of IS:398 (Part.2)/1996 amended up to date. The chemical composition is as per Annexure-C of IS:398 (Part.2)/1996 amended up to date.

3.2 **PRINCIPAL PARAMETERS:**

The details of ACSR Conductor are tabulated below:-

PARTICULAR	ACSR Weasel
a) Stranding and wire diameter (mm)	6/2.59 Al. 1/ 2.59 St.
b) Number of strands Central Steel wire Aluminum	1 6
c) Sectional area of Aluminum (Sq. mm)	31.61
d) Total Sectional area (Sq. mm)	36.88
e) Overall diameter (mm) (Approx.)	7.77
f) Weight (Kg/Km) (Approx.)	128.00
g) Calculated max. DC resistance at 20 Deg. C (Ohm./ Km.)	0.9289
h) Approx. calculated breaking load (KN)	11.12
i) Modulus of elasticity (GN/Sq. meter)	79
j) Coefficient of liner Expansion per deg C.	19.1×10^{-6}

3.3 The details of aluminum strands are as follows:

PARTICULAR	ACSR Weasel
a) Min. Breaking load of strand before stranding (KN)	0.89
b) Min. Breaking load of strand after stranding (KN)	0.85
c) Max. D.C. Resistance of strand at 20 Deg. C (ohm/Km.)	5.490
d) Diameter mm Nominal Minimum Maximum	2.59 2.56 2.62
e) Mass (Kg/Km.)	14.24

3.4 The details of steel strands are as follows:

PARATICULAR	ACSR Weasel
i) Min. Breaking load of strand before stranding (KN)	6.92
ii) Min. Breaking load of strand after stranding (KN)	6.57
iii) Diameter mm a) Nominal b) Max./Min	2.59 2.64/2.54
iv) Zinc coating testing	2 dips of 1 min. each & 1 dip. of ½ min.
v) Min. weight of zinc coating GM/ Sq. Mtr.	218.50
vi) Mass of strand at normal diameter of strand(Kg./Km.)	41.09

3.5 **Tolerance on normal sizes:**

The tolerance in diameter of aluminum wires and steel wire used in the manufacture of ACSR shall be allowed as per IS: 398/ (Part-2) /1996 amended up to date.

3.6 **Stranding :**

S. No.	Particulars	ACSR WEASEL
1	Number of wires : a) Aluminum b) Steel	6 1
2	Ratio of aluminum Wire dia-meter to Steel wire dia-meter	1
3	Lay ratio for aluminum Wires (Outer most layer): a) Minimum b) Maximum	10 14
4.	Lay ratio for steel core (6 wire layer) a)Minimum Maximum	- -

3.6.1 The of a steel shall

wires used in construction galvanized reinforced aluminum conductor before

stranding, satisfy all the relevant requirements of this specification and relevant IS.

3.6.2 The lay ratio of the different layers shall be within the limits given:

NOTE: For the purpose of calculation, the mean lay ratio shall be taken as the arithmetic mean of the relevant minimum and maximum value given in this table.

4.0 **GENERAL TECHNICAL REQUIREMENT OF AAA CONDUCTOR:**

The technical particulars shall be furnished strictly in the Performa attached at Schedule-V-B of this specification. The specific values must be indicated against each column and no 'dash'.

'dot', 'blank' or as per IS word should be indicated in this schedule. The technical suitability shall be adjudged from the values furnished in the clause 4.2 "PRINCIPAL PARAMETERS".

The AAA conductor shall comply in all respect with IS: 398(Part.4)/1994 with latest amendment, if any from the date of its applicability.

4.1 MATERIAL :

Material offered shall be of the best quality & workmanship. The wires shall be of heat treated aluminum, magnesium Silicon Alloy having a composition appropriate to the mechanical & electrical properties specified in Table 1 of IS – 398 (Part-4) / 1994 with latest version if any.

4.2 PRINCIPAL PARAMETERS:

The details of AAA Stranded Conductor are tabulated below:

S. No.	Particulars	AAA Conductor (Equivalent size of ACSR Weasel)
1.	Nominal Aluminum Alloy Area	34 Sq. mm
2.	Stranding and Wire dia	7/2.50 mm
3.	Cross Sectional Area of Conductor	34.36 Sq. mm
4.	Approximate overall Dia	7.50 mm
5.	Approximate Mass	94.00 Kg. / Km.
6.	Calculated Resistance at 20 Deg. C (Max.)	0.990 Ohms/Km.
7.	Approximate Breaking Load	10.11 KN

4.3 The properties of Aluminum Alloy Wires to be used in the construction of the stranded conductor shall be as follows:

S. No.	Particulars	AAA Conductor (Equivalent size of ACSR Weasel)
1.	Dia Meter a) Nominal b) Minimum c) Maximum	2.50 mm 2.47 mm 2.53 mm
2.	Cross Sectional Area of nominal dia wire	4.909 Sq. mm
3.	Mass	13.25 Kg./Km.
4.	Minimum Breaking Load after stranding	1.44 KN
5.	Resistance at 20 Deg. C (Max.)	6.845 Ohm/Km.

4.4 TOLERANCES ON NORMAL SIZES:

A tolerance of +/- 1% shall be permitted on the nominal diameter specified in Table 1 of IS-398 (Part-4)/1994 with latest version if any.

4.5 STRANDING

4.5.1 The wires used in the construction of stranded AAA Conductor shall before and after stranding satisfy all the relevant requirement of IS-398 (Part-4)/1994 with latest version if any.

4.5.2 The lay ratio of different layers shall be within the limits given below:

Number of Wires in AAA Conductor	Lay Ratio	
	Minimum	Maximum
7	10	14

The outer layer shall be right handed. The wires in each layer shall be evenly and closely stranded.

5. TESTS (FOR ACSR CONDUCTOR):

TESTS BEFORE DESPATCH: The ACSR Conductor shall be subjected at manufacturer's works before dispatch, to the tests mentioned here-under as per IS: 398 (Part-2)/1996 with latest amended.

5.1 ROUTINE TESTS:

The following tests shall be conducted before and after stranding on each drum of the conductor by the manufacturer at his works as per relevant standard IS: 398 (Part-2)/ 1996 (latest amended)

- a) Visual & dimensional check on drum as per specification.
- b) Visual check for joints, scratches etc. and length of conductor by re-winding of conductor on empty drum as per Specification/ IS.
- c) Measurement of dia-meter of individual Aluminum and steel wires. (Clause-13.2)
- d) Measurement of Lay Ratio. (Clause-13.8)
- e) Breaking load of individual wires (Clause-13.3.1)
- f) Ductility Test (Clause-13.4)
- g) Wrapping Test (Clause-13.5)
- h) Resistance Test (Clause-13.6)
- i) Galvanizing Test (Clause-13.7)
- j) Any other test as per relevant IS

5.2 ACCEPTANCE TESTS:-

The following tests shall be conducted on samples taken at random from a lot as per relevant standard IS: 398 (Part-2)/1996 (Latest amended) in presence of purchaser's representative:-

- a) Visual & dimensional check on drum as per specification.
- b) Visual check for joints, scratches etc. and length of conductor by re-winding of conductor on empty drum as per Specification / IS.
- c) Measurement of dia-meter of individual Aluminum and steel wires. (Clause-13.2)
- d) Measurement of Lay Ratio. (Clause-13.8)
- e) Breaking load of individual wires (Clause-13.3.1)

- f) Ductility Test (Clause-13.4)
- g) Wrapping Test (Clause-13.5)
- h) Resistance Test (Clause-13.6)
- i) Galvanizing Test (Clause-13.7)

6.0. TEST FOR AAA CONDUCTORS:

6.1. **TESTS BEFORE DESPATCH:** The AAA Conductor shall be subjected at manufacturer's works before dispatch, to the tests mentioned in IS: 398 (Part-4)/1994 with latest version if any.

6.2. Following acceptance tests shall be conducted on samples taken in presence of purchaser's representative as per Clause No.12.1.2 of IS-398 (Part-4)/1994 with latest version if any.

- (A) Breaking Load test as per Clause No.12.2 of IS-398 (Part-4)/1994
- (B) Elongation Test as per Clause No.12.3 of IS-398 (Part-4)/1994.
- (C) Resistance test as per Clause No.12.4 of IS-398 (Part-4)/1994.

In addition to above following tests shall also be carried out as acceptance tests at the works of firm during inspection:

- a) Visual & dimensional check on drum as per specification.
- b) Visual check for joints, scratches etc. and length of conductor by re-winding of conductor on empty drum as per Specification / IS.
- c) Measurement of dia-meter of individual Aluminum Alloy Wire.
- d) Measurement of Lay Ratio.

7.0 TYPE TESTS (ACSR & AAA CONDUCTORS):-

The type test in respect of ACSR Weasel, & AAA Conductor is already covered under Acceptance Tests, thus requirement of furnishing type test for ACSR Weasel and AAA Conductor is not essential along with Bid.

8.0 SAMPLING PLAN (FOR ACSR & AAA CONDUCTOR):

8.1 Samples for Acceptance Tests: Samples shall be taken as per relevant IS i.e. IS-398 (Part-2)/1996 or IS-398 (Part-4)/1994 with latest version as the case may be.

8.2 Apart from the sample selected for carrying out Acceptance Tests at the works of the firm during inspection, **one more sample from each length be also selected out of one drum under re-winding for carrying out various Acceptance Tests as per relevant IS. If any of the sample so selected from each length failed in any acceptance test the entire lot under inspection is not acceptable.**

8.3 TOLERANCE ON TEST RESULTS:

Tolerance on test results shall be allowed as per relevant IS/Spec. whichever is more stringent.

9.0 INSPECTION

9.1(a) The conductor shall be manufactured in accordance with latest edition of IS: 398(Part.2)/1996 or IS-398 (Part-4)/1994 with all subsequent amendments issued from time to time for ACSR Conductor or AAA Conductor respectively. All the tests as laid down in the above mentioned specification on individual aluminum wire and steel wire or Aluminum Alloy Wire as the case may be shall be carried out. The testing shall also include the tests on manufactured

finished conductor. Moreover the supplier shall also furnish test certificate(s) of raw materials to the inspecting officer at the time of inspection. The inspection & testing shall be governed by Clause No.1.27 of Section-II (General Condition of Contract).

- (b) The supplier / manufacturer must offer conductor for inspection through a letter of offer mentioning size and quantity of the conductor along with Packing List duly signed indicating drum Serial No. individual lengths total length, net weight & gross weight in DUPLICATE. This letter of offer shall be addressed to this office. The packing list shall also be furnished to the Inspecting Officer prior to carrying out the inspection at the works.
 - (c) The Manufacturer shall provide all adequate facilities at his works for inspection of at least one number conductor drum or 5% conductor drums offered for inspection whichever is higher selected at random by the authorized representative of the purchaser for checking / verification of conductor length/ manufacturing defects by transferring the conductor from one drum to the another empty drum and at the same time measuring the length and lay ratio of each conductor length so transferred by means of the standard calibrated and sealed meter.
 - (d) If the firm is not having the necessary facilities for carrying out the required tests as per relevant IS / Purchase Order, the supplier will arrange such testing facilities in some other Government laboratory and shall bear the cost so incurred. But in such cases firm shall inform to the purchaser in advance before commencement of supplies.
 - (e) The supplier shall provide adequate facilities for weighment of all the drums offered for inspection.
- 9.2 In case of testing after re-offering as per Clause No.15 of IS:398 (Part.2)/1996 or Clause No.13 of IS:398 (Part-4)/1994 as the case may be, the lot under reference will be subject to 100% checking, if required by the purchaser.
- 9.3 The supplier shall present the latest Calibration Certificate(s) of testing instruments / equipments to be used for the testing of the material covered in the Purchase Order to the authorized inspecting officer / inspecting agency of the purchaser. The testing instruments / meters/ apparatus etc. should be got calibrated by the supplier from time to time from Govt. Lab or Independent test laboratory / house having valid accreditation from National Accreditation Board for Testing and Calibrating Laboratories for the testing equipments or original manufacturer having traceability to NABL / NPL or equivalent accredited lab.

The calibration certificate(s) should not in any case be older than one year at the time of presenting the same to the inspecting officer / inspecting agency of the purchaser. The testing instruments / equipments should be duly sealed by the Calibrating Agency and mention thereof shall be indicated in the calibration certificate(s).

- 9.4 The manufacturer will provide certificates as per the Clause No.7 of IS: 398((Part.2)/1996 "Freedom from defects" and clause No.9 "Joint in Wires" of IS:398 (Part 2) /1996 for ACSR Conductors and the certificates as per Clause No.6 & 8 of IS:398 (Part-4)/ 1994 for AAA Conductors.

10.0 STANDARD LENGTH & VARIATION IN LENGTHS:

10.1 The ACSR & AAA Conductor shall be supplied in the standard length. The standard length of ACSR & AAA Conductor shall not less than the value specified below with a tolerance of (-) 5%. More than the standard length shall be acceptable.

a) **ACSR Weasel - 1500 Mtrs.**

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b) **AAA Conductor (Equivalent size of Weasel Conductor) – 1500 Mtrs.**

10.2 Short length(s), if any shall not measure less than 80% of standard length as specified above in any case. The total quantity of such short length(s) shall not exceed 5% of the quantity of the lot offered for inspection.

10.3 **The maximum permissible length per drum shall be as under subject to condition that the manufacturer while packing the conductor in drum shall ensure that after winding complete quantity of conductor in drum a uniform space of not less than 100 mm. remains between outer layer of conductor and inner surface of the external protective lagging of the drum. This is essential to ensure that the conductor does not get closer to the lagging and to avoid damaged during transportation/ reeling / unreeling or rolling on the undulated ground / fields:**

a) **ACSR WEASEL--- 7.5 Kms.**

b) **AAA Conductor(Equivalent size of Weasel Conductor) --- 7.5 Kms.**

11.0 QUANTITY TOLERANCE:

A quantity tolerance of plus minus 2% shall be allowed on the total ordered quantity.

12.0 QUANTITY:

c) The quantities as mentioned in the schedule of requirement are tentative & these may increase/decrease as per the requirement of the Nigam (**Schedule-I**).

d) Details of offered quantity along with justification with reference to Qualifying Requirement shall be furnished in **Schedule-IVA**.

13.0 PACKING FORWARDING AND MARKING:

13.1 The packing shall have to be done as per standard practice worthy of road transport. The conductor shall be wound in strong wooden drums so as to withstand all stresses due to transportation, handling and stringing operation so that there is no damage caused to the conductor during the process of these operations. The wooden drums shall be non-returnable and shall **generally conform IS:1778/1981 with latest amendments, however, the main parameters of the drum shall be as under:**

S.NO.	PARTICULARS	DIMENSION FOR ACSR WEASEL CONDUCTOR & AAA CONDUCTOR (EQUIVALENT SIZE OF WEASEL)
1.	Flange Dia	1250 mm (+/- 5%)
2.	Flange Thickness	2x25 mm (+/- 5%)
3.	Barrel Dia	500 mm (+/- 10 mm)
4.	Traverse	510 mm (+/- 10 mm)
5.	Number of Bolts	4 Nos.
6.	Dia of Bolts	12 mm

7.	Bore Dia	80 mm
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However, use of seasoned wood shall not be insisted, provided wood used should be of good quality to withstand transportation hazards. The drums shall be having inside flanges painted with Aluminum Paint and with Ordinary White Enamel paint from outside. The conductor on each drum shall be securely fastened at each end. The outer end of the conductor shall be fastened inside the drum against one of the sides of the flanges while it is under tension and shall be such that no looseness is transmitted to the internal layers. The conductor shall be snugly, tightly and uniformly spooled on the drums. The wrapping of conductor on the drums shall be laid snugly against side of the preceding wrap and the first and last wrap in each layer shall fit snugly against the sides of the flanges. Drums shall be lagged with sufficient strong wooden laggings to support the full drum without crushing. The wooden drums after providing lagging shall be fastened by two steel wires of min. 3 mm. Dia over the lagging on the two sides of adequate size to keep the lagging intact and to prevent the drum from crushing/ damage.

Although the various dimension of the drums such as flanges, stretches, traverse and barrel diameter shall depend on the quantity of conductor as offered and agreed upon, on one drum.

The manufacturer while packing the conductor in drum shall ensure that after winding complete quantity of conductor in drum a uniform space of not less than 100 mm. remains between outer layer of conductor and inner surface of the external protective lagging of the drum. This is essential to ensure that the conductor does not get closer to the legging and to avoid damaged during transportation/ reeling / unreeling or rolling on the undulated ground / fields.

13.2 Water proof material shall be wrapped round the barrel and inner surface of flange before winding the conductor and also wrapped round over the conductor completely wound and under the laggings.

13.3 **The drums shall be marked clearly in block letters with water proof mark having the marking attached to them so that there is no possibility of goods being lost or wrongly dispatched due to faulty marking. The marking shall constitute the following:-**

- a) Name & full address of the consignee.
- b) Destination station.
- c) Serial number of drum.
- d) Size of Conductor with its code name.
- e) Total length of Conductor in drum, with individual length (s).
- f) Number of length(s) in each drum.
- g) Gross mass of drum including the tare mass of drum.
- h) Tare mass of the empty drum with lagging.
- i) Net mass of conductor.
- j) BIS standard mark.
- k) Name of the supplier.

- l) Purchase order reference/TN number.
- m) Date of expiry of warranty / guarantee period.

Besides above, an arrow shall be put on the drum so as to indicate the direction in which the drum can be unwound. The manufacturer shall also provide his own lead seal with distinguishing mark at the outer end of the conductor on each drum before dispatch of the material.

14. PRICES :

- a) The bidder shall quote the Prices in **BOQ(Online)** strictly in the manner prescribed in Clause No. 1.09 of Section-I (Instruction to Bidders) & Clause No. 1.33 of Section-II (General Conditions of Contract).
- b) The **prices** quoted shall be **variable as per PV formula** given in the specification at **Clause No.15** without any ceiling with **Base Date as 1st day of one month prior to the date of opening of technical bid.** The Price Variation shall be governed by Clause No. 1.10 of Section-I (Instruction to Bidder).

15. PRICE VARIATION FORMULA:

The price of conductor(s) shall be variable without any ceiling, based on the average prices of ex-prime producer of EC grade Aluminum rod and High Tensile Galvanized steel wire in case of ACSR Conductor and Aluminum Alloy Rod incase of AAA Conductor prevailing on **1st day of one month prior to the date of opening of technical bid**, as per CACMAI Circular. The average price of the EC grade Aluminum wire rod, Aluminum Alloy Rod and price of High Tensile Galvanized steel wire (as the case may be) shall be furnished along with the bid.

No base price other than the prices prevailing on 1st day of one month prior to the date of opening of technical bid as per CACMAI Circular will be acceptable in any case.

No variation shall be allowed on labour, packing, forwarding, freight and insurance charges.

The duties / taxes shall not be allowed on basic price of Aluminum Rods, Aluminum Alloy Rods and Steel Wire, while evaluating the price variation.

Any statutory variation on ED and CST / VAT on the finished conductor shall be payable according to Clause No.1.09.15 of Section-I " Instructions to Bidders".

The Price Variation amount shall be determined as under:

- A. For every one Rupee, increase / decrease per Kg. in the above price of EC grade Aluminum wire Rod, the price per Km. for ACSR Weasel Conductor shall be increase / decrease by @ Rs.87.00. For every one rupee, increase / decrease per Kg. in the above price of high tensile galvanized steel wire the price per Km. of ACSR Weasel Conductor shall be increase / decrease by @ Rs.41.00.
- B. For every one Rupee, increase /decrease in the price per Kg. of raw material (Aluminum Alloy Rod) the cost per KM of AAA Conductor increase / decrease by @ Rs.94.00.

The above price variation bears no ceiling limit.

The applicable price for claiming price variation on account of change in the price of EC grade Aluminum Wire rod ,Aluminum Alloy Rod and High Tensile Galvanized Steel wire shall be the

price prevailing on the delivery date which shall be considered as per Clause No.1.10 of Section-I " Instructions to Bidders"

The quoted price should be based on the above price variation clause only.

In case there is any decrease in the base price of Aluminum, Aluminum Alloy and Steel, supplier shall give an undertaking in the shape of Indemnity Bond on Non Judicial Stamp Paper of Rajasthan State Government Worth Rs.100/- that such decrease will be immediately accounted for and brought to the notice of the purchaser to revise price accordingly. In case of failure to do so, the purchaser shall be at liberty to recover the excess amount drawn by you from any pending payments due or by operating the Bank Guarantee(s) or in the manner as may be deemed appropriate and expedient.

However, if any amount of Excise duty / Sales tax / VAT is claimed from the JVVNL/AVVNL/JdVVNL and subsequently got refunded back to the supplier from the Government of India / State Government the same shall be refunded to the purchaser within 15 days. Failing which purchase shall be at liberty to recover the excess amount drawn by supplier from any pending payment due or by operating Bank Guarantee(s) or in the manner deemed to be appropriate and expedient.

16.0 MODVAT

The price quoted in the bid offer should be after considering the Modvat benefit.

17.0 OCTROI DUTY

Presently, Octroi duty is not applicable in entire Rajasthan State and JVVNL/AVVNL/JdVVNL is exempted from payment of Octroi Duty. However, if leviable, the same shall be borne by the Nigam at actual and shall be payable by the consignee or the Sr. A.O.(Cash & CPC) JdVVNL, Jodhpur on production of original cash receipt provided the GTR is prepared in favor of Jodhpur Vidyut Vitaran Nigam Limited and not on "SELVES" basis.

18.0 PAYMENTS

The payment shall be governed by the provisions of the General Conditions of Contract and shall be released after receipt of successful test report from Nigam's (CTL) on the samples selected from the material received in stores as per clause No.20.

19.0 DELIVERY:

The bidder is required to quote monthly delivery in Schedule-VIII. The delivery of quoted quantity of each type of conductor should be **commenced after 30 days from the date of receipt of purchase order and shall be completed in 09 (Nine) months thereafter at equal monthly installments for each type of conductor.** In case of ordered quantity is different than the quoted quantity, then monthly delivery shall be adjusted proportionately. **Bids of bidders in which monthly delivery schedule is not quoted shall be considered as Non Responsive.**

20.0 TEST CHECKING OF MATERIAL AT STORES:

- i) **Sample drums from the material received at stores shall be selected for testing at CTL as per sampling plan given hereunder in presence of firm's representative.**
- ii) **The selected sample drum for CTL testing shall be identified by the seals provided by Inspecting Officer / Inspecting Agency during pre-dispatch inspection at firm's works and these sealing details shall be invariably mentioned in the selection Memo by the nominated officers of Nigam.**
- iii) The tests in the Nigam Testing laboratory (CTL) shall be conducted in the presence of representative of supplier for which a 7 days notice shall be issued through Fax / Speed Post stating Date & Time to the firm, so that supplier can depute their representative to witness the test . In case the supplier or his representative does not turn up the testing shall be proceeded & completed. **The payment shall be released only after receipt of successful CTL test reports** for the samples selected at purchaser's stores for mandatory test checking the samples to be selected from material received at Nigam's stores by officers to be nominated by Circle SE's / SE(I&S/RA&C/IT/_) for testing at CTL.

20.1 **SAMPLING**

Selection of samples from the material received at stores shall be done as soon as material received in stores in the presence of representative of supplier.

One number Drum out of each lot / sub-lot of 20 Nos. Drums or part thereof for the material received in Stores of Nigam. The selected sample drum / drums shall be transported to CTL by concerned ACOS / SS.

In case of selection of sample for type test the length of the sample shall be of 15 Mtrs. The selected and sealed sample for type test shall be identified by providing polycarbonate seals on both ends of conductor and after forming the coil of conductor two stickers seals provided around the coil.

20.2 **TESTS**

20.2.1. The following tests shall be carried out as per relevant Clause of latest IS-398 (Part2)/1996 on each selected drum by drawing sample of 5 Mtrs. at CTL from random distance from any length of the selected drum of ACSR Conductor during rewinding:

- a) Rewinding test (Measurement of Length and weight) & Checking of Manufacturing defects.
- b) Measurement of lay ratio during rewinding of Conductor Drum.
- c) Dia. of Aluminum Strands and Steel Wires.
- d) Breaking load test.
- e) Resistance Test.
- f) Galvanization of steel wire (Uniformity) and Mass of Zinc Coating.

- g) Verification of Water Proof marking on Drum as per Specification.

20.2.2 The following tests shall be carried out as per relevant Clause of latest IS / Specification on each selected drum by drawing sample of 5 Mtrs. at CTL from random distance from any length of the selected drum of AAA Conductor during rewinding:

- i) Rewinding test (Measurement of Length and weight) & Checking of Manufacturing defects.
- ii) Measurement of lay ratio during rewinding of Conductor Drum
- iii) Breaking Load test
- iv) Elongation Test
- v) Resistance test
- vi) Measurement of dia-meter of individual Aluminum Alloy Wire.
- vii) Verification of Water Proof marking on Drum as per Specification.

NOTE: (a) In addition to above tests remaining acceptance tests as per relevant IS shall also be conducted at CTL provided the testing facility is available at CTL for these tests time to time. Only those tests shall be conducted for which testing facilities are available in NIGAM's Lab.

- (a) The Officer In charge of central Testing Lab (CTL) of Nigam shall send copies of test reports to the Purchasing Officer / Sr. AO (CPC), consignee and the supplier.

(b) The payment of every lot shall be released after receipt of successful test report from Nigam's Lab (CTL) on the samples selected from the material received in Nigam stores.

20.3 **CRITERIA FOR ACCEPTANCE:**

- (a) Rewinding Test (Measurement of Length and weight): The results of measurement of length test shall be made applicable to all drums contained in each lot/sub-lot by making deduction of less length of conductor in a sample drum. In case short length is observed more than one percent of the length contained in lot / sub-lot , then the lot / sub-lot shall liable to be rejected.

The net calculated weight of various type of conductor corresponding to minimum prescribed diameter in IS of Aluminum Strand, Steel Strand (ACSR Conductor) and Aluminum Alloy Strand (AAA Conductor) shall be as under:

a) ACSR WEASEL	124.32 Kg./Km.
b) AAA C (Equivalent Size to WEASEL)	91.78 Kg./Km.

If weight of conductor corresponding to minimum prescribed diameter as per IS found less up to 2% in respect to measured length the lot shall be acceptable otherwise the entire lot for which sample drum represents shall be rejected and to be replaced by the supplier.

- (b) If the sample(s) fail in any test other than length measurement, the entire material in the Lot shall be rejected and shall have to be replaced by the supplier.
- (c) If the contractor / supplier fails to lift the material declared rejected or any part thereof from the consignee within a period of 15 days from the date of dispatch instruction from the purchaser, the purchaser shall be entitled to effect recovery along with other actions as per Clause No. 1.62 of Section-II (General Condition of Contract).

21.0 TEST CHARGES:

All test charges incurred towards test checking of the material received in our stores shall be borne by the NIGAM.

22.0 DETAILS OF PAST EXPERIENCE:

The details of past orders executed by the bidder may be indicated in the relevant **Schedule- VII & VII A** . The bidder must furnish the documentary evidence like copy of purchase order placed for detailing of past supplies.

23.0 CHALLENGE TESTING CLAUSE:

The other manufacturer can also request challenge testing for any test based on specification. The challenger would request for testing with testing fee. The challenge test fees are proposed at least three times cost of testing. This is likely to deter un-necessary challenges. The challenger would have the opportunity to select the sample from the store and any such challenge should be made within the guarantee period. The party challenged, the challenger & the utility could witness the challenge testing. The challenged testing would cover all the type tests as per relevant IS.

The challenge test could be conducted at NABL Accredited Laboratory like ERDA, CPRI, Bangalore / Muradnagar / Bhopal. If the values are within limit the product gets confirmed else not confirmed. If the product is not confirmed the manufacturer would pay the challenge fee and challenger would get the fee refunded. However, as a redressal system the challenger would be asked for fresh selection of two more samples from the stores and the same be tested in a NABL Laboratory (which shall be other than previously selected NABL Accredited Lab) at the cost of supplier in presence of party challenged, challenger and the utility. If any one or both samples does not confirmed the tests then the product is said to have failed the tests. In such cases, the manufacturer will be declared as unsuccessful manufacturer for the said product and balance supply shall not be availed and the order shall be cancelled with levy of maximum penalty.

METER BOARD FOR SERVICE CONNECTIONS

1.0 SCOPE:

1.1 This specification covers manufacture and supply of meter board with excellent weather-ability so as to offer protection against harsh weather. The Board shall be anti-corrosive, shock, vermin & moisture resistant, fire resistant and UV stabilized.

2.0 MATERIAL OF METER BOARD:

2.1 The meter board shall be made out of :

2.1 Thermosetting plastic e.g. glassfibre reinforced polyester SMC (Sheet Moulding Compound) as per S1 grade of IS: 13410, or Glass Reinforced Polyester Dough Moulding Compounds as per Grade D1 of IS 13411, with flame retardant properties and corrosion resistant properties.

2.2 All accessories of MS, like nuts, bolts, washers etc., shall be galvanized.

2.3 The overall dimensions of meter board shall be as per Annexure or as specified by the owner.

3.0 CONSTRUCTION

3.1 The meter board shall be single piece moulded.

3.2 Fixing arrangement:

The meter board shall have 4 nos. 6 mm dia holes for mounting the meter board on a wall with suitable screws. The mounting arrangement shall be designed in such a way that the board is securely held on to the wall.

3.3 Inlet and Outlet:

Suitable number of holes shall be provided in the meter board for cable/wire entry as required. The size of the holes shall be suitably modified depending on the size of the cable used for connections.

Thickness of the meter board shall not be less than 2.5 mm.

3.4 The meter board shall generally comply with the provisions of IS14772 or IEC 695. The meter board shall be suitable for outdoor/indoor application. The meter board shall be with good workmanship.

3.5 The color of meter board shall be off white/admiral grey/Black or as specified by the owner.

3.6 Wherever required ribs of adequate thickness shall be provided beneath the face of the board.

3.7 While moulding the meter boards, upto 20 %(max) resin regrind may be used with virgin material. The manufacturer shall declare the permissible regrind to be mixed with virgin material & all type tests shall be conducted on items moulded with the maximum permissible regrind.

3.8 It shall be possible to replace the switches/holders etc. without the need to remove the meter board from the wall. Wherever required metallic inserts shall be provided for fixing of fittings with screws. Screws fixing means shall be so designed that they withstand the mechanical stresses during installation and normal use. Test for this shall be carried out in line with clause 11.8 of IS:14772

3.9 Marking:

The name of the manufacturer along with month & year of manufacture shall be engraved/moulded on the meter board.

4.0 Sample Meter Board:

4.1The manufacturer shall submit a sample meter board before commencement of bulk production. The bulk production and supplies shall commence only after approval of sample & type test reports by the owner.

5.0 Quality Control:

5.1Type test report for UV stabilization test as per ASTM G 53/26/23 on the material used for making the board shall be submitted for approval. Type test reports from NABL accredited laboratory in accordance with clause 5 of IS: 14772 for the following tests shall be submitted for approval. The type test reports shall not be older than 5 years.

- a) Marking
- b) Dimensions
- c) Construction - Test for screw fixing means as per clause 11.8 of IS: 14772
- d) Resistance to ageing & to climatic condition as per clause 12.1.1 of IS: 14772
- e) Resistance to humid condition as per clause 12.2 of IS: 14772
- f) Mechanical strength as per clause 13.2 of IS: 14772
- g) Resistance to heat as per clause 14.2 of IS: 14772
- h) Resistance to abnormal heat and fire (Glow wire test) as per clause 15 of IS: 14772 at a temperature of 650 deg.C
- i) Drop test- The meter board shall not get damaged or deformed when dropped from a height of 2 meters on to concrete floor.

5.2 The owner may witness acceptance tests as per IS 14772 or any other applicable standard. All tests shall be carried out on every batch of manufacturing. All test records shall be maintained with proper correlation. IS 13360 'Plastics – Methods of Testing' shall be referred wherever required.

Following Acceptance tests shall be carried out in every lot:

- a) Marking
- b) Dimensions including thickness of material
- c) Test for screw fixing means as per clause 11.8 of IS: 14772
- d) Resistance to ageing to climatic condition as per clause 12.1.1 of IS: 14772
- e) Resistance to humid condition as per clause 12.2 of IS: 14772
- f) Mechanical strength as per clause 13.2 of IS: 14772
- g) Resistance to heat as per clause 14.2 of IS: 14772
- h) Resistance to abnormal heat and fire (Glow wire test) as per clause 15 of IS: 14772 at a temperature of 650 deg. C.

i) Drop test- The meter board shall not get damaged or deformed when dropped from a height of 2 meters on to concrete floor

TECHNICAL SPECIFICATION FOR SUPPLY OF 11/ $\sqrt{3}$ KV / 240 V 16 KVA RATING OUT DOOR TYPE COMPLETELY SELF PROTECTED SINGLE PHASE ALUMINIUM WOUND DISTRIBUTION TRANSFORMERS WITH INTERNAL CIRCUIT BREAKER , ENERGY EFFICIENT LEVEL-2.

1) SCOPE:

This specification covers design, engineering, manufacture, assembly, stage testing, inspection & testing before supply and delivery at Nigam store(s) anywhere in Rajasthan of the oil immersed, oil natural air natural (ONAN) out door type 11kV / $\sqrt{3}$ / 240 V, 50 Hz, Single Phase with **Aluminium** wound complete with fittings and accessories with meter protection unit on LT side of distribution transformers for use in distribution systems.

1.1 The Equipment Offered shall be complete with all parts necessary for their effective and trouble free operation. Such parts will be deemed to be within the scope of the supply irrespective of whether they are specifically indicated in the commercial order or not.

1.1.1 It is not the intent to specify herein complete details of design and construction. The equipment offered shall conform to the relevant standards and be of high quality, sturdy, robust and of good design and workmanship complete in all respects and capable to perform continuous and satisfactory operations in the actual service conditions at site and shall have sufficiently long life in service as per statutory requirements. The dimensional drawings attached with this specification and the notes thereto are generally of illustrative nature. In actual practice, not withstanding any anomalies, discrepancies, omissions, incompleteness, etc. in these specifications and attached drawings, the design and constructional aspects, including materials and dimensions, will be subject to good engineering practice in conformity with the required quality of the product, and to such tolerances, allowances and requirements for clearances etc. as are necessary by virtue of various stipulation in that respect in the relevant Indian Standards, IEC standards, I.E. Rules, I.E Act and other statutory provisions.

1.2 The Tender /supplier shall bind himself to abide by these considerations to the entire satisfaction of the Purchaser and will be required to adjust such details at no extra cost to the purchaser over and above the tendered rates and prices.

1.3 Tolerances on all the dimensions shall be in accordance with provisions made in the relevant Indian/ IEC standards and in these specifications. Otherwise the same will be governed by good engineering practice in conformity with required quality of the product.

2) **APPLICABLE STANDARDS:**

The materials shall conform in all respects to the relevant Indian Standard Specifications with latest amendments thereof; some of them are listed below:

Note: Wherever ISS are mentioned, equivalent or better International standards are also acceptable

IS: 5/1961: Colour for ready mixed paints

IS: 1180 Part-1 2014: Specification for outdoor type oil immersed distribution transformers up to and including 2500 KVA,33 KV.

IS/IEC 60947-2:2003 - low voltage switchgear and control gear – Part 2: Circuit Breaker.

IS:9385 Part-II:1980 – High voltage fuses : Part 2: Expulsion and similar fuses.

IS:8603:2008 – Dimensions for porcelain transformers bushings for use in heavily polluted atmospheres 12/17.5 kV, 24 kV and 36kV (Amalgamating IS 8603 (Parts 1,2&3) : 1977.

IS:2026 (PART I, II, III, IV & V)/1981 – Power Transformers.

IS:6600/1978 : Guide for loading of oil immersed Transformers

IS:335/1983 : New insulation oils for Transformers.

IS:3347 (Part I/Sec. 1 & 2): Dimension of Porcelain parts & Metal parts for Transformer bushing (1.1 KV)

IS:7421 : Porcelain Transformer Bushings for low voltage – upto 1 KV.

IS:2099/1986 : Porcelain Transformer bushing for AC volts above 1000 volts.

IS:3639/1966 : Fittings & accessories for Transformers.

IS:1866/1978 : Code of practice for maintenance & supervision of insulating oil in Service.

IS:9335 : Specifications for insulating kraft paper.

IS:1576 : Specifications for solid insulating press Boards for electrical purposes.

IS:104 : Ready mixed paint, brushing zinc chromate, painting.

IS:649 : Testing of steel sheets and strips for magnetic circuits.

IS:2362 : Determination of water content in oil for porcelain bushing transformers.

IS: 4257: Dimensions for clamping arrangements for bushings.

IS 6160 : Rectangular conductor for electrical machines.

IS:10028 : Selection, Installation and maintenance of transformers.

IS: 12444: Specifications for Aluminium wire rods.

REC Specification No. 2.

REC Specification No. 39/1993.

CEA Specification, Chapter 4.

IEC: 994: Specification Part4 for Surge Arresters without gap for AC system.

IS: 3070 (PartIII): Specification for Lightning Arresters for alternating current System Part.III.

IS: 3073/1974 : Specification for Lightning Arresters.

IS: 2629: Recommended practice for hot dip galvanizing of iron and steel.

IS: 2633: Method for testing uniformity of coating on Zinc coated articles.

IS: 5621: Specification for large hollow porcelain for use in electrical installation.

IS: 13947 (PartII) latest : Specification for Single Pole MCCB.

IS: 2147: Degree of protection provided by enclosures for low voltage switchgear and control gear.

IEC Pub 609472: Specification for Low Voltage Switch Gear and Control gear.

Material conforming to other internationally accepted standards, which ensure equal or higher quality than the standards mentioned above would also be acceptable. In case the Bidders who wish to offer material conforming to the other standards, salient points of difference between the standards adopted and the specific standards shall be clearly brought out in relevant schedule. Four copies of such standards with authentic English Translations shall be furnished along with the offer.

Note:- Besides above changes, the technical parameters of the specifications wherever are deviating from the IS:1180 (Part-I/2014) , the same shall be in accordance with IS:1180 (Part-I/2014) and its latest amendments, if any and the changes where the IS:1180 (Part-I/2014) is silent for technical parameters, same shall be applicable as per Discom specification.

3) SERVICE CONDITIONS:

The distribution transformers to be supplied against this specification shall be suitable for satisfactory continuous operation under the following climatic conditions as per IS 2026 (Part I) latest revision.

- | | | |
|------|---|---------|
| i) | Peak ambient temperature | : 50°C. |
| ii) | Minimum Ambient Temperature in shade | : 5°C. |
| iii) | Maximum average ambient temp in
24 hours period in shade | : 45°C |
| iv) | Maximum yearly weighted average
ambient temperature | : 35°C |
| v) | Maximum temperature attainable by an
object exposed to sun | : 60°C |

vi)	Maximum relative humidity	:100%
vii)	Average number of thunder storm days per annum	:40
viii)	Average number of rainy days per annum	:120
ix)	Average annual rainfall	:15-100 cm
x)	Number of months of tropical monsoon conditions	:4 Months
xi)	Maximum wind pressure	:195 kg/mt ²
xii)	Altitudes mtrs	:Not exceeding 1000

The equipment shall be for use in moderately hot and humid tropical climate, conducive to rust and fungus growth.

4. **PRINCIPAL PARAMETERS:**

The single phase transformers of standard ratings 16 KVA shall be suitable for outdoor installation with Single Phase, 50 Hz, 11KV system in which the neutral is effectively earthed and should be suitable for outdoor service under fluctuations in supply voltage upto plus 10% to minus 15%.

The transformer shall conform to the following specific parameters.

S.N	Particulars	Parameters
1	Continuous rated capacity	16 KVA
2	System voltage (max.)	12KV
3	Rated voltage HV	11/ $\sqrt{3}$ KV
4	Rated voltage LV	240 V
5	Line current HV	2.519 A
6	Line current LV	66.66 A
7	Frequency	50 c/s + / 3%
8	No. of phases	Single

9	Vector Group	IiO
10	Type of transformer	Outdoor
11	Type of cooling	ONAN
12	Class of insulation	Class A
13	Winding Material	Aluminium
14	Material of core	CRGO/ AMORPHOUS
15	Type of core construction	Wound
16	Over fluxing limit (due to combined effect of voltage and frequency)	12.5 %
17	Permissible temperature over ambient under full load condition: i) Of top oil measured by thermometer ii) Of winding measured by resistance	35 Deg.C 40 Deg.C
18	Minimum clearances in air a) Phase to earth (mm) H.T b) Phase to earth (mm) LT	140 40
19	Total losses (watts) at 75 Deg. C. (Max.) (As per Energy Efficient level-2) i)At 50% loading ii)At 100% loading	82 224
20	% age Impedance (with a tolerance of ± 10%)	4.0%
21	Max. Flux Density at Normal voltage and frequency	1.47 Tesla
22	Max. Current density	1.6 A/mm Sq
23	LT Breaker	Internally mounted

24	Radiator required	Not required
25	Magnetizing Current (max.)	1.5%+ 30% tolerance on 1.5% as per IS:2026 of rated full load current
	a) At 100% rated voltage	
	b) At 112.5% rated voltage	3% + 30% tolerance on 3% as per IS:2026 of rated full load current

ELECTRICAL CLEARANCES:

a) Minimum External Clearances (in air as per IS:1180)

- | | | |
|----------------------------|-----|-----|
| i) HV phase to earth (mm) | --- | 140 |
| ii) LV phase to earth (mm) | --- | 40 |

b) Minimum Internal Clearances

- | | | |
|---|----|----|
| i) Clearance between inner wall of tank and coil (mm) | -- | 12 |
| ii) Radial clearance between HV & LV windings (mm) | | |
| For 16 KVA | -- | 2 |
| iii) Radial clearance of LV coil from core (mm) | -- | 2 |
| iv) End clearance of HV coil from Yoke (mm) | -- | 15 |
| v) Minimum Gap between core & tank bottom for oil circulation (mm)-- 5 | | |
| For 16 KVA | | |

5) DESIGN & CONSTRUCTION:

5.1 Winding connection & terminal arrangements:

For HV, live end should be brought out through 12kV bushing and the other end of HV, which is intended to be earth, shall be brought out on 1.1kV bushing (HV Neutral bushing). Provision shall be made for connecting the neutral HV terminal to local earth. The secondary (LV) winding shall be

connected to LV bushings. The 12 KV HV bushing (live) shall be provided on top cover and the remaining three bushing(s) shall be provided on the sidewall of the tank and below top cover.

Two layer of electrical grade insulation craft paper (epoxy dotted) of 2 mil thickness or one layer of minimum 4 mil thickness shall be used for interlayer insulation both for HV and LV Coils.

5.2 INSULATION MATERIALS:

The following approved make of electrical grade insulation craft papers and boards shall be used in the transformer.

Sr. No.	Name of insulating material	Name of Firms
1.	Press board	(a) Senapathy whitely (b) Raman Board (c) Techno Electric, Hyderabad
2.	Kraft Paper	(a) Ballarpur (b) Padamjee (c) ITC Tribeni Tissue Paper Ltd., Kolkata (d) Munskjo, Sweden
3.	Press phan paper	Senapathy whitely
4.	Gaskets	(a) New cork (b) Talbros

5.3 Bushings

- i) The bushing shall conform to IS: 2099/3347 as amended upto date. Bushings having the creepage distance suitable for highly polluted atmosphere and having type tested as per IS: 3347 and IS:2099 latest version shall only be accepted.

- ii) For HV, 12 kV class bushings and for earth/neutral of HV winding 1.1 kV class bushing(s) shall be used and for LV, 1.1kV class bushing(s) shall be used.
- iii) The terminal arrangement shall not require a separate oil chamber.
- iv) The HV bushing shall be mounted on top cover and LV bushing(s) shall be mounted on side wall of tank below top cover. The bushing rods and nuts shall be of brass.
- v) The HV bushings shall not have arcing horns.
- vi) HV bushing mounting bolt should be tag welded.

5.4 CORE, WINDING AND OIL

5.4.1 CORE MATERIAL:

a) **CRGO MATERIAL:** Transformer core shall be wound core construction in shell type or core type, using prime grade imported M4 or better COLD ROLLED GRAIN ORIENTED (CRGO) laminations or any other combination of better grade be acceptable. The bidder shall furnish the core loss (watt per Kg.) and power (VA per Kg.) curves of the laminations used. The core shall be properly stress relieved by annealing in inert atmosphere. The transformer shall be suitable for over fluxing (due to combined effect of voltage and frequency) up to 12.5% without injurious heating. The operating flux density shall be such that there is a clear safe margin over the fluxing limit of 12.5%.

CRGO Laminations used shall be of prime grade and not second grade steel laminations. Only those bidders who directly imported CRGO either from the manufacturer or through their accredited marketing organization of repute (and not through any agent) shall be considered.

ALTERNATIVE

B) AMORPHOUS METAL CORE

The core shall be made of high quality Amorphous ribbons having very low loss formed into wound cores of rectangular shape, bolted together to the frames firmly to prevent vibration or noise. The complete design of core must ensure permanency of the

core losses with continuous working of the transformers. The value of the maximum flux density allowed in the design shall be clearly stated in the offer. Curve showing the properties of the metal shall be attached with the offer. The transformer core shall be suitable for over fluxing (due to combined effect of voltage and frequency) upto 12.5% without injurious heating at full load conditions and shall not get saturated. The bidder shall furnish necessary data in support of this situation.

Core clamping for Amorphous metal transformers.

1. Core clamping shall be with top and bottom U-shaped core clamps made of sheet steel clamped with HT steel strap for efficient clamping.
2. MS core clamps shall be painted with varnish or oil-resistant paint.
3. Suitable provision shall be made in the bottom core clamp/bottom plate of the transformer to arrest movement of the active part.

NOTE: Equal weightage shall be given to the transformer with amorphous metal core and CRGO core.

5.4.2 FLUX DENSITY:

Flux density should not be more than 1.47 Tesla (For 10/16/25 KVA) at the rated voltage and frequency. Transformer core should be designed in such a way that it will not get saturated for any value of V/f (Voltage/frequency) ratio to the extent of 112.5% of rated value of V/f ratio (i.e., 11000/50) and that *the maximum flux density in any part of the core and yoke at rated voltage & frequency shall be such that the flux density with +12.5% combined voltage & frequency variations from rated voltage & frequency does not exceed 1.9 Tesla. (as per amended IS:1180 (Part-I/2014) Actual core design along with calculations in support of it should be enclosed with the offer.*

5.4.3 WINDING:

HV and LV windings shall be wound from Aluminium conductors with DPC/Polyesterimide enamel (Class H) insulation. The enamel covering shall conform to Grade-II of IS:13730 Part8 or IEC 60317 Part 8. The windings shall be progressively wound in LVHV coil design for better voltage regulation and mechanical strength. The inter layer insulation shall be of Epoxy resin bond paper. The type of winding i.e. whether LV windings are of conventional type or foil wound shall be indicated in the tender. Winding must be done in cleanest possible atmosphere to prevent possible accumulation of dust particles. The coil shall be further processed for dimensional control, improved bonding and for improving short circuit withstanding capability.

The current density of winding shall not be more than 1.6 Amp./sq.mm for Aluminium. The test reports for material characteristics like density, tensile strength and elongation, moisture content, ash content, dielectric strength, thickness of resin etc. for epoxy dotted paper shall be submitted during stage inspection.

5.4.4 CORE COIL ASSEMBLY:

Core coil assembly shall be further processed in oven for removal of moisture.

Ample provision for free circulation of oil in the radial gap between the core & LV Coil shall be made. The core shall be effectively earthed through copper foil bolted on core clamps, after removing the core clamp paint.

All core-coil assembly shall be indelibly marked / punched on core channel / a identity plate welded on core channel with following details:

1. Name of Supplier:
2. Order / TN No:
3. Rating:
4. Sr. No. of Transformer:

In case if above marking is not found on the core assembly of physically opened transformer selected for physical verification during final inspection then no further inspection shall be carried out and re-inspection charges shall be payable by the supplier.

5.4.5 OIL:

The transformer shall be supplied complete with first filling of EHV Grade transformer oil, up to the normal oil level. The oil shall conform to IS: 335/1993 (latest amended) and should be ISI Marked and having the specified aging characteristics.

The make of Transformer Oil shall be either APAR/SAVITA/ RAJ LUBRICANTS/ ANAMIKA/SHARAVATI/ MADRAS PETRO/ RAJ PETROL/ LUBRICHEM, MUMBAI/ OPANAMA PETROCHEM, ANKELSHWAR/ TASHKENT OIL, VADODARA/ COLUMBIA. The transformer oil sample taken from the transformer shall be subject to testing as per provisions of IS:1866.

The oil manufacturer's test certificate shall be made available at the time of inspection to the inspecting officer.

5.5 BUSHING TERMINALS:

5.5.1 H.V. TERMINALS:

HV terminals shall be designed to directly receive ACSR conductor up to 7/3.35 mm (without requiring the use of the lug).

Starting and finishing leads of HT coils shall be covered with empire sleeve(s) or paper tube(s) of proper size. These leads should be clamped with the body of the winding with the help of cotton twine or permacel tape during manufacturing of the coils.

The transformer shall be provided with outdoor type 01 No. porcelain bushings, conforming to IS:3347/1972 & IS:2099/1973 from the manufacturer of repute. The HV bushings shall be on top of the tank and shall be fitted on a pocket made on top cover. These pockets shall be such that the HV bushing is tilted more towards the HV side. The bushing of R & B may also be tilted sidewise to maintain the required electrical clearance. The bushings rods and nuts shall be made of brass. The inner porcelain portion of the bushing shall be projected about 50% of the length inside the bushing pocket. **HT bushing(s) mounting bolts should be tag welded.**

The clamping ring of HV bushing shall be of galvanised MS Sheet having minimum thickness of 1.6 mm. The total weight of all the 12 aluminium caste member of HV bushing shall not be less than 210 grams.

The arcing horn(s) shall be single gap and fixed type. "The HV bushings shall generally confirmed to relevant IS: 3347 (Part-I to V of section I) , IS: 2099 (Part-I to V of section I) and IS:

7421 (As and where applicable). Embossing showing the manufacturer's name and month & year of manufacture shall be clearly visible on HV bushings, even after fixing on transformer(s)".

5.5.2 L.T TERMINALS:

The LV coil shall be taken by cut on the top core clamp duly reinforced to compensate for the mechanical strength.

In case of internal L.T. Breaker, the L.T. bushing and the terminals shall be suitable for being concealed inside the distribution box having insulated aluminium bus bar of suitable size (as per the enclosed drawing) from where the connections shall be taken for two or three numbers single core L.T. Aluminium Bunched Cable of size 16 sq.mm through cable glands for release of single phase connections to the consumer.

"The LV bushings shall generally confirmed to relevant IS: 3347 (Part-I to V of section I) , IS: 2099 (Part-I to V of section I) and IS: 7421 (As and where applicable). Embossing showing the manufacturer's name and month & year of manufacture shall be clearly visible on LV bushings, even after fixing on transformer(s)".

5.6 TANK:

The oil volume inside the tank shall be such that even under the extreme operating conditions, the pressure generated inside the tank does not exceed 0.4 kg/sq.cm positive or negative. There must be sufficient space from the core to the top cover to take care of oil expansion. The tank cover shall have plasticised surface on live parts to guard against bird faults. Alternately, suitable insulating shrouds shall be provided on the bushing terminals.

a) The tank cover shall have plasticised surface on live parts to guard against bird faults. Alternately, suitable insulating shrouds shall be provided on the bushing terminals.

- i) Main Tank : 2.0 mm (Min)
- ii) Top Cover : 2.5 mm (min.)
- iii) Bottom Cover : 2.5 mm (min.)

b) The tank without oil shall be capable of withstanding a pressure of 0.8 kg/cm² (g) above atmosphere at a vacuum of 760 mm of Hg for 30 minutes without any permanent deflection (Pressure test shall be conducted as per

IS -1180 Part-I). The permanent deflection should not be more than the limits specified in IS:1180 Part-I.

c) MEASUREMENT OF SHEET THICKNESS OF TRANSFORMER TANK/ METER & PROTECTION BOX:

The following measurements shall be carried out at respective Central Testing Lab (CTL) of the Discom(s) on the supplies of distribution transformers:

Measurement of Transformer Tank Thickness shall be done as follows:-

1.	Top Cover	At 2 places to be measured & average is to be taken.
2.	Bottom Cover	-do-
3.	Side Wall(s)	On all four sides (average is to be taken)
4.	M&P Box.	Both sides and front (average is to be taken)

- The nominal value of sheet thickness will be considered as mentioned in the Specification.
- .. Rolling tolerance will be as per ISS:1852-1985 with latest amendment and no penalty will be charged on such measured thickness till tolerance limit of ISS.
- ... Sheet thickness of transformer tank/ M&P Box for Distribution Transformers as per relevant tender specification are as under for ready reference:

Sr. No.	Rating	Top Cover (mm)	Bottom Cover (mm)	Side of Tank(mm)	M&P Box (mm)
1.	16 KV Single Phase	2.5	2.5	2.0	2.0

Further it is also intimated that 5% variation beyond tolerance limit in measurement of sheet thickness on negative side shall be acceptable by the Discom with levy of penalty. The rate of penalty will be Rs.80.00 per Kg.

For example:

Weight of 16 KVTransformer Tank and M&P Box	120 Kg. (approx.)
Variation in thickness of tank/M&P Box	5% (beyond tolerance limit)
Then penalty levied will be	120x80x5 -----= Rs.480.00 100

In case any dimension in transformer tank/ M&P Box sheet thickness found beyond aforesaid limit of (-) 5% will not be acceptable to the Discom and the relevant sub-lot shall stand rejected and the lot of such transformers will have to be replaced by the firm.

The highest percentage variation on negative side in respect of measurement of sheet thickness of any part of tank & M&P Box will be applicable on the entire dimensions for levy of penalty.

Transformer having thickness even more than 5% after allowing rolling tolerance shall be acceptable.

The measurements of sheet thickness & size of Box will be carried out on all those sample transformers which are tested in CTL and test results will be applicable to the respective sub-lot or part thereof from which the sample is drawn.

5.7 The following shall also be adhered:

- The long seam joint, CSEAM joint, fittings & accessories and other welds shall be oil tight and no deflection/ bulging should occur during service.

- Manufacturer should carry out the all welding operations as per relevant ASME standards and submit a copy of the welding procedure, qualifications and welder qualification certificate.
- The circular bottom plate edges of the tank should be folded upward, for at least 25mm to have sufficient over lap with vertical sidewall of the transformer.

Tank shall have permanent lugs for the lifting the Transformer body and there shall be facilities for lifting the core coil assembly separately.

The Transformer shall be provided with two mounting lugs suitable for fixing the transformer to a single pole by means of 2 bolts of 20 mm diameter as per ANSIC 57.12.201988. Both mounting lugs shall be made of steel of min. 6 mm thickness. Jump proof arrangements shall be provided on upper mounting lugs and lips shall be provided on lower mounting lugs for proper mounting of transformer on the pole. Both mounting lugs faces shall be in one plane (as per drawing enclosed at 'C').

The Transformer tank and the top cover shall be designed in such a manner as to leave no external pockets in which water can lodge. The top cover shall be fixed to the tank by proper arrangement to avoid ingress of moisture. Design of the top cover shall be such that no water can lodge on the top side. HV bushing pocket shall be embossed to top side of the top cover so as to eliminate ingress of moisture and water. The edges of the top cover shall be formed, so as to cover the top end of the tank and gasket (as per drawing enclosed at 'D').

Minimum & Maximum Oil level mark shall be embossed inside the tank. Nitrite/neoprene rubber gaskets conforming to latest IS:4253 Part-II shall be provided between tank and top cover.

Continuous welding of one inch length each should be provided at four places on ring (i.e. welding the clamping ring at top cover as well as with tank) and nut bolt of the ring should be tag welded.

On each transformer stainless steel anti theft fastener of suitable size shall be provided for clamping rim to hold fast tank and tank cover. In case of flange provided on top cover 2 Nos. stainless steel anti theft fastener shall be used and in case

of rim type tank top cover 1 No. anti theft fastener shall be used. **Alternatively Dome shaped side clamping type construction of clamping bolts with stopper washer with tack welding for antitheft purpose for top cover.**

6) TANK SEALING:

The space on the top of the oil shall be filled with dry air or nitrogen. The dry air (or nitrogen) plus oil volume inside the tank shall be such that even under extreme operating conditions, the pressure generated inside the tank does not exceed 0.4 kg/sq.cm positive or negative The nitrogen shall conform to commercial grade of relevant standards.

7) SURFACE PREPARATION & PAINTING :

7.1 General:

All paints shall be applied in accordance with the paint manufacturer's recommendations. Particular attention shall be paid to the following:

- a) Proper storage to avoid exposure as well as extreme of temperature.
- b) Surface preparation prior to painting.
- c) Mixing and thinning.
- d) Application of paints and the recommended limit on time intervals between coats.
- e) Shelf life for storage.

All paints, when applied in a normal full coat, shall be free from runs, sags, wrinkles, patchiness, brush marks or other defects.

All primers shall be well marked into the surface, particularly in areas where painting is evident and the first priming coat shall be applied as soon as possible after cleaning. The paint shall be applied by airless spray according to manufacturer's recommendations. However, wherever airless spray is not possible, conventional spray shall be used with prior approval of Purchaser.

The manufacturer shall, prior to painting protect nameplates, 'lettering gauges, sight glasses, light fittings and similar such items.

7.2 Cleaning and Surface Preparation:

After all machining, forming and welding has been completed, all steel work surfaces shall be thoroughly cleaned of rust, scale, welding slag or spatter and other contamination prior to any painting.

Steel surfaces shall be prepared by SAND/SHOT blast cleaning to Grade Sa. 2.5 of ISO 85011 or Chemical cleaning by Seven Tank Process including Phosphating (IS 3618).

The pressure and volume of the compressed air supply for blast cleaning shall meet the work requirements and shall be sufficiently free from all water contamination to ensure that the cleaning process is not impaired.

Chipping, scraping and steel wire brushing using manual or power driven tools cannot remove firmly adherent millscale and shall only be used where SAND/ shot blast cleaning is impractical. Manufacturer shall indicate such location, for owner's information, in his offer.

7.3 Protective Coating:

As soon as all items have been cleaned and within four hours of the subsequent drying, they shall be given suitable anticorrosion protection.

7.4 Paint Material:

Following are the types of paint that may be used for the items to be painted at shop and supply of matching paint to site:

Heat resistant paint shall be (Hot oil Proof) for inside surface.

Inside of tank Oil shall be painted with varnish or oil resistance paint. For external surface,

one coat of thermo-setting powder paint or one coat of epoxy primer followed by 2 coat of polyurethane base paint shall be used . Total Dry film thickness as per IS 1180 Part-1 2014.

The color of the finishing coats shall be olive green colour conforming to Shade No. 220 of IS -5 of 1961 in order to distinguish of star level transformers.

7.5 Painting Procedure:

All painting shall be carried out in conformity with both specification and with the paint manufacturer's recommendation. All paints in any one particular system, whether shop or site applied, shall originate from one paint manufacturer.

Particular attention shall be paid to the manufacturer's instructions on storage, mixing, thinning and pot life. The paint shall only be applied in the manner detailed by the manufacturer e.g. brush, roller, Conventional air spray and shall be applied under the manufacturer's recommended condition.

Minimum and maximum time intervals between coats shall be closely followed.

All prepared steel surfaces should be primed before visible rerusting occurs or within 4 hours, whichever is sooner. Chemical treated steel surfaces shall be primed as soon as the surface is dry and while the surface is still warm.

Where the quality of the film is impaired by excess film thickness (wrinkling, mud cracking or general softness) the supplier shall remove the unsatisfactory paint coating and apply another. As a general rule, dry film thickness should not exceed the specified minimum dry film thickness by more than 25%. In all instances where two or more coats of the same paint are specified, such coatings may or may not be of contrasting colours.

Paint applied to items that are not to be painted shall be removed at Supplier's expense, leaving the surface clean, unstained and undamaged

7.6 Damaged Paintwork:

Any damage occurring to any part of a painting scheme shall be made good to the same standard of corrosion protection and appearance as that originally employed.

Any damaged paintwork shall be made good as follows:

- a) The damaged area, together with an area exceeding 25 mm around its boundary, shall be cleaned down to bare metal.
- b) A priming coat shall be immediately applied, followed by a full paint finish equal to that originally applied and exceeding 50 mm around the perimeter of the original damage.
- c) The repainted surface shall present a smooth surface. This shall be obtained by carefully chamfering the paint edges before and after printing.

7.7 Dry Film Thickness:

To the maximum extent practicable the coats shall be applied as a continuous film of uniform thickness and free of pores. Over spray, skips, runs, sags and drips should be avoided. The different coats may or may not be of the same colour.

Each coat of paint shall be allowed to harden before the next is applied as per manufacturer's recommendation.

The requirement for the dry type film thickness (DFT) of paint and the materials to be used shall be as given below.

Sl. No.	Paint Type	Area to be Painted	No. of coats	Total Dry film thickness (min.)
1.	Thermosetting Powder Paint	Inside	01	30 microns
		Outside	01	60 microns
2.	Liquid Paint			

	a)Epoxy(Primer) b)Polyurethane base (Finish coat)	Outside	01	30 microns
	c)Heat resistance paint (Hot oil proof Paint)	Outside	02	25 microns each
		Inside	01	35/10 microns

7.8 Tests:

The painted surface shall be tested for paint thickness.

The painted surface shall pass the Cross Hatch Adhesion Test.

8 RATING AND TERMINAL PLATES

- 8.1 **Rating & terminal marking plate:** Each Transformer shall be provided with non detachable name, rating and terminal marking plate fitted in a visible position. All details shall be given on one plate. Material of the plate shall be stainless steel / **Aluminium** only. Thickness shall be 0.9 mm (with a tolerance of ± 0.1 mm). The plate shall be made absolutely undetachable either through welding or riveting or through any other approved method. There shall be a rating plate on the transformer containing the information given in the relevant ISS.

The HV winding terminals shall be marked 1U & 1N. The corresponding secondary terminals shall be marked as 2u & 2n. In the diagram to be given on the name plate, the relative position of various terminals when viewed shall be clearly visible. Inspection shall not be undertaken unless all these details are verified by the Inspecting Officer.

Besides other particulars, following details shall also be given on the name plate:

- i) P.O. No. month & year.
- ii) Sr. No. of transformer.
- iii) Date of despatch month & year.
- iv) Date of expiry of guarantee period – month & year.
- v) Maximum Guaranteed Load Losses at 50% and 100% loading.
- vi) Recommended fuse sizes for HV & LV sides.
- vii) Name & Full address of the manufacturer.

- viii) Capacity of the transformer.
- ix) Rating of the transformer.
- x) Type – Oil filled naturally cooled.
- xi) Energy Efficient level-2 and Standard IS1180 Part-1 with BIS Licence No.

ALL DETAILS ON THE “NAME RATING AND DIAGRAM PLATE” SHALL BE INDELIGIBLY MARKED i.e. BY ENGRAVING OR PUNCHING

8.2 Technical cum Identification Plate: M.S. plate of size 125 x 75 x 2.5 mm having following details punched with letters of size 8mm x 6mm shall be continuously welded to the main tank body below the middle HV bushing and on Top Cover of tank in clearly visible position:-

- A) Name of the Firm
- B) TN No.
- C) Make
- D) Sr. No.
- E) Jodhpur Discom
- F) Rating
- G) Date of Dispatch
- H) Date of Expiry of G.P.
- I) Core : Core Dia. _____ And Core Area. _____
- J) LV Coil :-
 - 1. ID/OD Dimensions
 - 2. Conductor Size
- K) HV Coil :-
 - 1. ID/OD Dimensions
 - 2. Conductor Size
- L) Limb Centre
- M) Window Height

8.3 Identification Mark:- In addition to above, the following identifying details shall be clearly punched on the brackets which are attached to the transformer with minimum 10 mm x 10 mm x 1 mm size punch letters.

MAKE _____

S. No. _____

T N _____

The above identification mark shall also be punched / welded to one of the top core clamping channels. The punching shall be distinct and visible. The dimensions of letters be 10x10x1 mm.

9.0 **PRESSURE RELEASE DEVICE:-**

The transformer shall be equipped with a self sealing pressure release device designed to operate at a minimum pressure of 8 PSI (0.564 Kg/Cm²).

i. **FITTINGS**

The following standard fittings shall be provided with each transformer.

- a. Two earthing terminals.
- b. Two lifting lugs.
- c. Rating and terminal marking plates.
- d. Pressure relief device.
- e. Internal Circuit Breaker (On LV Side).**
- f. HV Bushings.
- g. LV Bushings.
- h. HV terminal connectors.
- i. Top cover fixing clamps.
- j. Mounting lugs – 2 Nos.
- k. Bird guard or plasticised cover on live parts.
- l. LV earthing arrangement.
- m. Operating Mechanism of LT Circuit breaker.
- n. Signal Light.
- o. Three year Guarantee plate.
- p) Any other fitting necessary for satisfactory performance of the manufacturer as per IS:1180 Part-1(2014).
- q) Mounting Arrangement with pole will be as per drawing enclosed at Annexure-'B' for 16 KVA Single Phase Distribution Transformer. The mounting structure/ arrangement shall be in the scope of supplier.**

11.0 **FASTENERS**

- All bolts, studs, screw threads, pipe threads, bolt heads and nuts shall comply with the appropriate Indian Standards for metric threads, or the technical equivalent.
- Bolts or studs shall not be less than 6 mm in diameter except when used for small wiring terminals.
- All nuts and pins shall be adequately locked.
- **All Nuts, Bolts / Washers / Fasteners exposed to atmosphere used in transformers and Meter Protection Box should be of Stainless Steel.**
- Each bolt or stud shall project at least one thread but not more than three threads through the nut, except when otherwise approved for terminal board studs or

relay stems If bolts are provided at inaccessible places for ordinary spanners, special spanners shall be provided.

- The length of screwed portion of the bolts shall be such that no screw thread may form part of a sheer plane between members.
- Taper washers shall be provided where necessary. Protective washers of suitable material shall be provided front and back of the securing screws.

12.0 LOSSES:

The total losses at 50% and 100% loading for single phase various rating Transformers at rated voltage, frequency & 75 Deg. C shall not exceed the following values:

Rating in KVA	Voltage ratio in KV	Total losses at 50% loading (Watt) Max.	Total losses at 100% loading (Watt) Max.
16	$11/\sqrt{3} / 0.240$	82	224

These losses are maximum allowable as per Energy Efficient level-2, and there would not be any positive tolerance. Transformer with higher losses than the above specified losses would be rejected at the risk ,cost and responsibility of the supplier.

13.0 IMPEDANCE:

The recommended percentage impedance at rated current and at 75 Deg. C **4.0%** (For 16 KVA) with **a tolerance of ± 10%**.

14.0 TEMPERATURE RISE

The temperature rise over ambient shall not exceed the limits described below:

Top oil temperature rise measured by thermometer : 35 Deg.C

Winding temperature rise measured by method : 40 Deg.C

Temperature rise test shall be conducted on Maximum measured total loss (No load at rated excitation+Load loss at max. current tap at 75 deg. C) at 100% loading shall be supplied during temperature rise test at a Govt. approved/ a Govt. recognized/ NABL accredited laboratory/ILAC i.e. International Laboratory Accredited Laboratory/ ILAC i.e. International Laboratory Accreditation Cooperation (in case of foreign laboratory).

In case the temperature rise exceeds the above values, transformers shall be rejected at risk, cost and responsibility of the supplier.

It must be noted carefully that readings for hot resistance after shut down shall be taken separately for HV & LV windings, which means, after completing the readings for one winding (HV or LV), the transformer shall be connected again and rated current passed for another 60 minutes (min.) and shut down taken again to take hot resistance readings for the remaining winding. This is in line with the requirement of (BIP manual, to ensure proper resistance vis time curves.

Hot Spot temperature not to exceed 98 Deg. C when calculated over an annual weighted average ambient temperature of 35 Deg. C as per 15:2026 (Part-II Clause 4.9.4). '

However, the transformer shall be designed for class 'A' insulation

The transformer shall be capable of giving continuous rated output without exceeding the specified temperature rise.

15.0 GUARANTEED AND OTHER TECHNICAL PARTICULARS FOR TRANSFORMERS

. Complete details shall be furnished. Tolerances on weight quantity and dimension figures shall be $\pm 2\%$ at the tender stage, subject to maintaining the minimum electrical clearances as per the specification. However, no negative tolerance shall be allowed on the short circuit type tested design. Electrical performance data shall be subject to tolerances as per ISS, unless otherwise specified in this specification. However, the Total losses at 50% & 100 % loading shall be maximum guaranteed without any positive tolerance.

16.0 TYPE TEST CERTIFICATE

The bidder shall furnish type test certificate(s) of offered design / similar design, wherever available with the bid.

i) **DRAWING AND OTHER DOCUMENTS:**

One set of dimensional drawing(s) and internal construction drawing of each transformer rating shall be submitted with the tender. The tender shall be accompanied with the following drawings/calculation sheets, as per the offered designs. Size of the drawings shall be A3 (420 x 297 mm) or A4 size only.

- a) Name rating/diagram plate drawings.
- b) Outline and General arrangement drawings
- c) Core coil assembly drawings
- d) Core section along with flux density calculation sheet / drawings.
- e) Cooling area calculation sheet
- f) Thermal ability short circuit calculation sheet
- g) Core loss and magnetization curves of the laminations
- h) Heat dissipation calculations (heat dissipation by tank walls excluding top and bottom should be 500 W/ sq.mm.

i) The Type test certificate of Internal circuit breaker conducted in the manufacturer which should be not older than 5 years

Any delay in submission of drawings shall be to supplier's account.

17.0 PROTECTION:

The transformer shall have the following additional fittings features as its integral part for HV/ LV protection:

The Meter Protection Box shall have one chamber only containing LT Bushing & outgoing LT terminal Bushings as per IS 3347 (Brass) for releasing consumer connections .The chamber is fully sealed. The drawing of the LT Box is enclosed at Annexure-A.

In 10% qty. of Meter Protection Box a provision for installation of Meter visible through glass window be kept in separate chamber for which the requirement shall be intimated as and when required during the execution of contract.

Further Following provisions are also ensured on M&P Box and Transformer:-

1. On each transformer stainless steel anti theft fastener of suitable size shall be provided for clamping rim to hold fast tank and tank cover.
2. The M&P Box is firmly fixed with the transformer tank by providing all the nuts and bolts (total 8 Nos.) as per specification/approved drawing.
3. The Stainless Steel Anti-Theft Nuts and bolts should be provided on all the four corner bolts of box and remaining nuts should be tack welded with the bolts.
4. Hexagonal head of all the anti-theft nuts should be removed/detached so that the purpose of use of anti-Theft nut and bolt be fulfilled
5. It should be ensured that there should be continuous welding on the complete M&P Box and in case if only tack welding is found on the M&P Box body then the complete lot may not be accepted.
6. M&P Box should be properly fixed with LT side flange of transformer by using min. 3 mm thick gasket so that water should not be go inside of M&P Box.

(The above 6-Points appearing at Sr. No. 1 to 6 will be checked in Central Testing Lab)

17.1 The transformer shall have the following CSP features:

- (a) **INTERNAL HV FUSES ON THE HT SIDE OF TRANSFORMER as per IS9385 Part-II:1980**

Specification for the HT fuses: Expulsion / any other suitable fuse placed in series

with primary winding. This fuse is mounted normally inside of the primary bushing and is connected to the high voltage winding through a terminal block. This has to protect that part of the electrical distribution system which is ahead of the Distribution transformers from faults which occur inside the Distribution transformers i.e., either the windings or some other part of the transformer.

It shall be ensured that this fuse does not blow for faults on the secondary side (LT side) of the transformer i.e., the blowing characteristic of the fuse and LT breaker shall be so coordinated that the fuse shall not blow for any faults on the secondary side of the transformer and these faults shall be cleared by the LT breaker only. **The fuse shall be make of ABB/ERMCO/Global/samrakshna/Transguard or any make approved by JDVVNL.**

INTERNALLY MOUNTED OIL IMMERSSED LT BREAKER ON THE LV SIDE OF THE TRANSFORMER as per IS/IEC 60947-2:2003

LT circuit breaker: All LT faults after the breaker shall be cleared by this breaker.

As such, it shall be designed for the perfect coordination with the HT fuse link. The supplier shall furnish the time/current characteristics of LT circuit breaker and 11 kV fuses for various current multiples. The two characteristics shall be drawn on the same sheet to indicate coordination between the circuit breaker and fuse. This shall be based on the type test carried out on one of the transformers. In addition, the supplier shall carry out coordination test as indicated above, and this forms one of the test for acceptance.

The breaker is to be mounted on the secondary side of the transformer under oil to minimize premature operations from primary surges as would be with undersized line fuses. Two single pole elements is preferred. THE BREAKER SHALL BE COORDINATED THERMALLY WITH THE TRANSFORMER RATING TO FOLLOW CLOSELY THE VARIATIONS OF COIL TEMPERATURE DUE TO FLUCTUATIONS IN LOADS AND AMBIENT TEMPERATURES.

This is to be accomplished by connecting the breaker in series between the secondary winding and the load current. The breaker shall be located in the same oil as the core and coil assembly so that the bimetal are sensitive to the temperature of oil as well as the load current.

The circuit breaker may be an electromechanical device with three elements viz..

(i) Temperature sensing (ii) latching and tripping and (iii) current interrupting. The temperature sensing function might be accomplished through the use of bimetallic strips, which would be built into the breaker, such that load current of the transformer flows through them. In addition to this, a magnetic tripping device is to be provided for increasing the opening speed of the breaker under high fault conditions. The circuit breaker shall be mounted inside of the transformer so that these bimetallic strips are within the top oil layer of the transformer. The latching and tripping functions of the circuit breaker may be carried out within assembly similar to those used in industrial

type air circuit breaker. The circuit breaker shall also be closed and opened manually standing on ground and with a magnetic trip device also. The current interruption element shall consist of copper current carrying parts plus a set of copper tungsten current interrupting contacts. The magnetic element shall increase the opening speed of the circuit breaker under high fault current conditions. The response of circuit breaker to the activity shall remain unchanged by the addition of the magnetic trip element. The specification to which the breakers conform shall be indicated. **The LT circuit breaker shall be make of samrakshna/Transguard/ Vijai Mercantile/ Global/ P&A/ ARDRY/ERMCO or any make approved by JDVVNL**

LOAD MANAGEMENT SIGNAL LIGHT:

A signal light, controlled by a bimetal in the breaker shall switch on when the transformer load reaches a predetermined level indicating that the transformer has been overloaded. The load management signal light shall perform two functions. It shall show visually when the particular

transformer has been operating in an overload condition and shall provide knowledge that for good system management, the economical change out point for the transformer is fast approaching. The signal light need not indicate temporary overloads and shall turn on only when the overload condition has existed at a given level for a certain length of time.

The LT circuit breaker shall have a set of auxiliary contacts built in for signal light operation. These, normally open contact, shall form part of the signal light circuit. The signal light circuit shall consist of an auxiliary transformer winding (one or two turns) which generates about 4V, for the signal light contact set within the circuit breaker, and the signal light is to be mounted on the transformer tank. The signal light contact set is mechanically connected to the main circuit breaker latching and bimetal system. The signal light mechanism is adjusted so that the signal light contacts will close at a preset thermal condition which occurs before the main latching system opens the main contact. The net result is a visual external indication that a preset load condition has reached by the transformer. The signal light mechanism does not reset itself when the load drops off, the signal light remains lighted once the signal light contacts closes and can only be turned off by manually operating the external circuit breaker handle.

A distribution box is an enclosure (IP 33) is ready to be used condition and to be mounted on the transformer tank directly. The enclosure shall be made with sheet of thickness not less than 2.0 mm. It shall be painted with colour Shade No. 632 both inside and outside with powder coating. Enclosure shall have provision for pad locking arrangement. Detachable gland plate shall be provided for taking connections from distribution Box and transformer bushing terminal. The distribution box shall have Aluminium bus bar(covered with PVC Insulated tape) along with lugs fitted on bus bar for connecting two or more single core L.T. Aluminum Bunched Cable of size 16 sq.mm.

Instruction and operation Manual

The successful bidder shall be required to submit 5 copies of Instruction and Operation manual for each lot of 100 Transformers (or part thereof) supplied. This instruction manual should give complete details about the pre-commissioning

tests/checks and the details of preventive maintenance.

18.0 Deleted

19.0 INSPECTION AND TESTING:

i) The inspection and testing shall be conducted as per relevant clause of the general conditions of contract (Section II) at the place of manufacturer. The transformers shall be completely assembled and tested at the factory. The inspection may be carried out by the purchaser at any stage of manufacturing. The supplier shall grant free access to the purchaser's representative at all reasonable times when the manufacturing work is in process. Inspection and testing of any material under this specification by the purchaser shall not relieve the supplier of his obligation of supplying the material in accordance with the specification and shall not prevent subsequent rejection if the material is found to be defective.

ii) The supplier shall afford the inspector representing the purchaser. All reasonable facilities, without charge, to satisfy him that the material is being manufactured in accordance with the specification. The bidder must have adequate set of instruments for conducting testing as per class of 0.5 or better. The instruments shall be duly calibrated and Calibration certificates should not be older than one year on the date of presentation to the Inspecting officer. The calibration shall be arranged from NABL accredited testing house only. A comprehensive list of testing equipment / instruments indicating makes, Sr.No. type of accuracy, calibrating agency, calibration date etc., should be furnished also with the bid. The calibrated instruments shall be duly sealed by calibrating agency to avoid any tampering with calibration and the details there of shall be clearly mentioned in the calibration certificate(s).

iii) The supplier shall keep the purchaser informed in advance, about the manufacturing programme so that arrangement can be made for inspection. The supplier shall give minimum fifteen days advance intimation to enable the purchaser to depute his authorized representative for stage inspection / witnessing of various tests on the equipment / material as detailed below:

NOTE: - Penal provision shall be made for any short technical parameters found / noticed in the transformers at any time even beyond guarantee period.

20.0 TESTS:

20.1 Routine / Acceptance Tests:

- A) 100% testing of the Distribution Transformers shall be carried out at firm's works for measurement of total load losses at 50% & 100 % loading. Remaining testing shall also continue to be carried out as per practice.

All the assembled / finished transformers prior to dispatch shall be subjected to all the Routine Tests as per IS: 2026. Minimum 25% of the lot size samples for Routine tests & checking shall be selected by the inspecting officers at random subject to minimum five (5) Nos. The supplier shall invariably furnish manufacturer's Routine test certificates along with inspection call of the offered transformers for pre-despatch inspection.

The selected transformer samples shall be subjected to the following Routine / Acceptance Tests at the manufacturer's works in accordance with relevant ISS:

1. Measurement of Voltage ratio.
2. Measurement of No load losses & No Load current at 100% and 112.5% of rated voltage and normal frequency.
3. Measurement of load losses at rated voltage and normal frequency (at 50% & 100% loading).
4. Measurement of Impedance voltage at rated current and normal frequency.
5. Measurement of windings resistance cold (at or near the test bed temperature).
6. Insulation resistance.
7. Induced over voltage withstand test.
8. Separate source voltage withstand test.
9. Pressure Test (As per IS 1180 Part-1:2014)
10. Oil leakage Test (As per IS 1180 Part-1:2014)
11. Checking of rating and terminal marking plate.
12. Checking of weights, dimensions, fittings and accessories, tank sheet thickness, oil quantity, material, finish, paint thickness and workmanship as per purchase order and contract drawings.
13. Physical verification of core – coil dimension, internal clearances, provisions of required oil ducts in the HV and LV winding, conductor sizes, individual weights of HV and LV winding core laminations etc., with reference to contract drawings and type test report(s) by dismantling selected unit(s). The physical verification shall be conducted on units equivalent to one unit per 50 Nos. or part thereof of offered quantity randomly selected from the offered lot. The dismantled unit(s) after reassembly shall be accepted by the purchaser after routine testing in presence of his representative.

During final inspection, sheet thickness shall also be measured of the transformer opened for physical verification. The instrument for measurement of sheet thickness will be provided by the supplier.

14. Oil dielectric strength (break down voltage) test shall be carried out on the transformers opened for physical verification and average value shall be calculated.
15. Checking of manufacturer's test certificates shall be done and copies thereof duly signed by firm's representatives and inspecting officers shall be enclosed with the inspection report.

Invoices of Amorphous/CRGO core material shall be provided by the supplier to the inspecting officer at the time of inspection and same shall be verified by the inspecting officer.

The following tests shall also be carried out at manufacturer's works on one complete unit of each rating (16 KVA) from 1st Lot:

N) Salt spray test and Hardness tests as per the relevant standards.

Note: It will be mandatory for the manufacturer firms to maintain record of BDV value of the transformer oil and shall furnish to the inspecting officer who in turn shall furnish the same to the Nigam's CTL for verification purpose. The Inspecting Officer during inspection shall verify record of Meggar value of the offered DT's and furnish the same with inspection report to the Nigam's CTL. Simultaneously, record of Air Pressure Test shall also be checked by the inspecting officer and same be furnished with report to the CTL. CTL will conduct testing of DT's only after receipt of record of BDV value, Meggar value and air pressure test results.

Fifteen days clear notice shall be arranged for pre-dispatch inspection by Purchaser's representative as per General Conditions of Contract.

After successful inspection, the inspecting officer shall seal all the inspected transformers by tamper proof polycarbonate seals **on top cover bolts** of the transformer for identification. Before sealing the inspecting officer will ensure that all the offered transformers are complete and duly fitted with name, rating and diagram plate, identify plate and identification marks, as specified in this specification.

NOTE: Also after inspection/ testing, inspecting officer(s) shall affix Signature Seals also on each Transformer in addition to other seals.

- The oil leakage test shall be conducted on transformer complete in all respects shall be tested at a pressure equivalent to twice the normal head at the base of tank for 6 hours. There should be no leakage at any point.

20.2 TYPE TESTS & SPECIAL TESTS:

In addition to above tests the following type tests shall be arranged **on one transformer only as per IS :1180 (Part-1/2014)** in accordance with IS 2026 (Part 1 to III) with latest amendments, at laboratories accredited by National Accreditation Board/ Govt. approved lab for testing and calibration laboratories (NABL).

a) SHORT CIRCUIT TEST FOR DYNAMIC AND THERMAL ABILITY:

The Short circuit test for dynamic and thermal ability shall be arranged on one unit of each rating. The transformers for the test shall be selected /sealed by our inspecting officer from the first lot which shall be of minimum 20 Nos. (if ordered quantity is 500 Nos.) OR 50 Nos. (if ordered quantity is more than 500 Nos.). The Short Circuit test shall be conducted only after successful Routine tests including measurement of No Load and Load Losses (at 50% & 100% loading). The supply shall be accepted only after arranging successful type test on the selected transformer(s).

b) IMPULSE VOLTAGE WITHSTAND TEST:

The Impulse Voltage withstand test as per clause No. 13 of IS:2026 (Part-III) – 1981 shall be arranged. Impulse voltage withstand test shall be **Minimum 75 KVp** for 11 KV class transformers. The test shall be conducted on one unit of each rating to be selected by our inspecting officer from the first lot of minimum 20 Nos. (if ordered quantity is 500 Nos.) OR minimum 50 Nos. (if ordered quantity is more than 500 Nos.). The supply shall be accepted only after arranging successful Impulse test on the selected transformer(s).

Note :-If ordered qty. is less than 500 Nos. In such case first lot shall be of min. One month qty as per scheduled delivery .

c) TEMPERATURE RISE TEST:[As per IS:2026 (Part-2)]

Temperature rise test shall be conducted on Maximum measured total loss (No load at rated excitation+Load loss at max. current tap at 75 oC) at 100% loading shall be supplied during temperature rise test at a Govt. approved/ a Govt. recognized/ NABL accredited laboratory/ILAC i.e. International Laboratory Accredited Laboratory/ ILAC i.e. International Laboratory Accreditation Cooperation (in case of foreign laboratory).

The transformer shall be capable of giving continuous rated output without exceeding the specified temperature rise. Bids not meeting the above limits of temperature rise will be treated as non responsive.

d) PRESSURE TEST: (As per IS 1180 (Part 1):2014)

This test shall be conducted as type test at a Govt. approved/ a Govt. recognized/ NABL accredited laboratory. The pressure gauge shall be duly calibrated and sealed by an independent recognised test lab(s).

The test procedure shall be as detailed below :

The tank subjected to air pressure of 100 KPa above atmospheric pressure for 30 min. There should be no leakage at any point and is no deformation of tank.

No extra time shall be allowed for arranging these type tests. The cost of above type tests shall be borne by the supplier.

The programme indicating date and place of type testes), be intimated enabling purchaser to depute his representative to witness the test if desired. The testing house shall be advised to arrange type test result directly along with drawings duly attested by the testing authority for our scrutiny and approval. The type tested transformer(s) shall also be accepted as the part of the supplies. .

The requirement of arranging short circuit & impulse voltage withstand test shall however, not to be insisted on the suppliers who have arranged short circuit/impulse voltage withstand test **within last 5 years** from the date of opening of this tender on similar design. Minor changes in the present specification will not necessitate repetition of type testes), if design of core coil assembly is similar in essential details.

21.1 **RANDOM SELECTION AND TESTING (RST):**

- 21.2 The purchaser may select transformer(s) from the supplied lot(s) at random from the stores for conducting the following type tests, at any test house(s) as mentioned above. The supplier shall arrange these tests including loading, unloading and to & fro transportation from our stores to the test house(s). The charges for such tests shall be reimbursable to the supplier on actual basis on production of documentary evidence in case the selected sample successfully withstand type test(s) In case of otherwise, no charges will be reimbursed.
- i. Short circuit withstand test for Dynamic & Thermal ability. Measurement of No load & load Losses at 50% and 100% loading shall form part of tests conducted before and the after the short circuit test and recorded in the report.
 - ii. Impulse test as per Clause No.13 of IS:2026 (Part-III). Impulse voltage shall be **Minimum 75 KVp**.
 - iii. Temperature Rise Test as per IS 2026 Part 2
 - iv. Pressure Test as per IS 1180 Part-1:2014
 - v. Purchaser reserves the right to carry out any site tests he may decide upon at his own expenses. In case equipment/ material are not found as per P.O., all expenses incurred during the testing will be to supplier's account and material shall be replaced by the supplier at site free of cost.

FAILURE IN TYPE TEST(S):

In the event of failure / unsatisfactory results of the transformer(s) in short circuit test / impulse type tests/ Temperature rise Test/ Pressure Test, the supplier shall have to replace the supplies already made and no further transformers shall be accepted. The purchaser however, at his option, may accept the transformers already supplied with the following conditions

- i) Guarantee period of the supplied transformers issued to the field shall be increased by double the normal Guarantee period.
- ii) Bank Guarantee shall be extended to cover the additional Guarantee period.
- iii) For failure in any of the type tests listed under RST i.e., short circuit test/ Temperature rise Test/ Pressure Test & Impulse withstand test, no further supplies shall be accepted. The type test charges shall also not be reimbursable in this case and shall be borne by the supplier.
- iv) The transformers lying in the store(s) shall be replaced as per sub para (v) below.
- v) The bidder shall, however, be allowed to check the reasons of failure and if need be, to improve / modify the design. Further supplies, including

replacements against supplies already made, shall be accepted only after successful type test(s) are arranged on fresh transformer(s) selected by the authorized representative of the purchaser. All the type tests shall be arranged in case there is change in the design, otherwise, type test shall be repeated only for the test in which failure has occurred. Charges for such test(s) shall be borne by the supplier. However, in the event of failure of transformer in the repeat type test, the purchaser may take following actions:

- a) Cancel pending orders of the rating in which failure(s) has occurred, &
- b) Not place any order of Distribution Transformers on the firm for one two year(s).

21.3 Measurement of Total Losses (at 50% & 100% loading):

(i) After pre-dispatch inspection of material at firm's works, the dispatch instructions will be issued for the respective store(s) as per requirement of Nigam. Sample(s) will be drawn from the lot(s) received in store(s) and will be subjected to the following test(s):

- a) One transformer will be selected out of every lot of 10 Nos. or part thereof for measurement of No load Losses at rated voltage; No Load current (at 100% and 112.5% of rated voltage); Impedance voltage, thickness of tank body sheet and total Losses at 50% and 100% loading at rated current. The testing shall be arranged either at purchaser's own testing lab and / or at independent test lab. The testing charges for such tests shall be borne by the purchaser. The test results will be applicable to the respective lot of 10 Nos. from which sample was drawn.
- b) In case if dispatch instructions are less than 10 Nos. than one sample shall be selected from each store (s) and the test result so obtained shall be for the quantity consigned / received by the store (s).

The percentage impedance voltage at rated current shall not exceed the permissible limit as specified with allowable tolerance failing which the sub lot of transformers represented by the sample shall be rejected. The transformers selected for total Losses shall also be subjected to magnetizing current and in case found beyond the limit, the lot shall stand rejected.

The I.R. values of the sample(s) shall be measured at CTL, Jodhpur and it must be more than 50 MEGA-OHM.

One sample out of 100 Nos. transformers or part thereof (whose Sr. No. shall be decided by the committee members) shall be selected for physical verification/ checking of window height, limb centre and checking of insulation of HV and LV windings, make of Inbuilt circuit breaker size of lugs and size of PVC Copper cable at CTL.

Metal Parts shall be checked in CTL as per specification/IS on the transformer which is physically opened in CTL (from the lot of 100 Nos. or part thereof).

The No Load Voltage Ratio (Transformer Turn Ratio) shall be checked in CTL with the tolerance as per specification/ IS 2026 on the transformer from the lot of 10 Nos. or part thereof and the concerned sub lot shall be rejected if not meet out the requirement of IS.

Further, Internal clearances shall be checked without opening of core coil assembly in each of the transformers which have been selected for physical verification at CTL (i.e. one sample from a lot of 100 nos. or part thereof) in presence of firm's representative. No negative tolerance shall be admissible. If clearances are not found as per specification then the lot of 100 Nos. or part thereof shall be rejected.

The facility is being developed at CTL to test the Degree of Polarization (DP) of insulating paper used in Transformers. Therefore, the same shall be tested at CTL.

The sample of Oil be taken at CTL from the Transformer opened for physical verification in presence of firm's representative and same shall be tested at Nigam's CTL/NABL accredited Lab.

NOTE:

If the total losses are found more than 10% of specified losses at 100% loading then apart from rejecting the lot, firm's balance order would be cancelled and such firms shall not be awarded any order for one year or in next tender of tendered rating to be opened / finalized whichever is later.

The tolerance in window height shall be ± 2 mm, If the window height found beyond ± 2 mm but up to 7.5 mm then the lot shall be rejected. However if the window height is found more than 7.5 mm, then apart from rejecting the lot, firm's balance order would be cancelled and such firms shall not be awarded any order for one year or in next tender of tendered rating to be opened / finalized whichever is later.

No tolerance shall be allowed during CTL testing and in case any parameters which are to be tested in CTL are found beyond guaranteed parameters, the lot/ subplot shall stand rejected.

21.4 CHALLENGE TESTING CLAUSE:

The other manufacturer who has either participated in the instant tender enquiry can request challenge testing for tests covered in this clause based on specification & losses. The challenger would request for testing with testing fee. The cost of to & fro transportations of all transformer tested under the provision of this clause along with loading & unloading and transit insurance at actual shall be borne by Challenger firm. The challenge testing fees shall be at least three times the cost of testing. The challenger would have the opportunity to select the sample from the store. The party challenged, challenger & the utility could witness the challenge testing. The challenge testing would cover the

- i. Measurement of Magnetizing current
- ii. No Load Losses test
- iii. Load Losses test
- iv. Temperature Rise Test.

The challenge test could be conducted at any Govt. / NABL accredited Lab. like ERDA / CPRI. If the values are within limits as per specification including tolerance allowed in CTL, the products gets confirm else not confirmed. If the product is not confirmed, the manufacturer will pay the challenge fee and challenger would get the fee refunded.

However, as a redressal system, the manufacturer (challenged firm) would be allowed to ask for fresh testing of two more samples from the store and the same be tested in a NABL/Govt. laboratory in presence of party challenged, challenger & the utility. If any

one or both sample does not confirm the tests then the product is said to have failed the test. In such cases, the manufacturer (challenged firm) will be declared as unsuccessful manufacturer for the said product and balance supply shall not be availed and the balance order shall be cancelled with levy of maximum penalty. Firm shall also be debarred for one year or participating against next tender for that rating, whichever is later.

The transformers already supplied (including tested in challenge testing) shall be accepted with the following conditions:

- i. Guarantee period of the supplied Transformers shall be increased by double the normal guarantee period.
- ii. Bank guarantee shall be extended to cover the additional guarantee period.

22. Deleted

23. GUARANTEE PERIOD:

- I. Performance guarantee of the transformer(s) with LT protection unit shall be for the period of 60 (Sixty) months from the date of dispatch. The date of expiry of guarantee period shall be marked on the rating plate. Transformer(s) alongwith LT protection unit failed within such guarantee period shall have to be **repaired / rectified** free of cost expeditiously.

Note:

i) The firm will **repair** all type of G.P. failed Distribution transformers without asking any segregation on account of manufacturing defect. However, the Discoms will compensate the cost of missing parts as per practice in vogue.

ii) The guarantee period failed transformers will directly be lifted by the supplier from the respective circle store **within a period of 60 days from the date of intimation by the respective consignee and will repair Distribution Transformers against G.P. failed within 30 days from the date of lifting** in the ACOS / Central Store, if operative, along with the joint inspection sheet of missing parts issued by the respective consignee. After receiving the material at ACOS / Central Store, the same shall be tested at CTL as per provisions of the relevant contracts and will be issued to the circle store as per requirement of Nigam's account. The invoice of missing parts shall be verified by the ACOS as per the joint inspection sheet issued by the circle store as per practice in vogue and accordingly, the Sr. AO (Cash & CPC) will make the payment of missing parts, if any.

i) The loading of G.P. failed Distribution Transformers at circle store and unloading at ACOS will be on supplier account.

ii) The firm will **repair** G.P. failed transformers irrespective of breakage of body seals as well as physical damage of transformer tank body due to bursting. The period during which transformer remained defective / failed will not be accounted in the performance guarantee period. The period of defective will be reckoned from the date of first intimation (i.e. field officer / Consignee whichever is earlier) to date of delivery of repaired transformer.

iii) Firms shall lift the G.P. failed Transformer(s) within a period of 60 days from the date of intimation by the respective consignee and will repair Distribution Transformers against G.P. failed within 30 days from the date of lifting positively. In case firm fails to deliver repaired Transformer(s) within 90 days from date of intimation, the cost of the transformer(s) shall be withheld from firm's financial hold and in case firm fails to deliver repaired within 90 days from date of intimation, a penalty at the rate of ½% per week subject to maximum 10%, shall be levied for the late delivery of repaired Transformer(s).

Firm shall lift G.P. failed transformers after furnishing safe custody bank guarantee, the slab of safe custody Bank Guarantee shall be as under.

Safe custody Bank Guarantee :-

The Safe Custody Bank Guarantee (SCBG) shall be 1% of the value of the contract or as per following SCBG slabs whichever is lower.

1. In case if order is upto 1000 Nos. DT's the firm have to give safe custody Bank Guarantee for Rs.5.00 Lacs and
2. if order is more than 1000 Nos. but upto 3000 Nos. then the safe custody BG for Rs.10.00 lacs and
3. In case for orders more than 3000 Nos. DT's the value of safe custody BG shall be Rs.20.00 Lacs. In case firm fails to furnish the safe custody BG the amount equivalent to safe custody BG shall be deducted from firm's first bill due for payment. On furnishing of safe custody BG the amount so deducted shall be returned to the firm. The safe custody BG shall be valid for a period of 12 months over and above the normal GP. After a period of 16 months from normal GP the safe custody BG shall be returned back unless there is some specific direction from the purchaser.

II All the **repaired / rectified** transformers by the manufacturer under guarantee clause shall carry a further guarantee of 12 months after **repair** or unexpired guarantee of 60 months from the date of supply, whichever is later, after **repair / rectification**. The bank guarantee equivalent to cost of **repaired** transformers shall be furnished after expiry of performance guarantee period to cover **such repair guarantee**. The purchaser also reserves the right to withhold the payment of supplier firm, under any other contract, if the performance of the supplier in **repaired the failed** transformers is not satisfactory. Each supplier shall invariably furnish the detailed information about the total number of transformers failed and **repaired** by them, every month after commencement of supplies.

III In order to ascertain that transformers have successfully completed guarantee period the following details shall be provided on the transformer body:

- A. A repair identification steel plate of size 75 x 75 x 2.5 mm duly engraved with following details shall be welded on the transformer body.

Firm's Name / Logo

TN

KVA

Sr.No.

Date of supply

Ist time

IInd time

IIIrd time

Date of failure

Date of repair

Guarantee period

extended.

B. Such metallic plate fixed on first **repair** should not be removed at the time of second **repair** or any subsequent **repair**. However, necessary details of failure and **repair** shall be graved on **the identification plate**, each time it is **repaired** in guarantee.

C. The **repaired G.P. failed** transformer shall be provided with 40 mm wide red color band all around transformers including radiator each time it is **repaired** in G.P. Thus if a transformer is **repaired** three time in G.P. then there should be three colored bands each of size 40 mm.

IV All due care should be taken to ensure that the original name plate and identification plate provided should not be removed from the position at which they are fixed originally. In case it is felt that these are loose then it should be repaired suitably by welding or riveting.

V Test checking of G.P. failed transformers will be allowed to the supplier at Nigam's store before lifting of G.P. failed distribution transformers to repair at supplier's works so that minor mistakes like loosing of connections/ replacement of fuse wire be carried out at Nigam's stores.

VI G.P. repaired Distribution may be got tested at CTL as per the sampling plan of new transformer except the physical opening test. The 10% tolerance (as per IS:2026 part – I/1977) be allowed on total losses at 50% and 100% loading for the transformers failed under guarantee period for testing at firms' works as well as in CTL testing.

VII An undertaking shall be furnished by the firms, who will supply the amorphous distribution transformers that in case transformer fails beyond guarantee period, it shall be repaired by them on the rates, terms & conditions of Nigams existing CRC for repair of distribution transformers and in case firm denies to repair the transformers under CRC, such firms shall not be awarded order in subsequent tender.

24. **Deleted**

25. **Deleted**

26. **Besides above changes, the technical parameters of the specifications wherever are deviating from the IS:1180 (Part-I/2014), the same shall be in accordance with IS:1180 (Part-I/2014) and its latest amendments, if any and the changes where the IS:1180 (Part-I/2014) is silent for technical parameters, same shall be applicable as per Discom specification.**

27. **Deleted**

28. Make of Brought Out Items:

The Make of brought out items like Bushings, Transformer Oil, MCCB etc. other than Make specified in the specification/work order may be accepted if confirms to relevant IS with due approval of JdVVNL.

29. Every Micro, Small & Medium enterprises of Rajasthan shall be required to submit an affidavit in schedule-XI, along with duly filled bid document.

SCHEDULE – V(A)

MANUFACTURER’S GUARANTEED TECHNICAL PARTICULARS FOR

**11/ $\sqrt{3}$ KV / 240 V, 16 KVA RATING OUT DOOR TYPE COMPLETELY SELF PROTECTED
SINGLE PHASE ALUMINIUM WOUND DISTRIBUTION TRANSFORMERS ENERGY
EFFICIENCY LEVEL-2 WITH INBUILT CIRCUIT BREAKER AGAINST, TN-1424**

S.No	DESCRIPTION	Parameters
	Rating in KVA	16 KVA
1	Name of the manufacturer and place of manufacturer	
2	Continuous max rating as per this specification (KVA)	
3	Normal ratio of transformer (KV)	
4	Method of connection HV/LV	
5	Max. Current density in windings a. High voltage Amp/Sq.mm b. Lower voltage Amp/Sq.mm	
6	Max hot spot temp Deg.C (Ambient air temp on which above is based Deg.C)	

7	a. Max. observable oil temp in Deg.C (Ambient air temp on which above is based Deg.C)	
	b. Maximum winding temperature in Deg. C (Ambient air temp on which above is based Deg.C)	
8	ii) Total losses at normal voltage frequency, rated current and 75 Deg.C at 50% & 100% loading (Max).(watts)	
9	Flux Density(Max)(Tesla)	
10	Efficiency at normal voltage: i. Unity power factor a. At 50% load % b. At 75% load % c. At full load % ii 0.8 power factor a. At 50% load % b. At 75% load % c. At full load %	
11	Regulation as % of normal voltage a. At unity power factor % b. At 0.8 power factor lagging %	
12	Impedance voltage at normal ratio between HV and LV winding %	
13	Type of transformer, Shell type/Core type Wound core.	
14	Type of insulation used in a. HV winding b. LV winding	
15	Impulse test voltage level (KVrms) HV winding LV winding	
16	Characteristics of transformer oil	

17	Total content of oil in litres	
18	<p>i) Approximate overall dimensions</p> <p>a. Height in mm b. Breadth in mm c. width in mm</p> <p>ii) Tank dimensions</p> <p>a) Diameter mm b) Height mm</p>	
19	<p>Weight of insulated conductor</p> <p>a. HV (min) kg b. LV (min) kg</p>	
20	Weight of core (min.) kg (AMT)	
21	Weight of complete transformer arranged for transport kg	
22	<p>Resistance for windings at 75 Deg.C per phase</p> <p>a. HV Ohms b. LV Ohms</p>	
23	<p>Material of bushing rod and nuts &</p> <p>Bushing caps HV LV</p>	
24	Make , type of MCCB/ L.V Breakers	
25	Particulars of HV fuse	
a)	System voltage	
b)	Current	
c)	Max. Design voltage	
d)	Min. Melting time	
e)	Total clearing time	

f)	Interrupting rating	
g)	Mounting	
h)	Make	
25	All the standard fittings & accessories shall be provided as per IS:1180 (part-1)-2014/spec.	

(Signature)

Name & Designation

with seal of the bidder

**TECHNICAL SPECIFICATION FOR SUPPLY OF 11/ $\sqrt{3}$ KV / 240 V, 10 KVA
RATING OUT DOOR TYPE COMPLETELY SELF PROTECTED SINGLE PHASE
ALUMINIUM WOUND ENERGY EFFICIENT LEVEL-2 DISTRIBUTION
TRANSFORMERS WITH INBUILT CIRCUIT BREAKER**

1) SCOPE:

This specification covers design, engineering, manufacture, assembly, stage testing, inspection & testing before supply and delivery at Nigam store(s) anywhere in Rajasthan of the oil immersed, oil natural air natural (ONAN) out door type 11kV / $\sqrt{3}$ / 240 V, 50 Hz, 10 KVA Single Phase EEL-2 with **Aluminium wound** complete with fittings and accessories with meter protection unit on LT side of distribution transformers for use in distribution systems.

- 1.1 The Equipment Offered shall be complete with all parts necessary for their effective and trouble free operation. Such parts will be deemed to be within the scope of the supply irrespective of whether they are specifically indicated in the commercial order or not.
 - 1.1.1 It is not the intent to specify herein complete details of design and construction. The equipment offered shall conform to the relevant standards and be of high quality, sturdy, robust and of good design and workmanship complete in all respects and capable to perform continuous and satisfactory operations in the actual service conditions at site and shall have sufficiently long life in service as per statutory requirements. The dimensional drawings attached with this specification and the notes thereto are generally of illustrative nature. In actual practice, notwithstanding any anomalies, discrepancies, omissions, incompleteness, etc. in these specifications and attached drawings, the design and constructional aspects, including materials and dimensions, will be subject to good engineering practice in conformity with the required quality of the product, and to such tolerances, allowances and requirements for clearances etc. as are necessary by virtue of various stipulation in that respect in the relevant Indian Standards, IEC standards, I.E. Rules, I.E Act and other statutory provisions.
- 1.2 The Tender / supplier shall bind himself to abide by these considerations to the entire satisfaction of the Purchaser and will be required to adjust such details at no extra cost to the purchaser over and above the tendered rates and

prices.

- 1.3 Tolerances on all the dimensions shall be in accordance with provisions made in the relevant Indian/ IEC standards and in these specifications. Otherwise the same will be governed by good engineering practice in conformity with required quality of the product.

2) **APPLICABLE STANDARDS:**

The materials shall conform in all respects to the relevant Indian Standard Specifications with latest amendments thereof; some of them are listed below:

Note: Wherever ISS are mentioned, equivalent or better International standards are also acceptable.

IS: 1180 (PART-I)/2014: Specifications for outdoor type oil immersed distribution transformers upto and including 2500 KVA, 33 KV Class.

IS/IEC 60947-2:2003 - low voltage switchgear and control gear – Part 2: Circuit Breaker.

IS:9385 Part-II:1980 – High voltage fuses : Part 2: Expulsion and similar fuses.

IS:8603:2008 – Dimensions for porcelain transformers bushings for use in heavily polluted atmospheres 12/17.5 kV, 24 kV and 36kV (Amalgamating IS 8603 (Parts 1,2&3) : 1977.

IS: 5/1961: Colour for ready mixed paints

IS:2026 (PART I, II, III, IV & V)/1981 – Power Transformers.

IS:6600/1978 : Guide for loading of oil immersed Transformers

IS:335/1983 : New insulation oils for Transformers.

IS:3347 (Part I/Sec. 1 & 2): Dimension of Porcelain parts & Metal parts for Transformer bushing (1.1 KV)

IS:7421 : Porcelain Transformer Bushings for low voltage – upto 1 KV.

IS:2099/1986 : Porcelain Transformer bushing for AC volts above 1000 volts.

IS:3639/1966 : Fittings & accessories for Transformers.

IS:1866/1978: Code of practice for maintenance & supervision of insulating oil in Service.

IS:9335 : Specifications for insulating kraft paper.

IS:1576 : Specifications for solid insulating press Boards for electrical purposes.

IS:104 : Ready mixed paint, brushing zinc chromate, painting.

IS:649 : Testing of steel sheets and strips for magnetic circuits.

IS:2362 : Determination of water content in oil for porcelain bushing transformers.

IS: 4257: Dimensions for clamping arrangements for bushings.

IS 6160 : Rectangular conductor for electrical machines.

IS:10028 : Selection, Installation and maintenance of transformers.

IS: 5484: Specifications for Aluminium wire rods.

REC Specification No. 2.

REC Specification No. 39/1993.

CEA Specification, Chapter 4.

IEC: 994: Specification Part4 for Surge Arresters without gap for AC system.

IS: 3070 (PartIII): Specification for Lightning Arresters for alternating current System Part.III.

IS: 3073/1974 : Specification for Lightning Arresters.

IS: 2629: Recommended practice for hot dip galvanizing of iron and steel.

IS: 2633: Method for testing uniformity of coating on Zinc coated articles.

IS: 5621: Specification for large hollow porcelain for use in electrical installation.

IS: 13947 (PartII) latest : Specification for Single Pole MCCB.

IS: 2147: Degree of protection provided by enclosures for low voltage switchgear and control gear.

IEC Pub 609472: Specification for Low Voltage Switch Gear and Control gear.

Material conforming to other internationally accepted standards, which ensure equal or higher quality than the standards mentioned above would also be acceptable. In case the Bidders who wish to offer material conforming to the other standards, salient points of difference between the standards adopted and the specific standards shall be clearly brought out in relevant schedule. Four copies of such standards with authentic English Translations shall be furnished along with the offer.

Note:- Besides above changes, the technical parameters of the specifications wherever are deviating from the IS:1180 (Part-I/2014) , the same shall be in accordance with IS:1180 (Part-I/2014) and its latest amendments, if any and the changes where the IS:1180 (Part-I/2014) is silent for technical parameters, same shall be applicable as per Discom specification.

3) SERVICE CONDITIONS:

The distribution transformers to be supplied against this specification shall be suitable for satisfactory continuous operation under the following climatic conditions as per IS 2026 (Part I) latest revision.

- | | | | |
|-------|--|---|-------|
| xiii) | Peak ambient temperature | : | 50°C. |
| xiv) | Minimum Ambient Temperature in shade | : | 5°C. |
| xv) | Maximum average ambient temp in 24 hours period in shade | : | 45°C |
| xvi) | Maximum yearly weighted average ambient temperature | : | 35°C |

- xvii) Maximum temperature attainable by an object exposed to sun : 60°C
- xviii) Maximum relative humidity : 100%
- xix) Average number of thunder storm days per annum : 40
- xx) Average number of rainy days per annum : 120
- xxi) Average annual rainfall : 15-100 cm
- xxii) Number of months of tropical monsoon conditions : 4 Months
- xxiii) Maximum wind pressure : 195 kg/mt²
- xxiv) Altitudes : Not exceeding 1000 mtrs

The equipment shall be for use in moderately hot and humid tropical climate, conducive to rust and fungus growth.

1. **PRINCIPAL PARAMETERS:**

The single phase transformers of standard ratings 10 KVA shall be suitable for outdoor installation with Single Phase, 50 Hz, 11KV system in which the neutral is effectively earthed and should be suitable for outdoor service under fluctuations in supply voltage upto plus 10% to minus 15%.

The transformer shall conform to the following specific parameters.

S.N	Particulars	Parameters
1	Continuous rated capacity	10 KVA
2	System voltage (max.)	12KV
3	Rated voltage HV	11/ $\sqrt{3}$ KV
4	Rated voltage LV	240 V
5	Line current HV	1.57 A
6	Line current LV	41.67 A
7	Frequency	50 c/s +/- 3%
8	No. of phases	Single
9	Vector Group	IiO
10	Type of transformer	Outdoor
11	Type of cooling	ONAN

12	Class of insulation	Class A
13	Winding Material	Aluminium
14	Material of core	CRGO/AMORPHOUS
15	Type of core construction	Wound
16	Over fluxing limit (due to combined effect of voltage and frequency)	12.5 %
17	Permissible temperature over ambient under full load condition: i) Of top oil measured by thermometer ii) Of winding measured by resistance	35 Deg.C 40 Deg.C
18	Minimum clearances in air a) Phase to earth (mm) H.T b) Phase to earth (mm) LT	140 40
19	Total losses (watts) at 75 Deg. C. (Max.) (As per Energy Efficient level-2) i)At 50% loading ii)At 100% loading	60 watts 170 watts
20	% age Impedance (with a tolerance of $\pm 10\%$)	4.0 % ($\pm 10\%$ Tolerance)
21	Max. Flux Density at Normal voltage and frequency	1.47 Tesla
22	Max. Current density	1.6 A/mm Sq
23	LT Breaker	Internally mounted
24	Radiator required	Not required
25	Magnetizing Current (max.) a) At 100% rated voltage	1.5%+30% tolerance on 1.5% as per IS:2026 of rated full load current

	b) At 112.5% rated voltage	3% + 30% tolerance on 3% as per IS:2026 of rated full load current.
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ELECTRICAL CLEARANCES:

- c) Minimum External Clearances (in air as per IS:1180)
 - iii) HV phase to earth (mm) 140
 - iv) LV phase to earth (mm) 40

- d) Minimum Internal Clearances
 - vi) Clearance between inner wall of tank and coil (mm) -- 12
 - vii) Radial clearance between HV & LV windings (mm) -- 2
 - viii) Radial clearance of LV coil from core (mm) -- 2
 - ix) End clearance of HV coil from Yoke (mm) -- 15
 - x) Minimum clearance between core & tank bottom (mm) -- 5

5) DESIGN & CONSTRUCTION:

5.8 Winding connection & terminal arrangements:

For HV, live end should be brought out through 12kV bushing and the other end of HV, which is intended to be earth, shall be brought out on 1.1kV bushing (HV Neutral bushing). Provision shall be made for connecting the neutral HV terminal to local earth. The secondary (LV) winding shall be connected to LV bushings. The 12 KV HV bushing (live) shall be provided on top cover and the remaining three bushing(s) shall be provided on the sidewall of the tank and below top cover.

Two layer of electrical grade insulation kraft paper (epoxy dotted) of 2 mil thickness or one layer of minimum 4 mil thickness shall be used for interlayer insulation both for HV and LV Coils.

5.9 INSULATION MATERIALS:

The following approved make of electrical grade insulation craft papers and boards

shall be used in the transformer.

Sr. No.	Name of insulating material	Name of Firms
1.	Press board	(a) Senapathy whitely (b) Raman Board (c) Techno Electric, Hyderabad
2.	Kraft Paper	(a) Ballarpur (b) Padamjee (c) ITC Tribeni Tissue Paper Ltd., Kolkata (d) Munskjo, Sweden
3.	Press phan paper	Senapathy whitely
4.	Gaskets	(a) New cork (b) Talbros

5.10 Bushings

- i) The bushing shall conform to IS: 2099/3347 as amended upto date. Bushings having the creepage distance suitable for highly polluted atmosphere and having type tested as per IS: 3347 and IS:2099 latest version shall only be accepted.
- ii) For HV, 12kV class bushings and for earth/neutral of HV winding 1.1kV class bushing(s) shall be used and for LV, 1.1kV class bushing(s) shall be used.
- iii) The terminal arrangement shall not require a separate oil chamber.
- iv) The HV bushing shall be mounted on top cover and LV bushing(s) shall be mounted on side wall of tank below top cover. The bushing rods and nuts shall be of brass.
- vi) The HV bushings shall not have arcing horns.
- vi) HV bushing mounting bolt should be tag welded.

5.11 CORE, WINDING AND OIL

5.11.1 **CORE MATERIAL:**

a) **CRGO MATERIAL:**

Transformer core shall be wound core construction in shell type or core type, using prime grade imported M4 or better COLD ROLLED GRAIN ORIENTED (CRGO) laminations or any other combination of better grade be acceptable. The bidder shall furnish the core loss (watt per Kg.) and power (VA per Kg.) curves of the laminations used. The core shall be properly stress relieved by annealing in inert atmosphere. The transformer shall be suitable for over fluxing (due to combined effect of voltage and frequency) up to 12.5% without injurious heating. The operating flux density shall be such that there is a clear safe margin over the fluxing limit of 12.5%.

CRGO Laminations used shall be of prime grade and not second grade steel laminations. Only those bidders who directly imported CRGO either from the manufacturer or through their accredited marketing organization of repute (and not through any agent) shall be considered.

ALTERNATIVE

B) **AMORPHOUS METAL CORE**

The core shall be made of high quality Amorphous ribbons having very low loss formed into wound cores of rectangular shape, bolted together to the frames firmly to prevent vibration or noise. The complete design of core must ensure permanency of the core losses with continuous working of the transformers. The value of the maximum flux density allowed in the design shall be clearly stated in the offer. Curve showing the properties of the metal shall be attached with the offer. The transformer core shall be suitable for over fluxing (due to combined effect of voltage and frequency) upto 12.5% without injurious heating at full load conditions and shall not get saturated. The bidder shall furnish necessary data in support of this situation.

Core clamping for Amorphous metal transformers.

4. Core clamping shall be with top and bottom U-shaped core clamps made of sheet steel clamped with HT steel strap for efficient clamping.
5. MS core clamps shall be painted with varnish or oil-resistant paint.
6. Suitable provision shall be made in the bottom core clamp/bottom plate of the transformer to arrest movement of the active part.

NOTE: Equal Weightage shall be given to the transformer with amorphous metal core and CRGO core.

5.11.2 **FLUX DENSITY:**

Flux density should not be more than 1.47 Tesla(For 10 KVA) at the rated voltage

and frequency. Transformer core should be designed in such a way that it will not get saturated for any value of V/f (Voltage/frequency) ratio to the extent of 112.5% of rated value of V/f ratio (i.e., 11000/50) and that the maximum flux density in any part of the core and yoke at rated voltage & frequency shall be such that the flux density with +12.5% combined voltage & frequency variations from rated voltage & frequency does not exceed 1.9 Tesla. (as per amended IS:1180 (Part-I/2014) Actual core design along with calculations in support of it should be enclosed with the offer.

5.11.3 WINDING:

HV and LV windings shall be wound from Aluminium conductors with DPC/Polyesterimide enamel (Class H) insulation. The enamel covering shall conform to Grade-II of IS:13730 Part8 or IEC 60317 Part8. The windings shall be progressively wound in LVHV coil design for better voltage regulation and mechanical strength. The inter layer insulation shall be of Epoxy resin bond paper. The type of winding i.e. whether LV windings are of conventional type or foil wound shall be indicated in the tender. Winding must be done in cleanest possible atmosphere to prevent possible accumulation of dust particles. The coil shall be further processed for dimensional control, improved bonding and for improving short circuit withstanding capability.

The current density of winding shall not be more than 1.6 Amp./sq.mm for Aluminium. The test reports for material characteristics like density, tensile strength and elongation, moisture content, ash content, dielectric strength, thickness of resin etc. for epoxy dotted paper shall be submitted during stage inspection.

5.11.4 CORE COIL ASSEMBLY:

Core coil assembly shall be further processed in oven for removal of moisture.

Ample provision for free circulation of oil in the radial gap between the core & LV Coil shall be made. The core shall be effectively earthed through copper foil bolted on core clamps, after removing the core clamp paint.

All core-coil assembly shall be indelibly marked / punched on core channel / an identity plate welded on core channel with following details:

1. Name of Supplier:

2. Order / TN No:
3. Rating:
4. Sr. No. of Transformer:

In case if above marking is not found on the core assembly of physically opened transformer selected for physical verification during final inspection then no further inspection shall be carried out and re-inspection charges shall be payable by the supplier.

5.11.5 OIL:

The transformer shall be supplied complete with first filling of EHV Grade transformer oil, up to the normal oil level. The oil shall conform to IS: 335/1993 (latest amended) and should be ISI Marked and having the specified aging characteristics.

The make of Transformer Oil shall be either APAR/SAVITA/ RAJ LUBRICANTS/ ANAMIKA/SHARAVATI/ MADRAS PETRO/ RAJ PETROL/ LUBRICHEM, MUMBAI/ OPANAMA PETROCHEM, ANKELSHWAR/ TASHKENT OIL, VADODARA/COLUMBIA. The transformer oil sample taken from the transformer shall be subject to testing as per provisions of IS:1866.

The oil manufacturer's test certificate shall be made available at the time of inspection to the inspecting officer.

5.12 BUSHING TERMINALS:

5.12.1 H.V. TERMINALS:

HV terminals shall be designed to directly receive ACSR conductor up to 7/3.35 mm (without requiring the use of the lug).

Starting and finishing leads of HT coils shall be covered with empire sleeve(s) or paper tube(s) of proper size. These leads should be clamped with the body of the winding with the help of cotton twine or permacel tape during manufacturing of the coils.

The transformer shall be provided with outdoor type 01 No. porcelain bushings, conforming to IS:3347/1972 & IS:2099/1973 from the manufacturer of repute. The HV bushings shall be on top of the tank and shall be fitted on a pocket made on top cover. The bushings rods and nuts shall be made of brass. The inner porcelain portion of the bushing shall be projected about 50% of the length inside the bushing pocket. **HT bushing(s) mounting bolts should be tag welded.**

The clamping ring of HV bushing shall be of galvanised MS Sheet having minimum thickness of 1.6 mm. The total weight of all the 12 aluminium caste member of HV bushing shall not be less than 210 grams.

The arcing horn(s) shall be single gap and fixed type. "The HV bushings shall generally confirmed to relevant IS: 3347 (Part-I to V of section I) , IS: 2099 (Part-I to V of section I) and IS: 7421 (As and where applicable). Embossing showing the manufacturer's name and month & year of manufacture shall be clearly visible on HV bushings, even after fixing on transformer(s)".

5.12.2 L.T TERMINALS:

The LV coil shall be taken by cut on the top core clamp duly reinforced to compensate for the mechanical strength.

In case of internal L.T. Breaker, the L.T. bushing and the terminals shall be suitable for being concealed inside the distribution box having insulated aluminium bus bar of suitable size (as per the enclosed drawing) from where the connections shall be taken for two or three numbers single core L.T. Aluminium Bunched Cable of size 16 sq.mm through cable glands for release of single phase connections to the consumer.

"The LV bushings shall generally confirmed to relevant IS: 3347 (Part-I to V of section I) , IS: 2099 (Part-I to V of section I) and IS: 7421 (As and where applicable). Embossing showing the manufacturer's name and month & year of manufacture shall be clearly visible on LV bushings, even after fixing on transformer(s)".

5.13 TANK:

The oil volume inside the tank shall be such that even under the extreme operating

conditions, the pressure generated inside the tank does not exceed 0.4 kg/sq.cm positive or negative. There must be sufficient space from the core to the top cover to take care of oil expansion.

The tank cover shall have plasticised surface on live parts to guard against bird faults. Alternately, suitable insulating shrouds shall be provided on the bushing terminals.

a) The tank cover shall have plasticised surface on live parts to guard against bird faults. Alternately, suitable insulating shrouds shall be provided on the bushing terminals.

- iv) Main Tank : 2.0 mm (Min)
- v) Top Cover : 2.5 mm (min.)
- vi) Bottom Cover : 2.5 mm (min.)

b) The tank without oil shall be capable of withstanding a pressure of 0.8 kg/cm² (g) above atmosphere at a vacuum of 760 mm of Hg for 30 minutes without any permanent deflection (pressure test shall be conducted as per IS -1180 Part-I). The permanent deflection should not be more than the limits specified in IS:1180 Part-I.

c) MEASUREMENT OF SHEET THICKNESS OF TRANSFORMER TANK/ METER

& PROTECTION BOX:

The following measurements shall be carried out at respective Central Testing Lab (CTL) of the Discom(s) on the supplies of distribution transformers:

Measurement of Transformer Tank Thickness shall be done as follows:-

1.	Top Cover	At 2 places to be measured & average is to be taken.
2.	Bottom Cover	-do-
3.	Side Wall(s)	On all four sides (average is to be taken)
4.	M&P Box.	Both sides and front(average is to be taken)

- The nominal value of sheet thickness will be considered as mentioned in the Specification.
- .. Rolling tolerance will be as per ISS:1852-1985 with latest amendment and no penalty will be charged on such measured thickness till tolerance limit of ISS.
- ... Sheet thickness of transformer tank/ M&P Box for Distribution Transformers as per relevant tender specification are as under for ready reference:

Sr. No.	Rating	Top Cover (mm)	Bottom Cover (mm)	Side Tank (mm)	of M&P Box (mm)
1	10 KVA Single Phase	2.5	2.5	2.0	2.0

Further it is also intimated that 5% variation beyond tolerance limit in measurement of sheet thickness on negative side shall be acceptable by the Discom with levy of penalty. The rate of penalty will be Rs.80.00 per Kg.

For example:

Weight of 10 KVA Transformer Tank and M&P Box	120 Kg. (approx.)
Variation in thickness of tank/M&P Box	5% (beyond tolerance limit)
Then penalty levied will be	$120 \times 80 \times 5$ ----- = Rs.480.00 100

In case any dimension in transformer tank/ M&P Box sheet thickness found beyond aforesaid limit of (-) 5% will not be acceptable to the Discom and the relevant sub-lot shall stand rejected and the lot of such transformers will have to be replaced by the firm.

The highest percentage variation on negative side in respect of measurement of sheet thickness of any part of tank & M&P Box will be applicable on the entire dimensions for levy of penalty.

Transformer having thickness even more than 5% after allowing rolling tolerance shall be acceptable.

The measurements of sheet thickness & size of Box will be carried out on all those sample transformers which are tested in CTL and test results will be applicable to the respective sub-lot or part thereof from which the sample is drawn.

NOTE_ Firm may supply M.S. Sheet type OR Deep Drawn type Meter & Protection Boxes.

5.14 The following shall also be adhered:

- The long seam joint, CSEAM joint, fittings & accessories and other welds shall be oil tight and no deflection/ bulging should occur during service.
- Manufacturer should carry out the all welding operations as per relevant ASME standards and submit a copy of the welding procedure, qualifications and welder qualification certificate.
- The circular bottom plate edges of the tank should be folded upward, for at least 25mm to have sufficient over lap with vertical sidewall of the transformer.

Tank shall have permanent lugs for the lifting the Transformer body and there shall be facilities for lifting the core coil assembly separately.

The Transformer shall be provided with two mounting lugs suitable for fixing the transformer to a single pole by means of 2 bolts of 20 mm diameter as per ANSIC 57.12.201988. Both mounting lugs shall be made of steel of min. 6 mm thickness. Jump proof arrangements shall be provided on upper mounting lugs and lips shall be provided on lower mounting lugs for proper mounting of transformer on the pole. Both mounting lugs faces shall be in one plane.

The Transformer tank and the top cover shall be designed in such a manner as to leave no external pockets in which water can lodge. The top cover shall be fixed to the tank by proper arrangement to avoid ingress of moisture. Design of the top cover shall be such that no water can lodge on the top side. HV bushing pocket shall be embossed to top side of the top cover so as to eliminate ingress of moisture and water. The edges of the top cover shall be formed, so as to cover the top end of the tank and gasket.

Minimum & Maximum Oil level mark shall be embossed inside the tank. Nitrite/neoprene rubber gaskets conforming to latest IS:4253 Part-II shall be provided between tank and top cover.

Continuous welding of one inch length each should be provided at four places on ring (i.e. welding the clamping ring at top cover as well as with tank) and nut bolt of the ring should be tag welded.

On each transformer stainless steel anti theft fastener of suitable size shall be provided for clamping rim to hold fast tank and tank cover. In case of flange provided on top cover 2 Nos. stainless steel anti theft fastener shall be used and in case of rim type tank top cover 1 No. anti theft fastener shall be used. **Alternatively Dome shaped side clamping type construction of clamping bolts with stopper washer with tack welding for antitheft purpose for top cover.**

6) TANK SEALING:

The space on the top of the oil shall be filled with dry air or nitrogen. The dry air (or nitrogen) plus oil volume inside the tank shall be such that even under extreme operating conditions, the pressure generated inside the tank does not exceed 0.4 kg/sq.cm positive or negative. The nitrogen shall conform to commercial grade of relevant standards.

7) SURFACE PREPARATION & PAINTING :

8.4 General:

All paints shall be applied in accordance with the paint manufacturer's recommendations. Particular attention shall be paid to the following:

- f) Proper storage to avoid exposure as well as extreme of temperature.
- g) Surface preparation prior to painting.
- h) Mixing and thinning.
- i) Application of paints and the recommended limit on time intervals between coats.
- j) Shelf life for storage.

All paints, when applied in a normal full coat, shall be free from runs, sags, wrinkles, patchiness, brush marks or other defects.

All primers shall be well marked into the surface, particularly in areas where painting is evident and the first priming coat shall be applied as soon as possible after cleaning. The paint shall be applied by airless spray according to manufacturer's recommendations. However, wherever airless spray is not possible, conventional spray shall be used with prior approval of Purchaser.

The manufacturer shall, prior to painting protect nameplates, lettering gauges, sight glasses, light fittings and similar such items.

8.5 Cleaning and Surface Preparation:

After all machining, forming and welding has been completed, all steel work surfaces shall be thoroughly cleaned of rust, scale, welding slag or spatter and other contamination prior to any painting.

Steel surfaces shall be prepared by SAND/SHOT blast cleaning to Grade Sa. 2.5 of ISO 85011 or Chemical cleaning by Seven Tank Process including Phosphating (IS 3618).

The pressure and volume of the compressed air supply for blast cleaning shall meet the work requirements and shall be sufficiently free from all water contamination to ensure that the cleaning process is not impaired.

Chipping, scraping and steel wire brushing using manual or power driven tools cannot remove firmly adherent millscale and shall only be used where SAND/ shot blast

cleaning is impractical. Manufacturer shall indicate such location, for owner's information, in his offer.

8.6 Protective Coating:

As soon as all items have been cleaned and within four hours of the subsequent drying, they shall be given suitable anticorrosion protection.

8.7 Paint Material:

Following are the types of paint that may be used for the items to be painted at shop and supply of matching paint to site:

Heat resistant paint shall be (Hot oil Proof) for inside surface.

Inside of tank Oil shall be painted with varnish or oil resistance paint. For external surface, one coat of thermo-setting powder paint or one coat of epoxy primer followed by 2 coat of polyurethane base paint shall be used .Total Dry film thickness as per IS 1180 Part-1 2014.

The colour of the finishing coats shall be olive green colour conforming to Shade No. 220 of IS -5 of 1961.

8.8 Painting Procedure:

All painting shall be carried out in conformity with both specification and with the paint manufacturer's recommendation. All paints in any one particular system, whether shop or site applied, shall originate from one paint manufacturer.

Particular attention shall be paid to the manufacturer's instructions on storage, mixing, thinning and pot life. The paint shall only be applied in the manner detailed by the manufacturer e.g. brush, roller, Conventional air spray and shall be applied under the manufacturer's recommended condition.

Minimum and maximum time intervals between coats shall be closely followed.

All prepared steel surfaces should be primed before visible rerusting occurs or within 4 hours, whichever is sooner. Chemical treated steel surfaces shall be primed as soon as the surface is dry and while the surface is still warm.

Where the quality of the film is impaired by excess film thickness (wrinkling, mud cracking or general softness) the supplier shall remove the unsatisfactory paint coating and apply another. As a general rule, dry film thickness should not exceed the specified minimum dry film thickness by more than 25%. In all instances where two or more coats of the same paint are specified, such coatings may or may not be of contrasting colours.

Paint applied to items that are not to be painted shall be removed at Supplier's expense, leaving the surface clean, unstained and undamaged.

8.9 Damaged Paintwork:

Any damage occurring to any part of a painting scheme shall be made good to the same standard of corrosion protection and appearance as that originally employed.

Any damaged paintwork shall be made good as follows:

- a) The damaged area, together with an area exceeding 25 mm around its boundary, shall be cleaned down to bare metal.
- b) A priming coat shall be immediately applied, followed by a full paint finish equal to that originally applied and exceeding 50 mm around the perimeter of the original damage.
- c) The repainted surface shall present a smooth surface. This shall be obtained by carefully chamfering the paint edges before and after printing.

8.10 Dry Film Thickness:

To the maximum extent practicable the coats shall be applied as a continuous film of uniform thickness and free of pores. Over spray, skips, runs, sags and drips

should be avoided. The different coats may or may not be of the same colour.

Each coat of paint shall be allowed to harden before the next is applied as per manufacturer's recommendation.

The requirement for the dry type film thickness (DFT) of paint and the materials to be used shall be as given below.

Sl. No.	Paint Type	Area to be Painted	No. of coats	Total Dry film thickness (min.)
1.	Thermosetting Powder Paint	Inside	01	30 microns
		Outside	01	60 microns
2.	Liquid Paint			
	a) Epoxy(Primer)	Outside	01	30 microns
	b) Polyurethane base(Finish coat)	Outside	02	25 microns each
	c) Heat resistance paint (Hot oil proof Paint)	Inside	01	35/10 microns

8.11 Tests:

The painted surface shall be tested for paint thickness.

The painted surface shall pass the Cross Hatch Adhesion Test.

9 RATING AND TERMINAL PLATES

- 9.1 **Rating & terminal marking plate:** Each Transformer shall be provided with non detachable name, rating and terminal marking plate fitted in a visible position. All details shall be given on one plate. Material of the plate shall be stainless steel / **Aluminium** only. Thickness shall be 0.9 mm (with a tolerance of ± 0.1 mm). The plate shall be made absolutely undetectable either through welding or riveting or through any other approved method. There shall be a rating plate on the transformer containing the information given in the relevant ISS.

The HV winding terminals shall be marked 1U & 1N. The corresponding secondary terminals shall be marked as 2u & 2n. In the diagram to be given on the name plate, the relative position of various terminals when viewed shall be clearly visible. Inspection shall not be undertaken unless all these details are verified by the Inspecting Officer.

Besides other particulars, following details shall also be given on the name plate:

- xii) P.O. No. month & year.
- xiii) Sr. No. of transformer.
- xiv) Date of despatch month & year.
- xv) Date of expiry of guarantee period – month & year.
- xvi) Maximum Guaranteed Load Losses at 50% and 100% loading.
- xvii) Recommended fuse sizes for HV & LV sides.
- xviii) Name & Full address of the manufacturer.
- xix) Capacity of the transformer.
- xx) Rating of the transformer.
- xxi) Type – Oil filled naturally cooled.
- xxii) Energy Efficient level-2 and Standard IS1180 Part-1 with BIS Licence No.

ALL DETAILS ON THE “NAME RATING AND DIAGRAM PLATE” SHALL BE INDELIGIBLY MARKED i.e. BY ENGRAVING OR PUNCHING

9.2 Technical cum Identification Plate: M.S. plate of size 125 x 75 x 2.5 mm having following details punched with letters of size 8mm x 6mm shall be continuously welded to the main tank body below the middle HV bushing and on Top Cover of tank in clearly visible position:-

- O) Name of the Firm
- P) TN No.
- Q) Make
- R) Sr. No.
- S) Jodhpur Discom
- T) Rating
- U) Date of Dispatch
- V) Date of Expiry of G.P.
- W) Core : Core Dia. _____ And Core Area. _____
- X) LV Coil :-
 - 3. ID/OD Dimensions
 - 4. Conductor Size
- Y) HV Coil :-

- 1. ID/OD Dimensions
- 2. Conductor Size
- Z) Limb Centre
- AA) Window Height

9.3 **Identification Mark:-** In addition to above, the following identifying details shall be clearly punched on the brackets which are attached to the transformer with minimum 10 mm x 10 mm x 1 mm size punch letters.

MAKE _____

S. No. _____

T N _____

The above identification mark shall also be punched / welded to one of the top core clamping channels. The punching shall be distinct and visible. The dimensions of letters be 10x10x1 mm.

9.0 **PRESSURE RELEASE DEVICE:-**

The transformer shall be equipped with a self sealing pressure release device designed to operate at a minimum pressure of 8 PSI (0.564 Kg/Cm²).

i. **FITTINGS**

The following standard fittings shall be provided with each transformer.

- a. Two earthing terminals.
- p. Two lifting lugs.
- q. Rating and terminal marking plates.
- r. Pressure relief device.
- s. Internal Circuit Breaker (On LV Side).**
- t. HV Bushings.
- u. LV Bushings.
- v. HV terminal connectors.
- w. Top cover fixing clamps.
- x. Mounting lugs – 2 Nos.
- y. Bird guard or plasticised cover on live parts.
- z. LV earthing arrangement.
- aa. Operating Mechanism of LT Circuit breaker.
- bb. Signal Light.
- cc. Three year Guarantee plate.
- dd. Any other fitting necessary for satisfactory performance of the manufacturer as

per IS:1180 Part-1(2014).

ee. Mounting Arrangement with pole will be as per drawing enclosed at Annexure-'B' for 10 KVA Single Phase Distribution Transformer. The mounting structure/ arrangement shall be in the scope of supplier.

13.0 FASTENERS

- All bolts, studs, screw threads, pipe threads, bolt heads and nuts shall comply with the appropriate Indian Standards for metric threads, or the technical equivalent.
- Bolts or studs shall not be less than 6 mm in diameter except when used for small wiring terminals.
- All nuts and pins shall be adequately locked.
- **All Nuts, Bolts / Washers / Fasteners exposed to atmosphere used in transformers and Meter Protection Box should be of Stainless Steel.**
- Each bolt or stud shall project at least one thread but not more than three threads through the nut, except when otherwise approved for terminal board studs or relay stems. If bolts are provided at inaccessible places for ordinary spanners, special spanners shall be provided.
- The length of screwed portion of the bolts shall be such that no screw thread may form part of a shear plane between members.
- Taper washers shall be provided where necessary. Protective washers of suitable material shall be provided front and back of the securing screws.

14.0 LOSSES:

The total losses at 50% and 100% loading for single phase **10 KVA** Transformers at rated voltage, frequency & 75 Deg. C shall not exceed the following values:

Rating in KVA	Voltage ratio in KV	Total losses at 50% loading (Watt) Max.	Total losses at 100% loading (Watt) Max.
10	$11/\sqrt{3}/0.240$	60	170

These losses are maximum allowable as per Energy Efficient level-2, and there would not be any positive tolerance. Transformer with higher losses than the above specified losses would be rejected.

13.0 IMPEDANCE:

The recommended percentage impedance at rated current and at 75 Deg. C **4.0%** (with a tolerance of $\pm 10\%$).

14.0 TEMPERATURE RISE:

The temperature rise over ambient shall not exceed the limits described below:

Top oil temperature rise measured by thermometer : 35 Deg.C

Winding temperature rise measured by method : 40 Deg.C

Temperature rise test shall be conducted on Maximum measured total loss (No load at rated excitation+Load loss at max. current tap at 75°C) at 100% loading shall be supplied during temperature rise test at a Govt. approved/ a Govt. recognized/ NABL accredited laboratory/ILAC i.e. International Laboratory Accredited Laboratory/ ILAC i.e. International Laboratory Accreditation Cooperation (in case of foreign laboratory).

The limit of temperature rise mentioned above will have to be satisfied by the manufacturer by carrying the Heat Run Test by feeding guaranteed losses.

In case the temperature rise exceeds the above values, transformers shall be rejected at risk, cost and responsibility of the supplier.

It must be noted carefully that readings for hot resistance after shut down shall be taken separately for HV & LV windings, which means, after completing the readings for one winding (HV or LV), the transformer shall be connected again and rated current passed for another 60 minutes (min.) and shut down taken again to take hot resistance readings for the remaining winding. This is in line with the requirement of CBIP manual, to ensure proper resistance v/s time curves.

Hot Spot temperature not to exceed 98 Deg. C when calculated over an annual weighted average ambient temperature of 35 Deg. C as per IS:2026 (Part-II Clause 4.9.4). **However, the transformer shall be designed for class 'A' insulation.**

The transformer shall be capable of giving continuous rated output without exceeding the specified temperature rise.

15.0 GUARANTEED AND OTHER TECHNICAL PARTICULARS FOR TRANSFORMERS

Tolerances on weight quantity and dimension figures shall be $\pm 2\%$ at the tender stage, subject to maintaining the minimum electrical clearances as per the specification. However, no negative tolerance shall be allowed on the short circuit type tested design. Electrical performance data shall be subject to tolerances as per ISS, unless otherwise specified in this specification. However, the Total losses at 50% & 100 % loading shall be maximum guaranteed without any positive tolerance.

16.0 TYPE TEST CERTIFICATE

The bidder shall furnish type test certificate(s) of offered design / similar design, wherever available with the bid.

1. DRAWING AND OTHER DOCUMENTS:

One set of dimensional drawing(s) and internal construction drawing of each transformer rating shall be submitted with the tender. The tender shall be accompanied with the following drawings/calculation sheets, as per the offered designs. Size of the drawings shall be A3 (420 x 297 mm) or A4 size only.

- a) Name rating/diagram plate drawings.
- b) Outline and General arrangement drawings
- c) Core coil assembly drawings
- d) Core section along with flux density calculation sheet / drawings.
- e) Cooling area calculation sheet
- f) Thermal ability short circuit calculation sheet
- g) Core loss and magnetization curves of the laminations
- h) Heat dissipation calculations (heat dissipation by tank walls excluding top and bottom should be 500 W/ sq.mm.

Any delay in submission of drawings shall be to supplier's account.

i) The Type test certificate of Internal circuit breaker conducted in the manufacturer which should be not older than 5 years from date of opening of the bid.

17.0 PROTECTION:

The transformer shall have the following CSP features for Internal Circuit Breaker:

The Meter Protection Box shall have one chamber only containing LT Bushing & outgoing LT terminal Bushings as per IS 3347 (Brass) for releasing consumer connections. The chamber is fully sealed. The drawing of the LT Box is enclosed at Annexure-A.

In 10% qty. of Meter Protection Box a provision for installation of Meter visible through glass window be kept in separate chamber for which the requirement shall be intimated as and when required during the execution of contract.

Further Following provisions be also ensured on M&P Box and Transformer:-

- 1. On each transformers stainless steel anti theft fastener of suitable size shall be provided for clamping rim to hold fast tank and tank cover.**
 - 2. The M&P Box is firmly fixed with the transformer tank by providing all the nuts and bolts (total 8 Nos.) as per specification/approved drawing.**
 - 3. The Stainless Steel Anti-Theft Nuts and bolts should be provided on all the four corner bolts of box and remaining nuts should be tack welded with the bolts.**
 - 4. Hexagonal head of all the anti-theft nuts should be removed/detached so that the purpose of use of anti-theft nut and bolt be fulfilled.**
 - 5. It should be ensured that there should be continuous welding on the complete M&P Box and in case if only tack welding is found on the M&P Box body then the complete lot may not be accepted.**
 - 6. M&P Box should be properly fixed with LT side flange of transformer by using min. 3 mm thick gasket so that water should not be go inside of M&P Box.**
- (The above 5-Points appearing at Sr. No. 1 to 6 will be checked in Central Testing Lab)**

17.2 The transformer shall have the following CSP features:

(a) INRRNAL HV FUSES ON THE HT SIDE OF TRANSFORMER as per IS9385 Part-II:1980

Specification for the HT fuses: Expulsion / any other suitable fuse placed in series with primary winding. This fuse is mounted normally inside of the primary bushing and is connected to the high voltage winding through a terminal block. Fuse shall be mounted in such a way that it should be possible to replace the fuse by opening HV bushing and without opening top cover.

This has to protect that part of the electrical distribution system which is ahead of the Distribution transformers from faults which occur inside the Distribution transformers i.e., either the windings or some other part of the transformer. It shall be ensured that this fuse does not blow for faults on the secondary side (LT side) of the transformer i.e., the blowing characteristic of

the fuse and LT breaker shall be so coordinated that the fuse shall not blow for any faults on the secondary side of the transformer and these faults shall be cleared by the LT breaker only.

The fuse shall be make of ABB/ERMCO/Global/samrakshna/Transguard or any make approved by JDVVNL.

(b) INTERNALLY MOUNTED OIL IMMERSSED LT BREAKER ON THE LV SIDE OF THE TRANSFORMER as per IS/IEC 60947-2:2003:

LT circuit breaker: All LT faults after the breaker shall be cleared by this breaker. As such, it shall be designed for the perfect coordination with the HT fuse link. The supplier shall furnish the time/current characteristics of LT circuit breaker and 11 kV fuses for various current multiples. The two characteristics shall be drawn on the same sheet to indicate coordination between the circuit breaker and fuse. This shall be based on the type test carried out on one of the transformers. In addition, the supplier shall carry out coordination test as indicated above, and this forms one of the test for acceptance.

The breaker is to be mounted on the secondary side of the transformer under oil to minimize premature operations from primary surges as would be with undersized line fuses. Two single pole elements is preferred. THE BREAKER SHALL BE COORDINATED TRHEMALLY WITH THE TRANSFORMER RATING TO FOLLOW CLOSELY THE VARIATIONS OF COIL TEMPERATURE DUE TO FLUCTUATIONS IN LOADS AND AMBIENT TEMPERATURES.

This is to be accomplished by connecting the breaker in series between the secondary winding and the load current. The breaker shall be located in the same oil as the core and coil assembly so that the bimetal are sensitive to the temperature of oil as well as the load current.

The circuit breaker may be an electromechanical device with three elements viz..

(i) Temperature sensing (ii) latching and tripping and (iii) current interrupting. The temperature sensing function might be accomplished through the use of bimetallic strips, which would be built into the breaker, such that load current of the transformer flows through them. In addition to this, a magnetic tripping device is to be provided for increasing the opening speed of the breaker under high fault conditions. The circuit breaker shall be mounted inside of the transformer so that these bimetallic strips are within the top oil layer of the transformer. The latching and tripping functions of the circuit breaker may be carried out within assembly similar to those used in industrial

type air circuit breaker. The circuit breaker shall also be closed and opened manually standing on ground and with a magnetic trip device also. The current interruption element shall consist of copper current carrying parts plus a set of copper tungsten current interrupting contacts. The magnetic element shall increase the opening speed of the circuit breaker under high fault current conditions. The

response of circuit breaker to the activity shall remain unchanged by the addition of the magnetic trip element. The specification to which the breakers conform shall be indicated. **The LT circuit breaker shall be make of samrakshna/Transguard/ Vijai Mercantile/ Global/ P&A/ ARDRY/ERMCO or any make approved by JDVVNL**

17.2 LOAD MANAGEMENT SIGNAL LIGHT:

A signal light, controlled by a bimetal in the breaker shall switch on when the transformer load reaches a predetermined level indicating that the transformer has been overloaded. The load management signal light shall perform two functions. It shall show visually when the particular

transformer has been operating in an overload condition and shall provide knowledge that for good system management, the economical change out point for the transformer is fast approaching. The signal light need not indicate temporary overloads and shall turn on only when the overload condition has existed at a given level for a certain length of time.

The LT circuit breaker shall have a set of auxiliary contacts builtin for signal light operation. These, normally open contact, shall form part of the signal light circuit. The signal light circuit shall consist of an auxiliary transformer winding (one or two turns) which generates about 4V, for the signal light contact set within the circuit breaker, and the signal light is to be mounted on the transformer tank. The signal light contact set is mechanically connected to the main circuit breaker latching and bimetal system. The signal light mechanism is adjusted so that the signal light contacts will close at a preset thermal condition which occurs before the main latching system opens the main contact. The net result is a visual external indication that a preset load condition has reached by the transformer. The signal light mechanism does not reset itself when the load drops off, the signal light remains lighted once the signal light contacts closes and can only be turned off by manually operating the external circuit breaker handle.

A distribution box is an enclosure (IP 33) is ready to be used condition and to be mounted on the transformer tank directly. The enclosure shall be made with sheet of thickness not less than 2.0 mm. It shall be painted with colour Shade No. 220 both inside and outside with powder coating. Enclosure shall have provision for pad locking arrangement. Detachable gland plate shall be provided for taking connections from distribution Box and transformer bushing terminal. The distribution box shall have Aluminium bus bar(covered with PVC Insulated tape) along with lugs fitted on bus bar for connecting two or more single core L.T. Aluminum Bunched Cable of size 16 sq.mm.

Instruction and operation Manual

The successful bidder shall be required to submit 5 copies of Instruction and Operation manual for each lot of 100 Transformers (or part thereof) supplied. This instruction manual should give complete details about the pre-commissioning tests/checks and the details of preventive maintenance.

18.0 Deleted

19.0 INSPECTION AND TESTING:

i) The inspection and testing shall be conducted as per relevant clause of the general conditions of contract (Section II) at the place of manufacturer. The transformers shall be completely assembled and tested at the factory. The inspection may be carried out by the purchaser at any stage of manufacturing. The supplier shall grant free access to the purchaser's representative at all reasonable times when the manufacturing work is in process. Inspection and testing of any material under this specification by the purchaser shall not relieve the supplier of his obligation of supplying the material in accordance with the specification and shall not prevent subsequent rejection if the material is found to be defective.

ii) The supplier shall afford the inspector representing the purchaser. All reasonable facilities, without charge, to satisfy him that the material is being manufactured in accordance with the specification. The bidder must have adequate set of instruments for conducting testing as per class of 0.5 or better. The instruments shall be duly calibrated and Calibration certificates should not be older than one year on the date of presentation to the Inspecting officer. The calibration shall be arranged from NABL accredited testing house only. A comprehensive list of testing equipment / instruments indicating makes, Sr. No. type of accuracy, calibrating agency, calibration date etc., should be furnished also with the bid. The calibrated instruments shall be duly sealed by calibrating agency to avoid any tampering with calibration and the details there of shall be clearly mentioned in the calibration certificate(s).

iii) The supplier shall keep the purchaser informed in advance, about the manufacturing programme so that arrangement can be made for inspection. The supplier shall give minimum fifteen days advance intimation to enable the purchaser to depute his authorized representative for stage inspection / witnessing of various tests on the equipment / material as detailed below:

NOTE:- Penal provision shall be made for any short technical parameters found / noticed in the transformers at any time even beyond guarantee period.

20.0 TESTS:

20.3 Routine / Acceptance Tests:

- b) 100% testing of the Distribution Transformers shall be carried out at firm's works for measurement of total load losses at 50% & 100 % loading. Remaining testing shall also continue to be carried out as per practice.

All the assembled / finished transformers prior to dispatch shall be subjected to all the Routine Tests as per IS: 2026. Minimum 25% of the lot size samples for Routine tests & checking shall be selected by the inspecting officers at random subject to minimum five (5) Nos. The supplier shall invariably furnish manufacturer's Routine test certificates along with inspection call of the offered transformers for pre-despatch inspection.

The selected transformer samples shall be subjected to the following Routine / Acceptance Tests at the manufacturer's works in accordance with relevant ISS with latest amendments :

16. Measurement of Voltage ratio.
17. Measurement of No load losses & No Load current at 100% and 112.5% of rated voltage and normal frequency.
18. Measurement of load losses at rated voltage and normal frequency (at 50% & 100% loading).
19. Measurement of Impedance voltage at rated current and normal frequency.
20. Measurement of windings resistance cold (at or near the test bed temperature).
21. Insulation resistance.
22. Induced over voltage withstand test.
23. Separate source voltage withstand test.
24. Pressure Test(As per IS 1180 Part-1:2014)
25. Oil leakage Test(As per IS 1180 Part-1:2014)
26. Checking of rating and terminal marking plate.
27. Checking of weights, dimensions, fittings and accessories, tank sheet thickness, oil quantity, material, finish, paint thickness and workmanship as per purchase order and contract drawings.
28. Physical verification of core – coil dimension, internal clearances, provisions of required oil ducts in the HV and LV winding, conductor sizes, individual weights of HV and LV winding core laminations etc., with reference to contract drawings and type test report(s) by dismantling selected unit(s). The physical verification shall be conducted on units equivalent to one unit per 50 Nos. or part thereof of offered quantity randomly selected from the offered lot. The dismantled unit(s) after reassembly shall be accepted by the purchaser after routine testing in presence of his representative.

During final inspection, sheet thickness shall also be measured of the transformer opened for physical verification. The instrument for measurement of sheet thickness will be provided by the supplier.

29. Oil dielectric strength (break down voltage) test shall be carried out on the transformers opened for physical verification and average value shall be calculated.
30. Checking of manufacturer's test certificates shall be done and copies thereof duly signed by firm's representatives and inspecting officers shall be enclosed with the inspection report.

Invoices of Amorphous/CRGO core material shall be provided by the supplier to the inspecting officer at the time of inspection and same shall be verified by the inspecting officer.

The following tests shall also be carried out at manufacturer's works on one complete unit of 10 KVA:

- i. Salt spray test and Hardness tests as per the relevant standards.

Note: It will be mandatory for the manufacturer firms to maintain record of BDV value of the transformer oil and shall furnish to the inspecting officer who in turn shall furnish the same to the Nigam's CTL for verification purpose. The Inspecting Officer during inspection shall verify record of Meggar value of the offered DT's and furnish the same with inspection report to the Nigam's CTL. Simultaneously, record of Air Pressure Test shall also be checked by the inspecting officer and same be furnished with report to the CTL. CTL will conduct testing of DT's only after receipt of record of BDV value, Meggar value and air pressure test results.

Fifteen days clear notice shall be arranged for predispatch inspection by Purchaser's representative as per General Conditions of Contract.

After successful inspection, the inspecting officer shall seal all the inspected transformers by tamper proof polycarbonate seals **on top cover bolts** of the transformer for identification. Before sealing the inspecting officer will ensure that all the offered transformers are complete and duly fitted with name, rating and diagram plate, identify plate and identification marks, as specified in this specification.

NOTE: Also after inspection/ testing, inspecting officer(s) shall affix Signature Seals also on each Transformer in addition to other seals.

- a. The oil leakage test shall be conducted on transformer complete in all respects shall be tested at a pressure equivalent to twice the normal head at the base of tank for 6 hours. There should be no leakage at any point.

20.4 TYPE TESTS & SPECIAL TESTS:

In addition to above tests the following type tests shall be arranged **on one transformer only as per IS :1180 (Part-1/2014)** in accordance with IS 2026 (Part 1 to III) with latest amendments, at laboratories accredited by National Accreditation Board/ Govt. approved lab for testing and calibration laboratories (NABL).

1. SHORT CIRCUIT TEST FOR DYNAMIC AND THERMAL ABILITY:

The Short circuit test for dynamic and thermal ability shall be arranged on one unit of each rating. The transformers for the test shall be selected /sealed by our inspecting officer from the first lot which shall be of minimum 20 Nos. (if ordered quantity is 500 Nos.) OR 50 Nos. (if ordered quantity is more than 500 Nos.). The Short Circuit test shall be conducted only after successful Routine tests including measurement of No Load and Load Losses (at 50% & 100% loading). The supply shall be accepted only after arranging successful type test on the selected transformer(s).

2. IMPULSE VOLTAGE WITHSTAND TEST:

The Impulse Voltage withstand test as per clause No. 13 of IS:2026 (Part-III) – 1981 shall be arranged. Impulse voltage withstand test shall be **Minimum 75KVp** for 11 KV class transformers. The test shall be conducted on one unit of each rating to be selected by our inspecting officer from the first lot of minimum 20 Nos. (if ordered quantity is 500 Nos.) OR minimum 50 Nos. (if ordered quantity is more than 500 Nos.). The supply shall be accepted only after arranging successful Impulse test on the selected transformer(s).

Note :-If ordered qty. Is less than 500 Nos. In such case first lot shall be of min. One month qty as per scheduled delivery .

3. TEMPERATURE RISE TEST:

Temperature rise test shall be conducted on Maximum measured total loss (No load at rated excitation+Load loss at max. current tap at 75°C) at 100% loading shall be supplied during temperature rise test at a Govt. approved/ a

Govt. recognized/ NABL accredited laboratory/ILAC i.e. International Laboratory Accredited Laboratory/ ILAC i.e. International Laboratory Accreditation Cooperation (in case of foreign laboratory).

The transformer shall be capable of giving continuous rated output without exceeding the specified temperature rise. Bids not meeting the above limits of temperature rise will be treated as non responsive.

d) PRESSURE TEST:(As per IS 1180 (Part 1):2014)

This test shall be conducted as type test at a Govt. approved/ a Govt. recognized/ NABL accredited laboratory. The pressure gauge shall be duly calibrated and sealed by an independent recognised test lab(s).

The test procedure shall be as detailed below :

The tank subjected to air pressure of 100 KPa above atmospheric pressure for 30 min. There should be no leakage at any point and is no deformation of tank.

No extra time shall be allowed for arranging these type tests. The cost of above Type Tests shall be borne by the supplier.

The programmed indicating date and place of type test(s), be intimated enabling purchaser to depute his representative to witness the test if desired. The testing house shall be advised to arrange type test result directly alongwith drawings duly attested by the testing authority for our scrutiny and approval. The type-tested transformer(s) shall also be accepted as the part of the supplies.

The requirement of arranging above type tests shall however not to be insisted on the suppliers who have arranged the above type tests within last 5 years from the date of opening of this tender on similar design. Minor changes in the present specification will not necessitate repetition of type test(s), if design of core-coil assembly is similar in essential details.

21.0 RANDOM SELECTION AND TESTING (RST):

21.5 The purchaser may select transformer(s) from the supplied lot(s) at random from the stores for conducting the following type tests, at any test house(s) as mentioned above. The supplier shall arrange these tests including loading, unloading and to & fro transportation from our stores to the test house(s). The charges for such tests shall be reimbursable to the supplier on actual basis on production of documentary evidence in case the selected sample successfully withstand type test(s) In case of otherwise, no charges will be reimbursed.

- i. Short circuit withstand test for Dynamic & Thermal ability. Measurement of No load&loadLosses at 50% and 100% loading shall form part of tests conducted before and the after the short circuit test and recorded in the report.
- ii. Impulse test as per Clause No.13 of IS:2026 (Part-III). Impulse voltage shall be **Minimum 75 KVp**.
- iii. Temperature Rise Test as per IS 2026 Part 2
- iv. Pressure Test as per IS 1180 Part-1:2014
- v. Purchaser reserves the right to carry out any site tests he may decide upon at his own expenses. In case equipment/ material are not found as per P.O., all expenses incurred during the testing will be to supplier's account and material shall be replaced by the supplier at site free of cost.

FAILURE IN TYPE TEST(S):

In the event of failure / unsatisfactory results of the transformer(s) in short circuit test / impulse type tests/ Temperature rise Test/ Pressure Test, the supplier shall have to replace the supplies already made and no further transformers shall be accepted. The purchaser however, at his option, may accept the transformers already supplied with the following conditions-

- vi) Guarantee period of the supplied transformers issued to the field shall be increased by double the normal Guarantee period.
- vii) Bank Guarantee shall be extended to cover the additional Guarantee period.
- viii) For failure in any of the type tests listed under RST i.e., short circuit test / Temperature rise Test/ Pressure Test & Impulse withstand test, no further supplies shall be accepted. The type test charges shall also not be reimbursable in this case and shall be borne by the supplier.
- ix) The transformers lying in the store(s) shall be replaced as per sub para (v) below.
- x) The bidder shall, however, be allowed to check the reasons of failure and if need be, to improve / modify the design. Further supplies, including replacements against supplies already made, shall be accepted only after successful type test(s) are arranged on fresh transformer(s) selected by the authorized representative of the purchaser. All the type tests shall be arranged in case there is change in the design, otherwise, type test shall be repeated only for the test in which failure has occurred. Charges for such test(s) shall be borne by the supplier. However, in the event of failure of transformer in the repeat type test, the purchaser may take following actions:
 - a) Cancel pending orders of the rating in which failure(s) has occurred, &
 - b) Not place any order of Distribution Transformers on the firm for one two year(s).

21.6 Measurement of Total Losses (at 50% & 100% loading):

(i) After pre-dispatch inspection of material at firm's works, the dispatch instructions will be issued for the respective store(s) as per requirement of Nigam. Sample(s) will be drawn from the lot(s) received in store(s) and will be subjected to the following test(s):

- a. One transformer will be selected out of every lot of 10 Nos. or part thereof for measurement of No load Losses at rated voltage; No Load current (at 100% and 112.5% of rated voltage); Impedance voltage, thickness of tank body sheet and total Losses at 50% and 100% loading at rated current. The testing shall be arranged either at purchaser's own testing lab and / or at independent test lab. The testing charges for such tests shall be borne by the purchaser. The test results will be applicable to the respective lot of 10 Nos. from which sample was drawn.
- b. In case if dispatch instructions are less than 10 Nos. than one sample shall be selected from each store (s) and the test result so obtained shall be for the quantity consigned / received by the store (s).

The percentage impedance voltage at rated current shall not exceed the permissible limit as specified with allowable tolerance failing which the sub lot of transformers represented by the sample shall be rejected. The transformers selected for total Losses shall also be subjected to magnetizing current and in case found beyond the limit, the lot shall stand rejected.

The I.R. values of the sample(s) shall be measured at CTL, Jodhpur and it must be more than 50 MEGA-OHM.

One sample out of 100 Nos. transformers or part thereof (whose Sr. No. shall be decided by the committee members) shall be selected for physical verification/ checking of window height, limb centre and checking of insulation of HV and LV windings, make of Inbuilt circuit breaker size of lugs and size of PVC Copper cable at CTL.

Metal Parts shall be checked in CTL as per specification/IS on the transformer which is physically opened in CTL (from the lot of 100 Nos. or part thereof).

The No Load Voltage Ratio (Transformer Turn Ratio) shall be checked in CTL with the tolerance as per specification/ IS 2026 on the transformer from the lot of 10 Nos. or part thereof and the concerned sub lot shall be rejected if not meet out the requirement of IS.

Further, Internal clearances shall be checked without opening of core coil assembly in each of the transformers which have been selected for physical verification at CTL (i.e. one sample from a lot of 100 nos. or part thereof) in presence of firm's representative. No negative tolerance shall be admissible. If clearances are not found as per specification then the lot of 100 Nos. or part thereof shall be rejected.

The facility is being developed at CTL to test the Degree of Polarization (DP) of insulating paper used in Transformers. Therefore, the same shall be tested at CTL.

The sample of Oil be taken at CTL from the Transformer opened for physical verification in presence of firm's representative and same shall be tested at Nigam's CTL/NABL accredited Lab.

NOTE:

If the total losses are found more than 10% of specified losses at 100% loading then apart from rejecting the lot, firm's balance order would be cancelled and such firms shall not be awarded any order for one year or in next tender of tendered rating to be opened / finalized whichever is later.

The tolerance in window height shall be ± 2 mm, If the window height found beyond ± 2 mm but up to 7.5 mm then the lot shall be rejected. However if the window height is found more than 7.5 mm, then apart from rejecting the lot, firm's balance order would be cancelled and such firms shall not be awarded any order for one year or in next tender of tendered rating to be opened / finalized whichever is later.

No tolerance shall be allowed during CTL testing and in case any parameter which are to be tested in CTL are found beyond guaranteed parameters, the lot/ subplot shall stand rejected.

21.7 CHALLENGE TESTING CLAUSE:

The other manufacturer who have either participated in the instant tender enquiry can request challenge testing for tests covered in this clause based on specification & losses. The challenger would request for testing with testing fee. The cost of to & fro

transportations of all transformer tested under the provision of this clause along with loading & unloading and transit insurance at actual shall be borne by Challenger firm. The challenge testing fees shall be at least three times the cost of testing. The challenger would have the opportunity to select the sample from the store. The party challenged ,challenger & the utility could witness the challenge testing. The challenge testing would cover the

- i. Measurement of Magnetizing current
- ii. No Load Losses test
- iii. Load Losses test
- iv. Temperature Rise Test.

The challenge test could be conducted at any Govt. / NABL accredited Lab. like ERDA /CPRI. If the values are within limits as per specification including tolerance allowed in CTL, the products gets confirm else not confirmed. If the product is not confirmed, the manufacturer will pay the challenge fee and challenger would get the fee refunded. However, as a redressal system, the manufacturer (challenged firm) would be allowed to ask for fresh testing of two more samples from the store and the same be tested in a NABL/Govt. laboratory in presence of party challenged, challenger & the utility. If any one or both sample does not confirm the tests then the product is said to have failed the test. In such cases, the manufacturer (challenged firm) will be declared as unsuccessful manufacturer for the said product and balance supply shall not be availed and the balance order shall be cancelled with levy of maximum penalty. Firm shall also be debarred for one year or participating against next tender for that rating, whichever is later. The transformers already supplied (including tested in challenge testing) shall be accepted with the following conditions:

- i) Guarantee period of the supplied Transformers shall be increased by double the normal guarantee period.
- ii) Bank guarantee shall be extended to cover the additional guarantee period.

22. Deleted

23. GUARANTEE PERIOD:

I. Performance guarantee of the transformer(s) with LT protection unit shall be for the period of 60 (Sixty) months from the date of dispatch. The date of expiry of guarantee period shall be marked on the rating plate. Transformer(s)

alongwith LT protection unit failed within such guarantee period shall have to be **repaired / rectified** free of cost expeditiously.

Note:

j) The firm will **repair** all type of G.P. failed Distribution transformers without asking any segregation on account of manufacturing defect. However, the Discoms will compensate the cost of missing parts as per practice in vogue.

ii) The guarantee period failed transformers will directly be lifted by the supplier from the respective circle store **within a period of 60 days from the date of intimation by the respective consignee and will repair Distribution Transformers against G.P. failed within 30 days from the date of lifting** in the ACOS / Central Store, if operative, along with the joint inspection sheet of missing parts issued by the respective consignee. After receiving the material at ACOS / Central Store, the same shall be tested at CTL as per provisions of the relevant contracts and will be issued to the circle store as per requirement of Nigam's account. The invoice of missing parts shall be verified by the ACOS as per the joint inspection sheet issued by the circle store as per practice in vogue and accordingly, the Sr. AO (Cash & CPC) will make the payment of missing parts, if any.

iv) The loading of G.P. failed Distribution Transformers at circle store and unloading at ACOS will be on supplier account.

v) The firm will **repair** G.P. failed transformers irrespective of breakage of body seals as well as physical damage of transformer tank body due to bursting. The period during which transformer remained defective / failed will not be accounted in the performance guarantee period. The period of defective will be reckoned from the date of first intimation (i.e. field officer / Consignee whichever is earlier) to date of delivery of repaired transformer.

vi) **Firms shall lift the G.P. failed Transformer(s) within a period of 60 days from the date of intimation by the respective consignee and will repair Distribution Transformers against G.P. failed within 30 days from the date of lifting positively. In case firm fails to deliver repaired Transformer(s) within 90 days from date of intimation, the cost of the transformer(s) shall be withheld from firm's financial hold and in case firm fails to deliver repaired within 90 days from date of intimation, a penalty at the rate of ½% per week subject to maximum 10%, shall be levied for the late delivery of repaired Transformer(s).**

Firm shall lift G.P. failed transformers after furnishing safe custody bank guarantee, the slab of safe custody Bank Guarantee shall be as under.

Safe custody Bank Guarantee :-

The Safe Custody Bank Guarantee (SCBG) shall be 1% of the value of the contract or as per following SCBG slabs whichever is lower.

4. In case if order is upto 1000 Nos. DT's the firm have to give safe custody Bank Guarantee for Rs.5.00 Lacs and
5. if order is more than 1000 Nos. but upto 3000 Nos. then the safe custody BG for Rs.10.00 lacs and
6. In case for orders more than 3000 Nos. DT's the value of safe custody BG shall be Rs.20.00 Lacs. In case firm fails to furnish the safe custody BG the amount equivalent to safe custody BG shall be deducted from firm's first bill due for payment. On furnishing of safe custody BG the amount so deducted

shall be returned to the firm. The safe custody BG shall be valid for a period of 12 months over and above the normal GP. After a period of 16 months from normal GP the safe custody BG shall be returned back unless there is some specific direction from the purchaser.

II All the **repaired / rectified** transformers by the manufacturer under guarantee clause shall carry a further guarantee of 12 months after **repair** or unexpired guarantee of 60 months from the date of supply, whichever is later, after **repair / rectification**. The bank guarantee equivalent to cost of **repaired** transformers shall be furnished after expiry of performance guarantee period to cover **such repair guarantee**. The purchaser also reserves the right to withhold the payment of supplier firm, under any other contract, if the performance of the supplier in **repaired the failed** transformers is not satisfactory. Each supplier shall invariably furnish the detailed information about the total number of transformers failed and **repaired** by them, every month after commencement of supplies.

III In order to ascertain that transformers have successfully completed guarantee period the following details shall be provided on the transformer body:

D. A repair identification steel plate of size 75 x 75 x 2.5 mm duly engraved with following details shall be welded on the transformer body.

Firm's Name / Logo

TN

KVA

Sr.No.

Date of supply

Ist time

IInd time

IIIrd time

Date of failure

Date of repair

Guarantee period

extended.

E. Such metallic plate fixed on first **repair** should not be removed at the time of second **repair** or any subsequent **repair**. However, necessary details of failure and **repair** shall be graved on **the identification plate**, each time it is **repaired** in guarantee.

F. The **repaired G.P. failed** transformer shall be provided with 40 mm wide red color band all around transformers including radiator each time it is **repaired** in G.P. Thus if a transformer is **repaired** three time in G.P. then there should be three colored bands each of size 40 mm.

IV) All due care should be taken to ensure that the original name plate and identification plate provided should not be removed from the position at which they are fixed originally. In case it is felt that these are loose then it should be repaired suitably by welding or riveting.

V) Test checking of G.P. failed transformers will be allowed to the supplier at Nigam's store before lifting of G.P. failed distribution transformers to repair at supplier's works so that minor mistakes like loosing of connections/ replacement of fuse wire be carried out at Nigam's stores.

VI) G.P. repaired Distribution may be got tested at CTL as per the sampling plan of new transformer except the physical opening test. The 10% tolerance (as per IS:2026 part – I/1977) be allowed on total losses at 50% and 100% loading for the transformers failed under guarantee period for testing at firms' works as well as in CTL testing.

24. Deleted

25. Deleted

26. Besides above changes, the technical parameters of the specifications wherever are deviating from the IS:1180 (Part-I/2014), the same shall be in accordance with IS:1180 (Part-I/2014) and its latest amendments, if any and the changes where the IS:1180 (Part-I/2014) is silent for technical parameters, same shall be applicable as per Discom specification.

27. Deleted

28. Make of Brought Out Items:

The Make of brought out items like Bushings, Transformer Oil, MCCB etc. other than Make specified in the specification/work order may be accepted if confirms to relevant IS with due approval of JdVVNL.

29. Every Micro, Small & Medium enterprises of Rajasthan shall be required to submit an affidavit in schedule-XI, along with duly filled bid document.

Schedule -V(A)

MANUFACTURER'S GUARANTEED TECHNICAL PARTICULARS FOR 11/ $\sqrt{3}$ KV / 240 V, 10 KVA RATING OUT DOOR TYPE COMPLETELY SELF PROTECTED SINGLE PHASE ALUMINIUM WOUND DISTRIBUTION TRANSFORMERS ENERGY EFFICIENCY LEVEL-2 WITH INBUILT CIRCUIT BREAKER AGAINST TN-1425

S.No	DESCRIPTION	PARTICULARS
	Rating in KVA	10 KVA
1	Name of the manufacturer and place of manufacturer	
2	Continuous max rating as per this specification (KVA)	
3	Normal ratio of transformer (KV)	
4	Method of connection HV/LV	
5	Max. Current density in windings c. High voltage Amp/Sq.mm d. Lower voltage Amp/Sq.mm	
6	Max hot spot temp Deg.C (Ambient air temp on which above is based Deg.C)	
7	a. Max. observable oil temp in Deg.C (Ambient air temp on which above is based Deg.C)	
	b. Maximum winding temperature in Deg. C (Ambient air temp on which above is based Deg.C)	
8	ii) Total losses at normal voltage frequency, rated current and 75 Deg.C at 50% & 100% loading (Max).(watts)	
9	Flux Density(Max)(Tesla)	
10	Efficiency at normal voltage: ii. Unity power factor a. At 50% load % b. At 75% load % c. At full load % ii 0.8 power factor a. At 50% load % b. At 75% load % c. At full load %	
11	Regulation as % of normal voltage c. At unity power factor %	

	d. At 0.8 power factor lagging %	
12	Impedance voltage at normal ratio between HV and LV winding %	
13	Type of transformer, Shell type/Core type Wound core.	
14	Type of insulation used in c. HV winding d. LV winding	
15	Impulse test voltage level (KVrms) HV winding LV winding	
16	Characteristics of transformer oil	
17	Total content of oil in litres	
18	i) Approximate overall dimensions d. Height in mm e. Breadth in mm f. width in mm ii) Tank dimensions a) Diameter mm b) Height mm	
19	Weight of insulated conductor a. HV (min) kg b. LV (min) kg	
20	Weight of core (min.) kg (AMT)	
21	Weight of complete transformer arranged for transport kg	
22	Resistance for windings at 75 Deg.C per phase a. HV Ohms b. LV Ohms	

23	Material of bushing rod and nuts & Bushings caps HV LV	
24	Make , type of MCCB/ L.V Breakers	
25	Particulars of HV fuse	
a)	System voltage	
b)	Current	
c)	Max. Design voltage	
d)	Min. Melting time	
e)	Total clearing time	
f)	Interrupting rating	
g)	Mounting	
h)	Make	
25	All the standard fittings & accessories shall be provided as per IS:1180 (part-1)-2014/spec.	Yes

(Signature)

Name & Designation with seal of the bidder

TECHNICAL SPECIFICATION FOR SUPPLY OF 11/ $\sqrt{3}$ KV / 240 V, 5 KVA RATING OUT DOOR TYPE COMPLETELY SELF PROTECTED SINGLE PHASE ALUMINIUM WOUND ENERGY EFFICIENT LEVEL-2 DISTRIBUTION TRANSFORMERS WITH INBUILT CIRCUIT BREAKER

1) SCOPE:

This specification covers design, engineering, manufacture, assembly, stage testing, inspection & testing before supply and delivery at Nigam store(s) anywhere in Rajasthan of the oil immersed, oil natural air natural (ONAN) out door type 11kV / $\sqrt{3}$ / 240 V, 50 Hz, 5 KVA Single Phase EEL-2 with **Aluminium wound** complete with fittings and accessories with meter protection unit on LT side of distribution transformers for use in distribution systems.

- 1.1 The Equipment Offered shall be complete with all parts necessary for their effective and trouble free operation. Such parts will be deemed to be within the scope of the supply irrespective of whether they are specifically indicated in the commercial order or not.
 - 1.1.1 It is not the intent to specify herein complete details of design and construction. The equipment offered shall conform to the relevant standards and be of high quality, sturdy, robust and of good design and workmanship complete in all respects and capable to perform continuous and satisfactory operations in the actual service conditions at site and shall have sufficiently long life in service as per statutory requirements. The dimensional drawings attached with this specification and the notes thereto are generally of illustrative nature. In actual practice, notwithstanding any anomalies, discrepancies, omissions, incompleteness, etc. in these specifications and attached drawings, the design and constructional aspects, including materials and dimensions, will be subject to good engineering practice in conformity with the required quality of the product, and to such tolerances, allowances and requirements for clearances etc. as are necessary by virtue of various stipulation in that respect in the relevant Indian Standards, IEC standards, I.E. Rules, I.E Act and other statutory provisions.
- 1.2 The Tender / supplier shall bind himself to abide by these considerations to

the entire satisfaction of the Purchaser and will be required to adjust such details at no extra cost to the purchaser over and above the tendered rates and prices.

- 1.3 Tolerances on all the dimensions shall be in accordance with provisions made in the relevant Indian/ IEC standards and in these specifications. Otherwise the same will be governed by good engineering practice in conformity with required quality of the product.

2) **APPLICABLE STANDARDS:**

The materials shall conform in all respects to the relevant Indian Standard Specifications with latest amendments thereof; some of them are listed below:

Note: Wherever ISS are mentioned, equivalent or better International standards are also acceptable.

IS: 1180 (PART-I)/2014: Specifications for outdoor type oil immersed distribution transformers upto and including 2500 KVA, 33 KV Class.

IS/IEC 60947-2:2003 - low voltage switchgear and control gear – Part 2: Circuit Breaker.

IS:9385 Part-II:1980 – High voltage fuses : Part 2: Expulsion and similar fuses.

IS:8603:2008 – Dimensions for porcelain transformers bushings for use in heavily polluted atmospheres 12/17.5 kV, 24 kV and 36kV (Amalgamating IS 8603 (Parts 1,2&3) : 1977.

IS: 5/1961: Colour for ready mixed paints

IS:2026 (PART I, II, III, IV & V)/1981 – Power Transformers.

IS:6600/1978 : Guide for loading of oil immersed Transformers

IS:335/1983 : New insulation oils for Transformers.

IS:3347 (Part I/Sec. 1 & 2): Dimension of Porcelain parts & Metal parts for Transformer bushing (1.1 KV)

IS:7421 : Porcelain Transformer Bushings for low voltage – upto 1 KV.

IS:2099/1986 : Porcelain Transformer bushing for AC volts above 1000 volts.

IS:3639/1966 : Fittings & accessories for Transformers.

IS:1866/1978: Code of practice for maintenance & supervision of insulating oil in Service.

IS:9335 : Specifications for insulating kraft paper.

IS:1576 : Specifications for solid insulating press Boards for electrical purposes.

IS:104 : Ready mixed paint, brushing zinc chromate, painting.

IS:649 : Testing of steel sheets and strips for magnetic circuits.

IS:2362 : Determination of water content in oil for porcelain bushing transformers.

IS: 4257: Dimensions for clamping arrangements for bushings.

IS 6160 : Rectangular conductor for electrical machines.

IS:10028 : Selection, Installation and maintenance of transformers.

IS: 5484: Specifications for Aluminium wire rods.

REC Specification No. 2.

REC Specification No. 39/1993.

CEA Specification, Chapter 4.

IEC: 994: Specification Part4 for Surge Arresters without gap for AC system.

IS: 3070 (PartIII): Specification for Lightning Arresters for alternating current System Part.III.

IS: 3073/1974 : Specification for Lightning Arresters.

IS: 2629: Recommended practice for hot dip galvanizing of iron and steel.

IS: 2633: Method for testing uniformity of coating on Zinc coated articles.

IS: 5621: Specification for large hollow porcelain for use in electrical installation.

IS: 13947 (PartII) latest : Specification for Single Pole MCCB.

IS: 2147: Degree of protection provided by enclosures for low voltage switchgear and control gear.

IEC Pub 609472: Specification for Low Voltage Switch Gear and Control gear.

Material conforming to other internationally accepted standards, which ensure equal or higher quality than the standards mentioned above would also be acceptable. In case the Bidders who wish to offer material conforming to the other standards, salient points of difference between the standards adopted and the specific standards shall be clearly brought out in relevant schedule. Four copies of such standards with authentic English Translations shall be furnished along with the offer.

Note:- Besides above changes, the technical parameters of the specifications wherever are deviating from the IS:1180 (Part-I/2014) , the same shall be in accordance with IS:1180 (Part-I/2014) and its latest amendments, if any and the changes where the IS:1180 (Part-I/2014) is silent for technical parameters, same shall be applicable as per Discom specification.

3) SERVICE CONDITIONS:

The distribution transformers to be supplied against this specification shall be suitable for satisfactory continuous operation under the following climatic conditions as per IS 2026 (Part I) latest revision.

xxv) Peak ambient temperature	:	50°C.
xxvi) Minimum Ambient Temperature in shade	:	5°C.
xxvii) Maximum average ambient temp in 24 hours period in shade	:	45°C

- xxviii) Maximum yearly weighted average ambient temperature : 35°C
 - xxix) Maximum temperature attainable by an object exposed to sun : 60°C
 - xxx) Maximum relative humidity : 100%
 - xxxii) Average number of thunder storm days per annum : 40
 - xxxiii) Average number of rainy days per annum : 120
 - xxxiiii) Average annual rainfall : 15-100 cm
 - xxxv) Number of months of tropical monsoon conditions : 4 Months
 - xxxvi) Maximum wind pressure : 195 kg/mt²
 - xxxvii) Altitudes : Not exceeding 1000 mtrs
- The equipment shall be for use in moderately hot and humid tropical climate, conducive to rust and fungus growth.

2. PRINCIPAL PARAMETERS:

The single phase transformers of standard ratings 5 KVA shall be suitable for outdoor installation with Single Phase, 50 Hz, 11KV system in which the neutral is effectively earthed and should be suitable for outdoor service under fluctuations in supply voltage upto plus 10% to minus 15%.

The transformer shall conform to the following specific parameters.

S.N	Particulars	Parameters
1	Continuous rated capacity	5 KVA
2	System voltage (max.)	12KV
3	Rated voltage HV	11/ $\sqrt{3}$ KV
4	Rated voltage LV	240 V
5	Line current HV	0.79 A
6	Line current LV	20.83 A
7	Frequency	50 c/s +/- 3%
8	No. of phases	Single
9	Vector Group	IiO

10	Type of transformer	Outdoor
11	Type of cooling	ONAN
12	Class of insulation	Class A
13	Winding Material	Aluminium
14	Material of core	CRGO/AMORPHOUS
15	Type of core construction	Wound
16	Over fluxing limit (due to combined effect of voltage and frequency)	12.5 %
17	Permissible temperature over ambient under full load condition: i) Of top oil measured by thermometer ii) Of winding measured by resistance	35 Deg.C 40 Deg.C
18	Minimum clearances in air a) Phase to earth (mm) H.T b) Phase to earth (mm) LT	140 40
19	Total losses (watts) at 75 Deg. C. (Max.) (As per Energy Efficient level-2) i)At 50% loading ii)At 100% loading	35 watts 95 watts
20	% age Impedance (with a tolerance of $\pm 10\%$)	2.5 % ($\pm 10\%$ Tolerance)
21	Max. Flux Density at Normal voltage and frequency	1.6 Tesla
22	Max. Current density	1.6 A/mm Sq
23	LT Breaker	Internally mounted
24	Radiator required	Not required
25	Magnetizing Current (max.) a) At 100% rated voltage	2%+30% tolerance on 2% as

	b) At 112.5% rated voltage	per IS:2026 of rated full load current 4% + 30% tolerance on 4% as per IS:2026 of rated full load current.
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ELECTRICAL CLEARANCES:

- e) Minimum External Clearances (in air as per IS:1180)
 - v) HV phase to earth (mm) 140
 - vi) LV phase to earth (mm) 40

- f) Minimum Internal Clearances
 - xi) Clearance between inner wall of tank and coil (mm) -- 12
 - xii) Radial clearance between HV & LV windings (mm) -- 3
 - xiii) Radial clearance of LV coil from core (mm) -- 2
 - xiv) End clearance of HV coil from Yoke (mm) -- 15
 - xv) Minimum clearance between core & tank bottom (mm) -- 5

5) DESIGN & CONSTRUCTION:

5.15 Winding connection & terminal arrangements:

For HV, live end should be brought out through 12kV bushing and the other end of HV, which is intended to be earth, shall be brought out on 1.1kV bushing (HV Neutral bushing). Provision shall be made for connecting the neutral HV terminal to local earth. The secondary (LV) winding shall be connected to LV bushings. The 12 KV HV bushing (live) shall be provided on top cover and the remaining three bushing(s) shall be provided on the sidewall of the tank and below top cover.

Two layer of electrical grade insulation kraft paper (epoxy dotted) of 2 mil thickness or one layer of minimum 4 mil thickness shall be used for interlayer insulation both for HV and LV Coils.

5.16 INSULATION MATERIALS:

The following approved make of electrical grade insulation craft papers and boards shall be used in the transformer.

Sr. No.	Name of insulating material	Name of Firms
1.	Press board	(a) Senapathy whitely (b) Raman Board (c) Techno Electric, Hyderabad
2.	Kraft Paper	(a) Ballarpur (b) Padamjee (c) ITC Tribeni Tissue Paper Ltd., Kolkata (d) Munskjo, Sweden
3.	Press phan paper	Senapathy whitely
4.	Gaskets	(a) New cork (b) Talbros

5.17 Bushings

- i) The bushing shall conform to IS: 2099/3347 as amended upto date. Bushings having the creepage distance suitable for highly polluted atmosphere and having type tested as per IS: 3347 and IS:2099 latest version shall only be accepted.
- ii) For HV, 12kV class bushings and for earth/neutral of HV winding 1.1kV class bushing(s) shall be used and for LV, 1.1kV class bushing(s) shall be used.
- iii) The terminal arrangement shall not require a separate oil chamber.
- iv) The HV bushing shall be mounted on top cover and LV bushing(s) shall be mounted on side wall of tank below top cover. The bushing rods and nuts shall be of brass.
- vii) The HV bushings shall not have arcing horns.
- vi) HV bushing mounting bolt should be tag welded.

5.18 CORE, WINDING AND OIL

5.18.1 CORE MATERIAL:

a) CRGO MATERIAL:

Transformer core shall be wound core construction in shell type or core type, using prime grade imported M4 or better COLD ROLLED GRAIN ORIENTED (CRGO) laminations or any other combination of better grade be acceptable. The bidder shall furnish the core loss (watt per Kg.) and power (VA per Kg.) curves of the laminations used. The core shall be properly stress relieved by annealing in inert atmosphere. The transformer shall be suitable for over fluxing (due to combined effect of voltage and frequency) up to 12.5% without injurious heating. The operating flux density shall be such that there is a clear safe margin over the fluxing limit of 12.5%.

CRGO Laminations used shall be of prime grade and not second grade steel laminations. Only those bidders who directly imported CRGO either from the manufacturer or through their accredited marketing organization of repute (and not through any agent) shall be considered.

ALTERNATIVE

B) AMORPHOUS METAL CORE

The core shall be made of high quality Amorphous ribbons having very low loss formed into wound cores of rectangular shape, bolted together to the frames firmly to prevent vibration or noise. The complete design of core must ensure permanency of the core losses with continuous working of the transformers. The value of the maximum flux density allowed in the design shall be clearly stated in the offer. Curve showing the properties of the metal shall be attached with the offer. The transformer core shall be suitable for over fluxing (due to combined effect of voltage and frequency) upto 12.5% without injurious heating at full load conditions and shall not get saturated. The bidder shall furnish necessary data in support of this situation.

Core clamping for Amorphous metal transformers.

7. Core clamping shall be with top and bottom U-shaped core clamps made of sheet steel clamped with HT steel strap for efficient clamping.
8. MS core clamps shall be painted with varnish or oil-resistant paint.
9. Suitable provision shall be made in the bottom core clamp/bottom plate of the transformer to arrest movement of the active part.

NOTE: Equal Weightage shall be given to the transformer with amorphous metal core and CRGO core.

5.18.2 FLUX DENSITY:

Flux density should not be more than 1.6 Tesla(For 5 KVA) at the rated voltage and frequency. Transformer core should be designed in such a way that it will not get saturated for any value of V/f (Voltage/frequency) ratio to the extent of 112.5% of rated value of V/f ratio (i.e., 11000/50) and that the maximum flux density in any part of the core and yoke at rated voltage & frequency shall be such that the flux density with +12.5% combined voltage & frequency variations from rated voltage & frequency does not exceed 1.9 Tesla. (as per amended IS:1180 (Part-I/2014) Actual core design along with calculations in support of it should be enclosed with the offer.

5.18.3 WINDING:

HV and LV windings shall be wound from Aluminium conductors with DPC/Polyesterimide enamel (Class H) insulation. The enamel covering shall conform to Grade-II of IS:13730 Part8 or IEC 60317 Part8. The windings shall be progressively wound in LVHV coil design for better voltage regulation and mechanical strength. The inter layer insulation shall be of Epoxy resin bond paper. The type of winding i.e. whether LV windings are of conventional type or foil wound shall be indicated in the tender. Winding must be done in cleanest possible atmosphere to prevent possible accumulation of dust particles. The coil shall be further processed for dimensional control, improved bonding and for improving short circuit withstanding capability.

The current density of winding shall not be more than 1.6 Amp./sq.mm for Aluminium. The test reports for material characteristics like density, tensile strength and elongation, moisture content, ash content, dielectric strength, thickness of resin etc. for epoxy dotted paper shall be submitted during stage inspection.

5.18.4 CORE COIL ASSEMBLY:

Core coil assembly shall be further processed in oven for removal of moisture.

Ample provision for free circulation of oil in the radial gap between the core & LV Coil shall be made. The core shall be effectively earthed through copper foil bolted on core clamps, after removing the core clamp paint.

All core-coil assembly shall be indelibly marked / punched on core channel / an identity plate welded on core channel with following details:

1. Name of Supplier:
2. Order / TN No:
3. Rating:
4. Sr. No. of Transformer:

In case if above marking is not found on the core assembly of physically opened transformer selected for physical verification during final inspection then no further inspection shall be carried out and re-inspection charges shall be payable by the supplier.

5.18.5 OIL:

The transformer shall be supplied complete with first filling of EHV Grade transformer oil, up to the normal oil level. The oil shall conform to IS: 335/1993 (latest amended) and should be ISI Marked and having the specified aging characteristics.

The make of Transformer Oil shall be either APAR/SAVITA/ RAJ LUBRICANTS/ ANAMIKA/SHARAVATI/ MADRAS PETRO/ RAJ PETROL/ LUBRICHEM, MUMBAI/ OPANAMA PETROCHEM, ANKELSHWAR/ TASHKENT OIL, VADODARA/COLUMBIA. The transformer oil sample taken from the transformer shall be subject to testing as per provisions of IS:1866.

The oil manufacturer's test certificate shall be made available at the time of inspection to the inspecting officer.

5.19 BUSHING TERMINALS:

5.19.1 H.V. TERMINALS:

HV terminals shall be designed to directly receive ACSR conductor up to 7/3.35 mm (without requiring the use of the lug).

Starting and finishing leads of HT coils shall be covered with empire sleeve(s) or paper tube(s) of proper size. These leads should be clamped with the body of the winding with the help of cotton twine or permacel tape during manufacturing of the coils.

The transformer shall be provided with outdoor type 01 No. porcelain bushings, conforming to IS:3347/1972 & IS:2099/1973 from the manufacturer of repute. The HV bushings shall be on top of the tank and shall be fitted on a pocket made on top cover.. The bushings rods and nuts shall be made of brass. The inner porcelain portion of the bushing shall be projected about 50% of the length inside the bushing pocket. **HT bushing(s) mounting bolts should be tag welded.**

The clamping ring of HV bushing shall be of galvanised MS Sheet having minimum thickness of 1.6 mm. The total weight of all the 12 aluminium caste member of HV bushing shall not be less than 210 grams.

“The HV bushings shall generally confirmed to relevant IS: 3347 (Part-I to V of section I) , IS: 2099 (Part-I to V of section I) and IS: 7421 (As and where applicable). Embossing showing the manufacturer’s name and month & year of manufacture shall be clearly visible on HV bushings, even after fixing on transformer(s)”.

5.19.2 L.T TERMINALS:

The LV coil shall be taken by cut on the top core clamp duly reinforced to compensate for the mechanical strength.

In case of internal L.T. Breaker, the L.T. bushing and the terminals shall be suitable for being concealed inside the distribution box having insulated aluminium bus bar of suitable size (as per the enclosed drawing) from where the connections shall be taken for two or three numbers single core L.T. Aluminium Bunched Cable of size 16 sq.mm through cable glands for release of single phase connections to the consumer.

“The LV bushings shall generally confirmed to relevant IS: 3347 (Part-I to V of section I) , IS: 2099 (Part-I to V of section I) and IS: 7421 (As and where applicable). Embossing showing the manufacturer’s name and month & year of manufacture shall be clearly visible on LV bushings, even after fixing on transformer(s)”.

5.20 TANK:

The oil volume inside the tank shall be such that even under the extreme operating conditions, the pressure generated inside the tank does not exceed 0.4 kg/sq.cm positive or negative. There must be sufficient space from the core to the top cover to take care of oil expansion.

The tank cover shall have plasticised surface on live parts to guard against bird faults. Alternately, suitable insulating shrouds shall be provided on the bushing terminals.

a) The tank cover shall have plasticised surface on live parts to guard against bird faults. Alternately, suitable insulating shrouds shall be provided on the bushing terminals.

- vii) Main Tank : 2.0 mm (Min)
- viii) Top Cover : 2.5 mm (min.)
- ix) Bottom Cover : 2.5 mm (min.)

b) The tank without oil shall be capable of withstanding a pressure of 0.8 kg/cm² (g) above atmosphere at a vacuum of 760 mm of Hg for 30 minutes without any permanent deflection (pressure test shall be conducted as per IS -1180 Part-I). The permanent deflection should not be more than the limits specified in IS:1180 Part-I.

**c) MEASUREMENT OF SHEET THICKNESS OF TRANSFORMER TANK/ METER
& PROTECTION BOX:**

The following measurements shall be carried out at respective Central Testing Lab (CTL) of the Discom(s) on the supplies of distribution transformers:

Measurement of Transformer Tank Thickness shall be done as follows:-

1.	Top Cover	At 2 places to be measured & average is to be taken.
2.	Bottom Cover	-do-
3.	Side Wall(s)	On all four sides (average is to be taken)

4.	M&P Box.	Both sides and front(average is to be taken)
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- The nominal value of sheet thickness will be considered as mentioned in the Specification.
- Rolling tolerance will be as per ISS:1852-1985 with latest amendment and no penalty will be charged on such measured thickness till tolerance limit of ISS.
- Sheet thickness of transformer tank/ M&P Box for Distribution Transformers as per relevant tender specification are as under for ready reference:

Sr. No.	Rating	Top Cover (mm)	Bottom Cover (mm)	Side Tank (mm)	of M&P Box (mm)
1	5 KVA Single Phase	2.5	2.5	2.0	2.0

Further it is also intimated that 5% variation beyond tolerance limit in measurement of sheet thickness on negative side shall be acceptable by the Discom with levy of penalty. The rate of penalty will be Rs.80.00 per Kg.

For example:

Weight of 5 KVA Transformer Tank and M&P Box	80 Kg. (approx.)
Variation in thickness of tank/M&P Box	5% (beyond tolerance limit)
Then penalty levied will be	$80 \times 80 \times 5$ <p style="text-align: center;">----- = Rs.320.00</p> 100

In case any dimension in transformer tank/ M&P Box sheet thickness found beyond aforesaid limit of (-) 5% will not be acceptable to the Discom and the relevant

sub-lot shall stand rejected and the lot of such transformers will have to be replaced by the firm.

The highest percentage variation on negative side in respect of measurement of sheet thickness of any part of tank & M&P Box will be applicable on the entire dimensions for levy of penalty.

Transformer having thickness even more than 5% after allowing rolling tolerance shall be acceptable.

The measurements of sheet thickness & size of Box will be carried out on all those sample transformers which are tested in CTL and test results will be applicable to the respective sub-lot or part thereof from which the sample is drawn.

NOTE_ Firm may supply M.S. Sheet type OR Deep Drawn type Meter & Protection Boxes.

5.21 The following shall also be adhered:

- The long seam joint, CSEAM joint, fittings & accessories and other welds shall be oil tight and no deflection/ bulging should occur during service.
- Manufacturer should carry out the all welding operations as per relevant ASME standards and submit a copy of the welding procedure, qualifications and welder qualification certificate.
- The circular bottom plate edges of the tank should be folded upward, for at least 25mm to have sufficient over lap with vertical sidewall of the transformer.

Tank shall have permanent lugs for the lifting the Transformer body and there shall be facilities for lifting the core coil assembly separately.

The Transformer shall be provided with two mounting lugs suitable for fixing the transformer to a single pole by means of 2 bolts of 20 mm diameter as per ANSIC 57.12.201988. Both mounting lugs shall be made of steel of min. 6 mm thickness. Jump proof arrangements shall be provided on upper mounting lugs and lips shall be provided on lower mounting lugs for proper mounting of transformer on the pole. Both mounting lugs faces shall be in one plane.

The Transformer tank and the top cover shall be designed in such a manner as to leave no external pockets in which water can lodge. The top cover shall be fixed to the tank by proper arrangement to avoid ingress of moisture. Design of the top cover shall be such that no water can lodge on the top side. HV bushing pocket shall be embossed to top side of the top cover so as to eliminate ingress of moisture and water. The edges of the top cover shall be formed, so as to cover the top end of the tank and gasket.

Minimum & Maximum Oil level mark shall be embossed inside the tank. Nitrite/neoprene rubber gaskets conforming to latest IS:4253 Part-II shall be provided between tank and top cover.

Continuous welding of one inch length each should be provided at four places on ring (i.e. welding the clamping ring at top cover as well as with tank) and nut bolt of the ring should be tag welded.

On each transformer stainless steel anti theft fastener of suitable size shall be provided for clamping rim to hold fast tank and tank cover. In case of flange provided on top cover 2 Nos. stainless steel anti theft fastener shall be used and in case of rim type tank top cover 1 No. anti theft fastener shall be used. **Alternatively Dome shaped side clamping type construction of clamping bolts with stopper washer with tack welding for antitheft purpose for top cover.**

6) TANK SEALING:

The space on the top of the oil shall be filled with dry air or nitrogen. The dry air (or nitrogen) plus oil volume inside the tank shall be such that even under extreme operating conditions, the pressure generated inside the tank does not exceed 0.4 kg/sq.cm positive or negative. The nitrogen shall conform to commercial grade of relevant standards.

7) SURFACE PREPARATION & PAINTING :

9.4 General:

All paints shall be applied in accordance with the paint manufacturer's recommendations. Particular attention shall be paid to the following:

- k) Proper storage to avoid exposure as well as extreme of temperature.
- l) Surface preparation prior to painting.
- m) Mixing and thinning.
- n) Application of paints and the recommended limit on time intervals between coats.
- o) Shelf life for storage.

All paints, when applied in a normal full coat, shall be free from runs, sags, wrinkles, patchiness, brush marks or other defects.

All primers shall be well marked into the surface, particularly in areas where painting is evident and the first priming coat shall be applied as soon as possible after cleaning. The paint shall be applied by airless spray according to manufacturer's recommendations. However, wherever airless spray is not possible, conventional spray shall be used with prior approval of Purchaser.

The manufacturer shall, prior to painting protect nameplates, lettering gauges, sight glasses, light fittings and similar such items.

9.5 Cleaning and Surface Preparation:

After all machining, forming and welding has been completed, all steel work surfaces shall be thoroughly cleaned of rust, scale, welding slag or spatter and other contamination prior to any painting.

Steel surfaces shall be prepared by SAND/SHOT blast cleaning to Grade Sa. 2.5 of ISO 85011 or Chemical cleaning by Seven Tank Process including Phosphating (IS 3618).

The pressure and volume of the compressed air supply for blast cleaning shall meet the work requirements and shall be sufficiently free from all water contamination to ensure that the cleaning process is not impaired.

Chipping, scraping and steel wire brushing using manual or power driven tools cannot remove firmly adherent millscale and shall only be used where SAND/ shot blast cleaning is impractical. Manufacturer shall indicate such location, for owner's information, in his offer.

9.6 Protective Coating:

As soon as all items have been cleaned and within four hours of the subsequent drying, they shall be given suitable anticorrosion protection.

9.7 Paint Material:

Following are the types of paint that may be used for the items to be painted at shop and supply of matching paint to site:

Heat resistant paint shall be (Hot oil Proof) for inside surface.

Inside of tank Oil shall be painted with varnish or oil resistance paint. For external surface, one coat of thermo-setting powder paint or one coat of epoxy primer followed by 2 coat of polyurethane base paint shall be used .Total Dry film thickness as per IS 1180 Part-1 2014.

The colour of the finishing coats shall be olive green colour conforming to Shade No. 220 of IS -5 of 1961.

9.8 Painting Procedure:

All painting shall be carried out in conformity with both specification and with the paint manufacturer's recommendation. All paints in any one particular system, whether shop or site applied, shall originate from one paint manufacturer.

Particular attention shall be paid to the manufacturer's instructions on storage, mixing, thinning and pot life. The paint shall only be applied in the manner detailed by the

manufacturer e.g. brush, roller, Conventional air spray and shall be applied under the manufacturer's recommended condition.

Minimum and maximum time intervals between coats shall be closely followed.

All prepared steel surfaces should be primed before visible rerusting occurs or within 4 hours, whichever is sooner. Chemical treated steel surfaces shall be primed as soon as the surface is dry and while the surface is still warm.

Where the quality of the film is impaired by excess film thickness (wrinkling, mud cracking or general softness) the supplier shall remove the unsatisfactory paint coating and apply another. As a general rule, dry film thickness should not exceed the specified minimum dry film thickness by more than 25%. In all instances where two or more coats of the same paint are specified, such coatings may or may not be of contrasting colours.

Paint applied to items that are not to be painted shall be removed at Supplier's expense, leaving the surface clean, unstained and undamaged.

9.9 Damaged Paintwork:

Any damage occurring to any part of a painting scheme shall be made good to the same standard of corrosion protection and appearance as that originally employed.

Any damaged paintwork shall be made good as follows:

- a) The damaged area, together with an area exceeding 25 mm around its boundary, shall be cleaned down to bare metal.
- b) A priming coat shall be immediately applied, followed by a full paint finish equal to that originally applied and exceeding 50 mm around the perimeter of the original damage.
- c) The repainted surface shall present a smooth surface. This shall be obtained by carefully chamfering the paint edges before and after printing.

9.10 Dry Film Thickness:

To the maximum extent practicable the coats shall be applied as a continuous film of uniform thickness and free of pores. Over spray, skips, runs, sags and drips should be avoided. The different coats may or may not be of the same colour.

Each coat of paint shall be allowed to harden before the next is applied as per manufacturer's recommendation.

The requirement for the dry type film thickness (DFT) of paint and the materials to be used shall be as given below.

Sl. No.	Paint Type	Area to be Painted	No. of coats	Total Dry film thickness (min.)
1.	Thermosetting Powder Paint	Inside	01	30 microns
		Outside	01	60 microns
2.	Liquid Paint			
	b) Epoxy(Primer)	Outside	01	30 microns
	b)Polyurethane base(Finish coat)	Outside	02	25 microns each
	c)Heat resistance paint (Hot oil proof Paint)	Inside	01	35/10 microns

9.11 Tests:

The painted surface shall be tested for paint thickness.

The painted surface shall pass the Cross Hatch Adhesion Test.

10 RATING AND TERMINAL PLATES

10.1 **Rating & terminal marking plate:** Each Transformer shall be provided with non detachable name, rating and terminal marking plate fitted in a visible position. All details shall be given on one plate. Material of the plate shall be stainless steel / **Aluminium** only. Thickness shall be 0.9 mm (with a tolerance of ± 0.1 mm). The plate shall be made absolutely undetectable either through welding or riveting or through any other approved method.

There shall be a rating plate on the transformer containing the information given in the relevant ISS.

The HV winding terminals shall be marked 1U & 1N. The corresponding secondary terminals shall be marked as 2u & 2n. In the diagram to be given on the name plate, the relative position of various terminals when viewed shall be clearly visible. Inspection shall not be undertaken unless all these details are verified by the Inspecting Officer.

Besides other particulars, following details shall also be given on the name plate:

- xxiii) P.O. No. month & year.
- xxiv) Sr. No. of transformer.
- xxv) Date of despatch month & year.
- xxvi) Date of expiry of guarantee period – month & year.
- xxvii) Maximum Guaranteed Load Losses at 50% and 100% loading.
- xxviii) Recommended fuse sizes for HV & LV sides.
- xxix) Name & Full address of the manufacturer.
- xxx) Capacity of the transformer.
- xxxi) Rating of the transformer.
- xxxii) Type – Oil filled naturally cooled.
- xxxiii) Energy Efficient level-2 and Standard IS1180 Part-1 with BIS Licence No.

ALL DETAILS ON THE “NAME RATING AND DIAGRAM PLATE” SHALL BE
INDELIGIBLY MARKED i.e. BY ENGRAVING OR PUNCHING

10.2 Technical cum Identification Plate: M.S. plate of size 125 x 75 x 2.5 mm having following details punched with letters of size 8mm x 6mm shall be continuously welded to the main tank body below the middle HV bushing and on Top Cover of tank in clearly visible position:-

- BB) Name of the Firm
- CC) TN No.
- DD) Make
- EE) Sr. No.
- FF) Jodhpur Discom
- GG) Rating
- HH) Date of Dispatch
- II) Date of Expiry of G.P.
- JJ) Core : Core Dia. _____ And Core Area. _____
- KK) LV Coil :-

- 5. ID/OD Dimensions
- 6. Conductor Size
- LL) HV Coil :-
 - 1. ID/OD Dimensions
 - 2. Conductor Size
- MM) Limb Centre
- NN) Window Height

10.3 **Identification Mark:-** In addition to above, the following identifying details shall be clearly punched on the brackets which are attached to the transformer with minimum 10 mm x 10 mm x 1 mm size punch letters.

MAKE _____

S. No. _____

T N _____

The above identification mark shall also be punched / welded to one of the top core clamping channels. The punching shall be distinct and visible. The dimensions of letters be 10x10x1 mm.

9.0 PRESSURE RELEASE DEVICE:-

The transformer shall be equipped with a self sealing pressure release device designed to operate at a minimum pressure of 8 PSI (0.564 Kg/Cm²).

ii. FITTINGS

The following standard fittings shall be provided with each transformer.

- a. Two earthing terminals.
- ff. Two lifting lugs.
- gg. Rating and terminal marking plates.
- hh. Pressure relief device.
- ii. Internal Circuit Breaker (On LV Side).**
- jj. HV Bushings.
- kk. LV Bushings.
- ll. HV terminal connectors.
- mm. Top cover fixing clamps.
- nn. Mounting lugs – 2 Nos.
- oo. Bird guard or plasticised cover on live parts.
- pp. LV earthing arrangement.
- qq. Operating Mechanism of LT Circuit breaker.
- rr. Signal Light.
- ss. Three year Guarantee plate.

tt. Any other fitting necessary for satisfactory performance of the manufacturer as per IS:1180 Part-1(2014).

uu. Mounting Arrangement with pole will be as per drawing enclosed at Annexure-'B' for 5 KVA Single Phase Distribution Transformer. The mounting structure/ arrangement shall be in the scope of supplier.

15.0 FASTENERS

- All bolts, studs, screw threads, pipe threads, bolt heads and nuts shall comply with the appropriate Indian Standards for metric threads, or the technical equivalent. Bolts or studs shall not be less than 6 mm in diameter except when used for small wiring terminals.
- All nuts and pins shall be adequately locked.
- **All Nuts, Bolts / Washers / Fasteners exposed to atmosphere used in transformers and Meter Protection Box should be of Stainless Steel.**
- Each bolt or stud shall project at least one thread but not more than three threads through the nut, except when otherwise approved for terminal board studs or relay stems If bolts are provided at inaccessible places for ordinary spanners, special spanners shall be provided.
- The length of screwed portion of the bolts shall be such that no screw thread may form part of a sheer plane between members.
- Taper washers shall be provided where necessary. Protective washers of suitable material shall be provided front and back of the securing screws.

16.0 LOSSES:

The total losses at 50% and 100% loading for single phase **5 KVA** Transformers at rated voltage, frequency & 75 Deg. C shall not exceed the following values:

Rating in KVA	Voltage ratio in KV	Total losses at 50% loading (Watt) Max.	Total losses at 100% loading (Watt) Max.
5	$11/\sqrt{3} / 0.240$	35	95

These losses are maximum allowable as per Energy Efficient level-2, and there would not be any positive tolerance. Transformer with higher losses than the above specified losses would be rejected.

17.0 IMPEDANCE:

The recommended percentage impedance at rated current and at 75 Deg. C **2.5 %** (with a tolerance of $\pm 10\%$).

18.0 TEMPERATURE RISE:

The temperature rise over ambient shall not exceed the limits described below:

Top oil temperature rise measured by thermometer : 35 Deg.C

Winding temperature rise measured by method : 40 Deg.C

Temperature rise test shall be conducted on Maximum measured total loss (No load at rated excitation+Load loss at max. current tap at 75°C) at 100% loading shall be supplied during temperature rise test at a Govt. approved/ a Govt. recognized/ NABL accredited laboratory/ILAC i.e. International Laboratory Accredited Laboratory/ ILAC i.e. International Laboratory Accreditation Cooperation (in case of foreign laboratory).

The limit of temperature rise mentioned above will have to be satisfied by the manufacturer by carrying the Heat Run Test by feeding guaranteed losses.

In case the temperature rise exceeds the above values, transformers shall be rejected at risk, cost and responsibility of the supplier.

It must be noted carefully that readings for hot resistance after shut down shall be taken separately for HV & LV windings, which means, after completing the readings for one winding (HV or LV), the transformer shall be connected again and rated current passed for another 60 minutes (min.) and shut down taken again to take hot resistance readings for the remaining winding. This is in line with the requirement of CBIP manual, to ensure proper resistance v/s time curves.

Hot Spot temperature not to exceed 98 Deg. C when calculated over an annual weighted average ambient temperature of 35 Deg. C as per IS:2026 (Part-II Clause 4.9.4). **However, the transformer shall be designed for class 'A' insulation.**

The transformer shall be capable of giving continuous rated output without exceeding the specified temperature rise.

19.0 GUARANTEED AND OTHER TECHNICAL PARTICULARS FOR TRANSFORMERS

Tolerances on weight quantity and dimension figures shall be $\pm 2\%$ at the tender stage, subject to maintaining the minimum electrical clearances as per the specification. However, no negative tolerance shall be allowed on the short circuit type tested design. Electrical performance data shall be subject to tolerances as per ISS, unless otherwise specified in this specification. However, the Total losses at 50% & 100 % loading shall be maximum guaranteed without any positive tolerance.

20.0 TYPE TEST CERTIFICATE

The bidder shall furnish type test certificate(s) of offered design / similar design, wherever available with the bid.

1. DRAWING AND OTHER DOCUMENTS:

One set of dimensional drawing(s) and internal construction drawing of each transformer rating shall be submitted with the tender. The tender shall be accompanied with the following drawings/calculation sheets, as per the offered designs. Size of the drawings shall be A3 (420 x 297 mm) or A4 size only.

- a) Name rating/diagram plate drawings.
- b) Outline and General arrangement drawings
- c) Core coil assembly drawings
- d) Core section along with flux density calculation sheet / drawings.
- e) Cooling area calculation sheet
- f) Thermal ability short circuit calculation sheet
- g) Core loss and magnetization curves of the laminations
- h) Heat dissipation calculations (heat dissipation by tank walls excluding top and bottom should be 500 W/ sq.mm.

Any delay in submission of drawings shall be to supplier's account.

i) The Type test certificate of Internal circuit breaker conducted in the manufacturer which should be not older than 5 years

17.0 PROTECTION:

The transformer shall have the following CSP features for Internal Circuit Breaker:

The Meter Protection Box shall have one chamber only containing LT Bushing & outgoing LT terminal Bushings as per IS 3347 (Brass) for releasing consumer connections. The chamber is fully sealed. The drawing of the LT Box is enclosed at Annexure-A.

In 10% qty. of Meter Protection Box a provision for installation of Meter visible through glass window be kept in separate chamber for which the requirement shall be intimated as and when required during the execution of contract.

Further Following provisions be also ensured on M&P Box and Transformer:-

- 1. On each transformers stainless steel anti theft fastener of suitable size shall be provided for clamping rim to hold fast tank and tank cover.**
 - 2. The M&P Box is firmly fixed with the transformer tank by providing all the nuts and bolts (total 8 Nos.) as per specification/approved drawing.**
 - 3. The Stainless Steel Anti-Theft Nuts and bolts should be provided on all the four corner bolts of box and remaining nuts should be tack welded with the bolts.**
 - 4. Hexagonal head of all the anti-theft nuts should be removed/detached so that the purpose of use of anti-theft nut and bolt be fulfilled.**
 - 5. It should be ensured that there should be continuous welding on the complete M&P Box and in case if only tack welding is found on the M&P Box body then the complete lot may not be accepted.**
 - 6. M&P Box should be properly fixed with LT side flange of transformer by using min. 3 mm thick gasket so that water should not be go inside of M&P Box.**
- (The above 5-Points appearing at Sr. No. 1 to 6 will be checked in Central Testing Lab)**

17.3 The transformer shall have the following CSP features:

(a) INRRNAL HV FUSES ON THE HT SIDE OF TRANSFORMER as per IS9385 Part-II:1980

Specification for the HT fuses: Expulsion / any other suitable fuse placed in series with primary winding. This fuse is mounted normally inside of the primary bushing and is connected to the high voltage winding through a terminal block. Fuse shall be mounted in such a way that it should be possible to replace the fuse by opening HV bushing and without opening top cover.

This has to protect that part of the electrical distribution system which is ahead of the Distribution transformers from faults which occur inside the Distribution transformers i.e., either the windings or some other part of the transformer. It shall be ensured that this fuse does not blow for faults on the secondary side (LT side) of the transformer i.e., the blowing characteristic of

the fuse and LT breaker shall be so coordinated that the fuse shall not blow for any faults on the secondary side of the transformer and these faults shall be cleared by the LT breaker only.

The fuse shall be make of ABB/ERMCO/Global/samrakshna/Transguard or any make approved by JDVVNL.

(b) INTERNALLY MOUNTED OIL IMMERSSED LT BREAKER ON THE LV SIDE OF THE TRANSFORMER as per IS/IEC 60947-2:2003:

LT circuit breaker: All LT faults after the breaker shall be cleared by this breaker. As such, it shall be designed for the perfect coordination with the HT fuse link. The supplier shall furnish the time/current characteristics of LT circuit breaker and 11 kV fuses for various current multiples. The two characteristics shall be drawn on the same sheet to indicate coordination between the circuit breaker and fuse. This shall be based on the type test carried out on one of the transformers. In addition, the supplier shall carry out coordination test as indicated above, and this forms one of the test for acceptance.

The breaker is to be mounted on the secondary side of the transformer under oil to minimize premature operations from primary surges as would be with undersized line fuses. Two single pole elements is preferred. THE BREAKER SHALL BE COORDINATED TRHEMALLY WITH THE TRANSFORMER RATING TO FOLLOW CLOSELY THE VARIATIONS OF COIL TEMPERATURE DUE TO FLUCTUATIONS IN LOADS AND AMBIENT TEMPERATURES.

This is to be accomplished by connecting the breaker in series between the secondary winding and the load current. The breaker shall be located in the same oil as the core and coil assembly so that the bimetal are sensitive to the temperature of oil as well as the load current.

The circuit breaker may be an electromechanical device with three elements viz..

(i) Temperature sensing (ii) latching and tripping and (iii) current interrupting. The temperature sensing function might be accomplished through the use of bimetallic strips, which would be built into the breaker, such that load current of the transformer flows through them. In addition to this, a magnetic tripping device is to be provided for increasing the opening speed of the breaker under high fault conditions. The circuit breaker shall be mounted inside of the transformer so that these bimetallic strips are within the top oil layer of the transformer. The latching and tripping functions of the circuit breaker may be carried out within assembly similar to those used in industrial type air circuit breaker. The circuit breaker shall also be closed and opened manually standing on ground and with a magnetic trip device also. The current interruption element shall consist of copper current carrying parts plus a set of copper tungsten current interrupting contacts. The magnetic element shall increase the opening speed of the circuit breaker under high fault current conditions. The response of circuit breaker to the activity shall remain unchanged by the addition of the

magnetic trip element. The specification to which the breakers conform shall be indicated. **The LT circuit breaker shall be make of samrakshna/Transguard/ Vijai Mercantile/ Global/ P&A/ ARDRY/ERMCO or any make approved by JDVVNL**

17.2 LOAD MANAGEMENT SIGNAL LIGHT:

A signal light, controlled by a bimetal in the breaker shall switch on when the transformer load reaches a predetermined level indicating that the transformer has been overloaded. The load management signal light shall perform two functions. It shall show visually when the particular

transformer has been operating in an overload condition and shall provide knowledge that for good system management, the economical change out point for the transformer is fast approaching. The signal light need not indicate temporary overloads and shall turn on only when the overload condition has existed at a given level for a certain length of time.

The LT circuit breaker shall have a set of auxiliary contacts built in for signal light operation. These, normally open contact, shall form part of the signal light circuit. The signal light circuit shall consist of an auxiliary transformer winding (one or two turns) which generates about 4V, for the signal light contact set within the circuit breaker, and the signal light is to be mounted on the transformer tank. The signal light contact set is mechanically connected to the main circuit breaker latching and bimetal system. The signal light mechanism is adjusted so that the signal light contacts will close at a preset thermal condition which occurs before the main latching system opens the main contact. The net result is a visual external indication that a preset load condition has reached by the transformer. The signal light mechanism does not reset itself when the load drops off, the signal light remains lighted once the signal light contacts closes and can only be turned off by manually operating the external circuit breaker handle.

A distribution box is an enclosure (IP 33) is ready to be used condition and to be mounted on the transformer tank directly. The enclosure shall be made with sheet of thickness not less than 2.0 mm. It shall be painted with colour Shade No. 632 both inside and outside with powder coating. Enclosure shall have provision for pad locking arrangement. Detachable gland plate shall be provided for taking connections from distribution Box and transformer bushing terminal. The distribution box shall have Aluminium bus bar(covered with PVC Insulated tape) along with lugs fitted on bus bar for connecting two or more single core L.T. Aluminum Bunched Cable of size 16 sq.mm.

Instruction and operation Manual

The successful bidder shall be required to submit 5 copies of Instruction and

Operation manual for each lot of 100 Transformers (or part thereof) supplied. This instruction manual should give complete details about the pre-commissioning tests/checks and the details of preventive maintenance.

22.0 Deleted

23.0 INSPECTION AND TESTING:

i) The inspection and testing shall be conducted as per relevant clause of the general conditions of contract (Section II) at the place of manufacturer. The transformers shall be completely assembled and tested at the factory. The inspection may be carried out by the purchaser at any stage of manufacturing. The supplier shall grant free access to the purchaser's representative at all reasonable times when the manufacturing work is in process. Inspection and testing of any material under this specification by the purchaser shall not relieve the supplier of his obligation of supplying the material in accordance with the specification and shall not prevent subsequent rejection if the material is found to be defective.

ii) The supplier shall afford the inspector representing the purchaser. All reasonable facilities, without charge, to satisfy him that the material is being manufactured in accordance with the specification. The bidder must have adequate set of instruments for conducting testing as per class of 0.5 or better. The instruments shall be duly calibrated and Calibration certificates should not be older than one year on the date of presentation to the Inspecting officer. The calibration shall be arranged from NABL accredited testing house only. A comprehensive list of testing equipment / instruments indicating make, Sr.No. type of accuracy, calibrating agency, calibration date etc., should be furnished also with the bid. The calibrated instruments shall be duly sealed by calibrating agency to avoid any tampering with calibration and the details there of shall be clearly mentioned in the calibration certificate(s).

iii) The supplier shall keep the purchaser informed in advance, about the manufacturing programme so that arrangement can be made for inspection. The supplier shall give minimum fifteen days advance intimation to enable the purchaser to depute his authorized representative for stage inspection / witnessing of various tests on the equipment / material as detailed below:

NOTE:- Penal provision shall be made for any short technical parameters found / noticed in the transformers at any time even beyond guarantee period.

24.0 TESTS:

20.5 Routine / Acceptance Tests:

- c) 100% testing of the Distribution Transformers shall be carried out at firm's works for measurement of total load losses at 50% & 100 % loading. Remaining testing shall also continue to be carried out as per practice.

All the assembled / finished transformers prior to dispatch shall be subjected to all the Routine Tests as per IS: 2026. Minimum 25% of the lot size samples for Routine tests & checking shall be selected by the inspecting officers at random subject to minimum five (5) Nos. The supplier shall invariably furnish manufacturer's Routine test certificates along with inspection call of the offered transformers for pre-despatch inspection.

The selected transformer samples shall be subjected to the following Routine / Acceptance Tests at the manufacturer's works in accordance with relevant ISS with latest amendments :

31. Measurement of Voltage ratio.
32. Measurement of No load losses & No Load current at 100% and 112.5% of rated voltage and normal frequency.
33. Measurement of load losses at rated voltage and normal frequency (at 50% & 100% loading).
34. Measurement of Impedance voltage at rated current and normal frequency.
35. Measurement of windings resistance cold (at or near the test bed temperature).
36. Insulation resistance.
37. Induced over voltage withstand test.
38. Separate source voltage withstand test.
39. Pressure Test(As per IS 1180 Part-1:2014)
40. Oil leakage Test(As per IS 1180 Part-1:2014)
41. Checking of rating and terminal marking plate.
42. Checking of weights, dimensions, fittings and accessories, tank sheet thickness, oil quantity, material, finish, paint thickness and workmanship as per purchase order and contract drawings.
43. Physical verification of core – coil dimension, internal clearances, provisions of required oil ducts in the HV and LV winding, conductor sizes, individual weights of HV and LV winding core laminations etc., with reference to contract drawings and type test report(s) by dismantling selected unit(s). The physical verification shall be conducted on units equivalent to one unit per 50 Nos. or part thereof of offered quantity randomly selected from the offered lot. The dismantled unit(s) after reassembly shall be accepted by the purchaser after routine testing in presence of his representative.

During final inspection, sheet thickness shall also be measured of the transformer opened for physical verification. The instrument for measurement of sheet thickness will be provided by the supplier.

44. Oil dielectric strength (break down voltage) test shall be carried out on the transformers opened for physical verification and average value shall be calculated.
45. Checking of manufacturer's test certificates shall be done and copies thereof duly signed by firm's representatives and inspecting officers shall be enclosed with the inspection report.

Invoices of Amorphous/CRGO core material shall be provided by the supplier to the inspecting officer at the time of inspection and same shall be verified by the inspecting officer.

The following tests shall also be carried out at manufacturer's works on one complete unit of 5 kVA:

- i. Salt spray test and Hardness tests as per the relevant standards.

Note: It will be mandatory for the manufacturer firms to maintain record of BDV value of the transformer oil and shall furnish to the inspecting officer who in turn shall furnish the same to the Nigam's CTL for verification purpose. The Inspecting Officer during inspection shall verify record of Meggar value of the offered DT's and furnish the same with inspection report to the Nigam's CTL. Simultaneously, record of Air Pressure Test shall also be checked by the inspecting officer and same be furnished with report to the CTL. CTL will conduct testing of DT's only after receipt of record of BDV value, Meggar value and air pressure test results.

Fifteen days clear notice shall be arranged for predispach inspection by Purchaser's representative as per General Conditions of Contract.

After successful inspection, the inspecting officer shall seal all the inspected transformers by tamper proof polycarbonate seals **on top cover bolts** of the transformer for identification. Before sealing the inspecting officer will ensure that all the offered transformers are complete and duly fitted with name, rating and diagram plate, identify plate and identification marks, as specified in this specification.

NOTE: Also after inspection/ testing, inspecting officer(s) shall affix Signature Seals also on each Transformer in addition to other seals.

- a. The oil leakage test shall be conducted on transformer complete in all respects shall be tested at a pressure equivalent to twice the normal head at the base of tank for 6 hours. There should be no leakage at any point.

20.6 TYPE TESTS & SPECIAL TESTS:

In addition to above tests the following type tests shall be arranged **on one transformer only as per IS :1180 (Part-1/2014)** in accordance with IS 2026 (Part 1 to III) with latest amendments, at laboratories accredited by National Accreditation Board/ Govt. approved lab for testing and calibration laboratories (NABL).

(a) SHORT CIRCUIT TEST FOR DYNAMIC AND THERMAL ABILITY:

The Short circuit test for dynamic and thermal ability shall be arranged on one unit of each rating. The transformers for the test shall be selected /sealed by our inspecting officer from the first lot which shall be of minimum 20 Nos. (if ordered quantity is 500 Nos.) OR 50 Nos. (if ordered quantity is more than 500 Nos.). The Short Circuit test shall be conducted only after successful Routine tests including measurement of No Load and Load Losses (at 50% & 100% loading). The supply shall be accepted only after arranging successful type test on the selected transformer(s).

2. IMPULSE VOLTAGE WITHSTAND TEST:

The Impulse Voltage withstand test as per clause No. 13 of IS:2026 (Part-III) – 1981 shall be arranged. Impulse voltage withstand test shall be **Minimum 75KVp** for 11 KV class transformers. The test shall be conducted on one unit of each rating to be selected by our inspecting officer from the first lot of minimum 20 Nos. (if ordered quantity is 500 Nos.) OR minimum 50 Nos. (if ordered quantity is more than 500 Nos.). The supply shall be accepted only after arranging successful Impulse test on the selected transformer(s).

Note :-If ordered qty. Is less than 500 Nos. In such case first lot shall be of min. One month qty as per scheduled delivery .

3. TEMPERATURE RISE TEST:

Temperature rise test shall be conducted on Maximum measured total loss (No load at rated excitation+Load loss at max. current tap at 75 oC) at 100% loading shall be supplied during temperature rise test at a Govt. approved/ a

Govt. recognized/ NABL accredited laboratory/ILAC i.e. International Laboratory Accredited Laboratory/ ILAC i.e. International Laboratory Accreditation Cooperation (in case of foreign laboratory).

The transformer shall be capable of giving continuous rated output without exceeding the specified temperature rise. Bids not meeting the above limits of temperature rise will be treated as non responsive.

d) PRESSURE TEST:(As per IS 1180 (Part 1):2014)

This test shall be conducted as type test at a Govt. approved/ a Govt. recognized/ NABL accredited laboratory. The pressure gauge shall be duly calibrated and sealed by an independent recognised test lab(s).

The test procedure shall be as detailed below :

The tank subjected to air pressure of 100 KPa above atmospheric pressure for 30 min. There should be no leakage at any point and is no deformation of tank.

No extra time shall be allowed for arranging these type tests. The cost of above Type Tests shall be borne by the supplier.

The programmed indicating date and place of type test(s), be intimated enabling purchaser to depute his representative to witness the test if desired. The testing house shall be advised to arrange type test result directly alongwith drawings duly attested by the testing authority for our scrutiny and approval. The type-tested transformer(s) shall also be accepted as the part of the supplies.

The requirement of arranging above type tests shall however not to be insisted on the suppliers who have arranged the above type tests within last 5 years from the date of opening of this tender on similar design. Minor changes in the present specification will not necessitate repetition of type test(s), if design of core-coil assembly is similar in essential details.

25.0 RANDOM SELECTION AND TESTING (RST):

21.8 The purchaser may select transformer(s) from the supplied lot(s) at random from the stores for conducting the following type tests, at any test house(s) as mentioned above. The supplier shall arrange these tests including loading, unloading and to & fro transportation from our stores to the test house(s). The charges for such tests shall be reimbursable to the supplier on actual basis on production of documentary evidence in case the selected sample successfully withstand type test(s) In case of otherwise, no charges will be reimbursed.

- i. Short circuit withstand test for Dynamic & Thermal ability. Measurement of No load&loadLosses at 50% and 100% loading shall form part of tests conducted before and the after the short circuit test and recorded in the report.
- ii. Impulse test as per Clause No.13 of IS:2026 (Part-III). Impulse voltage shall be **Minimum 75 KVp**.
- iii. Temperature Rise Test as per IS 2026 Part 2
- iv. Pressure Test as per IS 1180 Part-1:2014

- v. Purchaser reserves the right to carry out any site tests he may decide upon at his own expenses. In case equipment/ material are not found as per P.O., all expenses incurred during the testing will be to supplier's account and material shall be replaced by the supplier at site free of cost.

FAILURE IN TYPE TEST(S):

In the event of failure / unsatisfactory results of the transformer(s) in short circuit test / impulse type tests/ Temperature rise Test/ Pressure Test, the supplier shall have to replace the supplies already made and no further transformers shall be accepted. The purchaser however, at his option, may accept the transformers already supplied with the following conditions-

- xi) Guarantee period of the supplied transformers issued to the field shall be increased by double the normal Guarantee period.
- xii) Bank Guarantee shall be extended to cover the additional Guarantee period.
- xiii) For failure in any of the type tests listed under RST i.e., short circuit test / Temperature rise Test/ Pressure Test & Impulse withstand test, no further supplies shall be accepted. The type test charges shall also not be reimbursable in this case and shall be borne by the supplier.
- xiv) The transformers lying in the store(s) shall be replaced as per sub para (v) below.
- xv) The bidder shall, however, be allowed to check the reasons of failure and if need be, to improve / modify the design. Further supplies, including replacements against supplies already made, shall be accepted only after successful type test(s) are arranged on fresh transformer(s) selected by the authorized representative of the purchaser. All the type tests shall be arranged in case there is change in the design, otherwise, type test shall be repeated only for the test in which failure has occurred. Charges for such test(s) shall be borne by the supplier. However, in the event of failure of transformer in the repeat type test, the purchaser may take following actions:

- a) Cancel pending orders of the rating in which failure(s) has occurred, &
- b) Not place any order of Distribution Transformers on the firm for one two year(s).

21.9 Measurement of Total Losses (at 50% & 100% loading):

(i) After pre-dispatch inspection of material at firm's works, the dispatch instructions will be issued for the respective store(s) as per requirement of Nigam. Sample(s) will be drawn from the lot(s) received in store(s) and will be subjected to the following test(s):

- c) One transformer will be selected out of every lot of 10 Nos. or part thereof for measurement of No load Losses at rated voltage; No Load current (at 100% and 112.5% of rated voltage); Impedance voltage, thickness of tank body sheet and total Losses at 50% and 100% loading at rated current. The testing shall be arranged either at purchaser's own testing lab and / or at independent test lab. The testing charges for such tests shall be borne by the purchaser. The test results will be applicable to the respective lot of 10 Nos. from which sample was drawn.
- d) In case if dispatch instructions are less than 10 Nos. than one sample shall be selected from each store (s) and the test result so obtained shall be for the quantity consigned / received by the store (s).

The percentage impedance voltage at rated current shall not exceed the permissible limit as specified with allowable tolerance failing which the sub lot of transformers represented by the sample shall be rejected. The transformers selected for total Losses shall also be subjected to magnetizing current and in case found beyond the limit, the lot shall stand rejected.

The I.R. values of the sample(s) shall be measured at CTL, Jodhpur and it must be more than 50 MEGA-OHM.

One sample out of 100 Nos. transformers or part thereof (whose Sr. No. shall be decided by the committee members) shall be selected for physical verification/ checking of window height, limb centre and checking of insulation of HV and LV

windings, make of Inbuilt circuit breaker size of lugs and size of PVC Copper cable at CTL.

Metal Parts shall be checked in CTL as per specification/IS on the transformer which is physically opened in CTL (from the lot of 100 Nos. or part thereof).

The No Load Voltage Ratio (Transformer Turn Ratio) shall be checked in CTL with the tolerance as per specification/ IS 2026 on the transformer from the lot of 10 Nos. or part thereof and the concerned sub lot shall be rejected if not meet out the requirement of IS.

Further, Internal clearances shall be checked without opening of core coil assembly in each of the transformers which have been selected for physical verification at CTL (i.e. one sample from a lot of 100 nos. or part thereof) in presence of firm's representative. No negative tolerance shall be admissible. If clearances are not found as per specification then the lot of 100 Nos. or part thereof shall be rejected.

The facility is being developed at CTL to test the Degree of Polarization (DP) of insulating paper used in Transformers. Therefore, the same shall be tested at CTL.

The sample of Oil be taken at CTL from the Transformer opened for physical verification in presence of firm's representative and same shall be tested at Nigam's CTL/NABL accredited Lab.

NOTE:

If the total losses are found more than 10% of specified losses at 100% loading then apart from rejecting the lot, firm's balance order would be cancelled and such firms shall not be awarded any order for one year or in next tender of tendered rating to be opened / finalized whichever is later.

The tolerance in window height shall be ± 2 mm, If the window height found beyond ± 2 mm but up to 7.5 mm then the lot shall be rejected. However if the window height is found more than 7.5 mm, then apart from rejecting the lot, firm's

balance order would be cancelled and such firms shall not be awarded any order for one year or in next tender of tendered rating to be opened / finalized whichever is later.

No tolerance shall be allowed during CTL testing and in case any parameter which are to be tested in CTL are found beyond guaranteed parameters, the lot/ subplot shall stand rejected.

21.10 CHALLENGE TESTING CLAUSE:

The other manufacturer who have either participated in the instant tender enquiry can request challenge testing for tests covered in this clause based on specification & losses. The challenger would request for testing with testing fee. The cost of to & fro transportations of all transformer tested under the provision of this clause along with loading & unloading and transit insurance at actual shall be borne by Challenger firm. The challenge testing fees shall be at least three times the cost of testing. The challenger would have the opportunity to select the sample from the store. The party challenged ,challenger & the utility could witness the challenge testing. The challenge testing would cover the

- i. Measurement of Magnetizing current
- ii. No Load Losses test
- iii. Load Losses test
- iv. Temperature Rise Test.

The challenge test could be conducted at any Govt. / NABL accredited Lab. like ERDA /CPRI. If the values are within limits as per specification including tolerance allowed in CTL, the products gets confirm else not confirmed. If the product is not confirmed, the manufacturer will pay the challenge fee and challenger would get the fee refunded. However, as a redressal system, the manufacturer (challenged firm) would be allowed to ask for fresh testing of two more samples from the store and the same be tested in a NABL/Govt. laboratory in presence of party challenged, challenger & the utility. If any one or both sample does not confirm the tests then the product is said to have failed the test. In such cases, the manufacturer (challenged firm) will be declared as unsuccessful manufacturer for the said product and balance supply shall not be availed and the balance order shall be cancelled with levy of maximum penalty. Firm shall also be debarred for one year or participating against next tender for that rating, whichever is later. The transformers already supplied (including tested in challenge testing) shall be accepted with the following conditions:

- i) Guarantee period of the supplied Transformers shall be increased by double the normal guarantee period.

ii) Bank guarantee shall be extended to cover the additional guarantee period.

22. Deleted

23. GUARANTEE PERIOD:

I. Performance guarantee of the transformer(s) with LT protection unit shall be for the period of 60 (Sixty) months from the date of dispatch. The date of expiry of guarantee period shall be marked on the rating plate. Transformer(s) alongwith LT protection unit failed within such guarantee period shall have to be **repaired / rectified** free of cost expeditiously.

Note:

k) The firm will **repair** all type of G.P. failed Distribution transformers without asking any segregation on account of manufacturing defect. However, the Discoms will compensate the cost of missing parts as per practice in vogue.

ii) The guarantee period failed transformers will directly be lifted by the supplier from the respective circle store **within a period of 60 days from the date of intimation by the respective consignee and will repair Distribution Transformers against G.P. failed within 30 days from the date of lifting** in the ACOS / Central Store, if operative, along with the joint inspection sheet of missing parts issued by the respective consignee. After receiving the material at ACOS / Central Store, the same shall be tested at CTL as per provisions of the relevant contracts and will be issued to the circle store as per requirement of Nigam's account. The invoice of missing parts shall be verified by the ACOS as per the joint inspection sheet issued by the circle store as per practice in vogue and accordingly, the Sr. AO (Cash & CPC) will make the payment of missing parts, if any.

vii) The loading of G.P. failed Distribution Transformers at circle store and unloading at ACOS will be on supplier account.

viii) The firm will **repair** G.P. failed transformers irrespective of breakage of body seals as well as physical damage of transformer tank body due to bursting. The period during which transformer remained defective / failed will not be accounted in the performance guarantee period. The period of defective will be reckoned from the date of first intimation (i.e. field officer / Consignee whichever is earlier) to date of delivery of repaired transformer.

ix) Firms shall lift the G.P. failed Transformer(s) within a period of 60 days from the date of intimation by the respective consignee and will repair Distribution Transformers against G.P. failed within 30 days from the date of lifting positively. In case firm fails to deliver repaired Transformer(s) within 90 days from date of intimation, the cost of the transformer(s) shall be withheld from firm's financial hold and in case firm fails to deliver repaired within 90 days from date of intimation, a penalty at the rate of ½% per week subject to maximum 10%, shall be levied for the late delivery of repaired Transformer(s).

Firm shall lift G.P. failed transformers after furnishing safe custody bank guarantee, the slab of safe custody Bank Guarantee shall be as under.

Safe custody Bank Guarantee :-

The Safe Custody Bank Guarantee (SCBG) shall be 1% of the value of the contract or as per following SCBG slabs whichever is lower.

- 7. In case if order is upto 1000 Nos. DT's the firm have to give safe custody Bank Guarantee for Rs.5.00 Lacs and**
- 8. if order is more than 1000 Nos. but upto 3000 Nos. then the safe custody BG for Rs.10.00 lacs and**
- 9. In case for orders more than 3000 Nos. DT's the value of safe custody BG shall be Rs.20.00 Lacs. In case firm fails to furnish the safe custody BG the amount equivalent to safe custody BG shall be deducted from firm's first bill due for payment. On furnishing of safe custody BG the amount so deducted shall be returned to the firm. The safe custody BG shall be valid for a period of 12 months over and above the normal GP. After a period of 16 months from normal GP the safe custody BG shall be returned back unless there is some specific direction from the purchaser.**

II All the **repaired / rectified** transformers by the manufacturer under guarantee clause shall carry a further guarantee of 12 months after **repair** or unexpired guarantee of 36 months from the date of supply, whichever is later, after **repair / rectification**. The bank guarantee equivalent to cost of **repaired** transformers shall be furnished after expiry of performance guarantee period to cover **such repair guarantee**. The purchaser also reserves the right to withhold the payment of supplier firm, under any other contract, if the performance of the supplier in **repaired the failed** transformers is not satisfactory. Each supplier shall invariably furnish the detailed information about the total number of transformers failed and **repaired** by them, every month after commencement of supplies.

III In order to ascertain that transformers have successfully completed guarantee period the following details shall be provided on the transformer body:

G. A repair identification steel plate of size 75 x 75 x 2.5 mm duly engraved with following details shall be welded on the transformer body.

Firm's Name / Logo

TN

KVA

Sr.No.

Date of supply

Ist time

IInd time

IIIrd time

Date of failure

Date of repair

Guarantee period

extended.

H. Such metallic plate fixed on first **repair** should not be removed at the time of second **repair** or any subsequent **repair**. However, necessary details of failure and **repair** shall be graved on **the identification plate**, each time it is **repaired** in guarantee.

I. The **repaired G.P. failed** transformer shall be provided with 40 mm wide red color band all around transformers including radiator each time it is **repaired** in G.P. Thus if a transformer is **repaired** three time in G.P. then there should be three colored bands each of size 40 mm.

IV) All due care should be taken to ensure that the original name plate and identification plate provided should not be removed from the position at which they are fixed originally. In case it is felt that these are loose then it should be repaired suitably by welding or riveting.

V) Test checking of G.P. failed transformers will be allowed to the supplier at Nigam's store before lifting of G.P. failed distribution transformers to repair at supplier's works so that minor mistakes like loosing of connections/ replacement of fuse wire be carried out at Nigam's stores.

VI) G.P. repaired Distribution may be got tested at CTL as per the sampling plan of new transformer except the physical opening test. The 10% tolerance (as per IS:2026 part – I/1977) be allowed on total losses at 50% and 100% loading for the transformers failed under guarantee period for testing at firms' works as well as in CTL testing.

NOTE:-1. Firm shall keep the records for at least 8 years of transformers supplied by them.

24. **Deleted**

25. Deleted

26. Besides above changes, the technical parameters of the specifications wherever are deviating from the IS:1180 (Part-I/2014), the same shall be in accordance with IS:1180 (Part-I/2014) and its latest amendments, if any and the changes where the IS:1180 (Part-I/2014) is silent for technical parameters, same shall be applicable as per Discom specification.

27. Deleted

28. Make of Brought Out Items:

The Make of brought out items like Bushings, Transformer Oil, MCCB etc. other than Make specified in the specification/work order may be accepted if confirms to relevant IS with due approval of JdVVNL.

- 29.** Every Micro, Small & Medium enterprises of Rajasthan shall be required to submit an affidavit in schedule-XI, along with duly filled bid document.

Schedule -V(A)

MANUFACTURER'S GUARANTEED TECHNICAL PARTICULARS FOR

**11/ $\sqrt{3}$ KV / 240 V, 5 KVA RATING OUT DOOR TYPE COMPLETELY SELF PROTECTED
SINGLE PHASE ALUMINIUM WOUND DISTRIBUTION TRANSFORMERS ENERGY EFFICIENCY
LEVEL-2 WITH INBUILT CIRCUIT BREAKER AGAINST TN-1426**

S.No	DESCRIPTION	PARTICULARS
	Rating in KVA	5 KVA
1	Name of the manufacturer and place of manufacturer	
2	Continuous max rating as per this specification (KVA)	
3	Normal ratio of transformer (KV)	
4	Method of connection HV/LV	
5	Max. Current density in windings e. High voltage Amp/Sq.mm f. Lower voltage Amp/Sq.mm	
6	Max hot spot temp Deg.C (Ambient air temp on which above is based Deg.C)	
7	a. Max. observable oil temp in Deg.C (Ambient air temp on which above is based Deg.C)	
	b. Maximum winding temperature in Deg. C (Ambient air temp	

	on which above is based Deg.C)	
8	ii) Total losses at normal voltage frequency, rated current and 75 Deg.C at 50% & 100% loading (Max).(watts)	
9	Flux Density(Max)(Tesla)	
10	Efficiency at normal voltage: iii. Unity power factor a. At 50% load % b. At 75% load % c. At full load % ii 0.8 power factor a. At 50% load % b. At 75% load % c. At full load %	
11	Regulation as % of normal voltage e. At unity power factor % f. At 0.8 power factor lagging %	
12	Impedance voltage at normal ratio between HV and LV winding %	
13	Type of transformer, Shell type/Core type Wound core.	
14	Type of insulation used in e. HV winding f. LV winding	
15	Impulse test voltage level (KVrms) HV winding LV winding	
16	Characteristics of transformer oil	
17	Total content of oil in litres	
18	i) Approximate overall dimensions g. Height in mm h. Breadth in mm	

	i. width in mm	
	ii) Tank dimensions	
	a) Diameter mm	
	b) Height mm	
19	Weight of insulated conductor	
	a. HV (min) kg	
	b. LV (min) kg	
20	Weight of core (min.) kg (AMT)	
21	Weight of complete transformer arranged for transport kg	
22	Resistance for windings at 75 Deg.C per phase	
	a. HV Ohms	
	b. LV Ohms	
23	Material of bushing rod and nuts & Bushing caps HV LV	
24	Make , type of MCCB/ L.V Breakers	
25	Particulars of HV fuse	
a)	System voltage	
b)	Current	
c)	Max. Design voltage	
d)	Min. Melting time	
e)	Total clearing time	
f)	Interrupting rating	
g)	Mounting	
h)	Make	

25	All the standard fittings & accessories shall be provided as per IS:1180 (part-1)-2014/spec.	Yes
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(Signature)

Name & Designation with seal of the bidder

