



आरईसी पावर डिस्ट्रीब्यूशन कम्पनी लिमिटेड
REC POWER DISTRIBUTION COMPANY LIMITED
(A wholly owned subsidiary of REC Ltd., a 'Navratna CPSE' under Ministry of Power, Govt. of India)
CIN No. RECPDCL-U40101DL2007GOI165779

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NIT No: RECPDCL/TECH/Arunachal-DTR/18-19/1912

Date: 01.08.2018

Notice Inviting Limited Tender

(Invited through e-Tendering mode only)

(Limited to Agencies as per list enclosed in "Annexure XI")

For

Supply in the State of Arunachal Pradesh for Electrification work under SAUBHAGYA/DDUGJY
of

1. Three Phase Distribution Transformers (16, 25 & 63 KVA)
2. LT Distribution Board for DT (16, 25 & 63 KVA)
3. Trivector Meter
4. TP&N Distribution Box

REC Power Distribution Company Limited (RECPDCL)

(A wholly owned subsidiary of REC Ltd., a 'Navaratna CPSE'

Under Ministry of Power, Govt. of India)

CIN No. of RECPDCL: U40101DL2007GOI165779

Corporate office

4th Floor, KRIBHCO Bhawan,
A10, Sector-1, Noida (U.P.)-201301
Phone: 0120-4383783
Website: www.recpdcl.in

Description of task, e-tender submission format and procedure is provided in the tender document available on RECPDCL website (www.recpdcl.in), REC website (www.recindia.nic.in), e-tendering website (www.tenderwizard.com/REC), Central Public Procurement Portal (www.eprocure.gov.in)

| Important Dates | |
|-----------------------------------|------------------------------|
| Date of Release of Limited Tender | 01.08.2018 |
| Last date of submission of Bid | 09.08.2018 up to 15:00 Hours |
| Date of opening of Bids | 09.08.2018 up to 15:30 Hours |

Note: Online registration has to be done at e-tendering website i.e. www.tenderwizard.com/REC in general, activation of registration may take about maximum 24 hours subject to the submission of all requisite documents required in the process.

-Sd-
(Ajay Kumar Gupta)
CTO

[This document is meant for the purpose of engaging of Agencies against this tender and should not be transferred, reproduced or otherwise used for purposes other than specified/issued.]

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SECTION-I

TENDER INFORMATION

NAME OF ASSIGNMENT:

Supply of Three Phase Distribution Transformers and other materials in the State of Arunachal Pradesh for electrification work under SAUBHAGYA/DDUGJY

IMPORTANT INFORMATION

| S. No. | Event | Date/ Information | |
|--------|--|---|--|
| 1 | Date of Release of Financial Bid | 01.08.2018 | |
| 2 | Last date of submission of Financial Bid | 09.08.2018 up to 15:00 Hours | |
| 3 | Date of Opening of Financial Bids | 09.08.2018 up to 15:30 Hours | |
| 4 | Tender document | The tender document can be downloaded and viewed from any of the website: www.recpdcl.in (or) www.recindia.nic.in (or) www.eprocure.gov.in (or) www.tenderwizard.com/REC at free of cost. | |
| 5 | Earnest Money Deposit (EMD) | All participating bidders have to submit EMD in original as per Clause No. 2 under Section-V in the form of Demand Draft (DD) in favour of REC Power Distribution Company Ltd. payable at New Delhi (or) in the form of Bank Guarantee (bid bank guarantee) from a scheduled bank as per format of Annexure-IV. | |
| 6 | Address for Bid Submission | Addl. Chief Executive Officer REC Power Distribution Company Limited, 4 th Floor, KRIBHCO Bhawan, A10, Sector-1, Noida (U.P.)-201301 Email: co.delhi@recpdcl.in | |
| 7 | Validity of Bid | 180 days from the last bid submission | |
| 8 | Contact Person | Shri Ajay Kumar Gupta Chief Technical Officer RECPDCL Email: co@recpdcl.in | Shri Sunil Bisht Dy. Manager (Tech.) RECPDCL, Phone: 0120-4383759/767 Email: co@recpdcl.in |

#The EMD (Earnest Money Deposit) is to be submitted by all the participating bidders in original as per Clause No. 2 under Section-V in the form of Demand Draft (DD) in favour of REC Power Distribution Company Ltd. payable at New Delhi (or) in the form of Bank Guarantee (bid bank guarantee) from a scheduled bank as per format of Annexure-IV. The EMD of unsuccessful bidder/s will be returned within 90 days after the finalization of Financial Bid/award of contract and EMD of successful bidder will also be returned after acceptance of work order & submission of PBG.

Exemption for payment of EMD amount will be given to Micro, Small & Medium Enterprises (MSMEs) registered with National Small Industries Corporation Ltd. (NSIC). However, relevant valid document/ Certificate from NSIC or Ministry of MSMEs, Govt. of India is required to be submitted without which bidders are not entitled for exemption.

SECTION-II

PREFACE & INTENT

REC Power Distribution Company Limited (RECPDCL) is a wholly owned subsidiary of Rural Electrification Corporation Ltd. (REC), a “Navratna CPSE” under the Ministry of Power, Govt. of India. RECPDCL is also an Empaneled Government Agency with Ministry of New & Renewable Energy (MNRE), Govt. of India.

RECPDCL is engaged in providing value added consultancy services in power sector arena covering Power Generation, Renewable Energy Sector and Energy Efficiency programs including Govt. of India’s power schemes for power utilities across the country and various regulatory assignments with CERC/SERCs. It includes the project works under Rural Electrification, Project Management Consultancy (PMC) works, Detailed Project Report (DPR) preparation for R-APDRP/DDUGJY/RGGVY/NEF and other power project schemes, Third Party Inspection of DDUGJY/ RGGVY/other projects, Feeder Renovation Program, Feeder separation, HVDS program, Lender’s Engineers assignment, IT related assignments in Distribution sector including Energy Audit, Evaluation study for HVDS/Distribution network, AT&C Loss assessment, System study, MRI based billing and Cost Book Data Preparation.

Government of India has launched Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY) for strengthening & augmentation of power distribution network, separation of agriculture & non-agriculture feeders and rural electrification works. This scheme is already under implementation by various states in the country.

In addition to this, Government of India has recently launched SAUBHAGYA scheme to ensure last mile connectivity and electricity connections to all remaining un-electrified households in the country. This scheme aims for providing service connections to un-connected households in rural and urban areas through available grid or by incremental infrastructure.

RECPDCL, which expression shall also include its successors and permitted assigns, hereby invites Bids from the agencies which are technically and professionally qualified, experienced and capable of supplying single phase and three phase distribution transformers with other materials in large quantum as per Scope of Work detailed in Section-V of this tender document and are able to deliver the job in a time bound and efficient manner as per the requirements of RECPDCL.

Arunachal Power Development Agency (hereinafter referred as “APDA”) shall be Owner of the project however, REC Power Distribution Company Limited (hereinafter referred as “RECPDCL”) shall act as Employer for the Contract under this NIT.

RECPDCL shall be responsible for procurement of the materials under this NIT & timely supply to the respective store(s) located in the operational area of the Owner on behalf of Owner.

SECTION-III

INSTRUCTIONS TO BIDDING AGENCIES

SUBMISSION PROCESS OF BID DOCUMENTS:

A. Downloading & viewing of Tender Document:

Bidders can download and view tender document from RECPDCL web site www.recpdcl.in (or) e-tender website www.tenderwizard.com/REC (or) REC website www.recindia.nic.in (or) Central Public Procurement Portal www.eprocure.gov.in at free of cost.

B. Participation through e-Bid Submission:

Bidders shall submit their Bid documents online through website www.tenderwizard.com/REC

- 1) In order to participate in e-Bid submission, it is mandatory for agencies to have log-in User ID and Password. For this purpose, the agency has to register with RECPDCL through tender Wizard website as per procedure given below.

Steps for Online Registration:

- (i) Go to website <https://www.tenderwizard.com/REC>
- (ii) Click the link 'Register Me'
- (iii) Enter the details about the E-tendering as per format
- (iv) Click 'Create Profile'
- (v) System will provide / confirmation with Login ID and Password

Note:

- While accessing tenderwizard.com website, please type 'REC' in capital letters only to get access of e-tender portal.
 - Activation of On-Line registration may take about maximum 24 hours. It is the responsibility of the bidder to register in advance.
- 2) Please note that the agencies have to obtain digital signature token for applying the bid. Bidders may also obtain the same from Tender Wizard.

Steps for applying for Digital Signature from Tender Wizard:

Download the Application Form from the website <https://www.tenderwizard.com/REC>. Follow the instructions as provided therein. In case of any assistance you may contact RECPDCL officials whose address is given in this tender document.

C. Submission of Bid Documents:

Submission of bids will be through online e-tendering mode only from www.tenderwizard.com/REC website.

Agencies should upload Bid documents (scanned copies) as mentioned below. Online submission of Bid documents is mandatory.

- 1) **Letter for Submission of Financial Bid** has to be submitted on Company's letterhead duly signed and stamped as per format of **Annexure-I**. This is mandatory document for submission.

- 2) **Bidder's General Details** has to be submitted on Company's letterhead duly signed and stamped as per format of **Annexure-II**.
- 3) **Letter for Transmittal** has to be submitted on Company's letterhead duly signed and stamped as per format of **Annexure-III**.
- 4) **Earnest Money Deposit (EMD)** as per Clause No. 2 under Section-V has to be deposited in the form of Demand Draft (DD) in favour of 'REC Power Distribution Company Ltd.' payable at New Delhi (or) in the form of Bank Guarantee (Bid Bank Guarantee) from a scheduled bank as per format **Annexure-IV**. Scanned copy of DD or BG has to be uploaded and ***original of DD or BG has to be submitted before last date & time of submission of financial bid***. Exemption for payment of EMD amount will be given to Micro, Small & Medium Enterprises (MSMEs) registered with National Small Industries Corporation Ltd. (NSIC) or any other body as specified by Ministry of MSME. However, relevant valid document/ Certificate from NSIC or any other body as specified by Ministry of MSME, Govt. of India is required to be submitted without which bidders are not entitled for exemption.
- 5) **Power of Attorney** has to be submitted issued by the Bidding Company in favour of the authorized person signing the Bid as per format of **Annexure-V**. Scanned copy of Power of Attorney has to be uploaded and ***original has to be submitted before last date & time of submission of bid***.
- 6) **Acceptance form for participation in reverse auction event** has to be submitted duly signed and stamped as per format of **Annexure-VIII**.
- 7) **Price Bid** has to be submitted **through online** mode only as per format of **Annexure-X**.

Documents to be submitted in case of Award of Work.

- 1) **Advance Bank Guarantee** has to be submitted issued by the Bidding Company, if bidder wants mobilization advance during commencement of work as per **Annexure-VI**.
- 2) **Performance Bank Guarantee** has to be submitted by bidder within 5 days from the award of LoA as per **Annexure-VII**.

Note: All the documents should be addressed to.

**Addl. Chief Executive Officer
REC Power Distribution Company Ltd.
4th Floor Kribhco Bhawan,
A-10, Sector-4, Noida
(UP)-201301**

SECTION-IV

DETAILED SCOPE OF WORK, TECHNICAL SPECIFICATIONS & CONDITIONS OF CONTRACT

A. Detailed scope of work for the bidder but not limited to following includes:

SCOPE

Design, engineering, manufacture, testing and supply of Three phase distribution transformers, LTDB, Trivector meter and TP&N Distribution Box (as detailed in Table below) as per Scope of Work including transportation & insurance up to sub-divisional headquarters of the Namsai District in Arunachal Pradesh. Unloading of equipment on reaching the designated store shall be in the scope of respective DISCOMs/ Power Departments. All manpower, crane, truck etc. shall be arranged and paid by DISCOM officials. On successful delivery of equipment up to designated store, it shall be handed over to respective DISCOM/ Power Department.

| S.No | Description | Unit | Nos. |
|------|--|------|------|
| 1 | Designing, Manufacturing & Supply of 63 KVA step down out door type 3 phase 11/0.415 kV 50Hz oil immersed naturally cooled doubled wound copper winding out door type conventional step down transformer | Nos. | 8 |
| 2 | Designing manufacturing & Supply of 16 KVA step down out door type 3 phase 11/0.415 Kv 50 Hz oil immersed naturally cooled doubled wound copper winding outdoor type conventional step down distribution transformer | Nos. | 1 |
| 3 | Designing manufacturing and supply of 25 KVA step down outdoor type 3 Phase 11/0.415 kv 50 Hz oil immersed naturally cooled double wound copper winding outdoor type conventional step down distribution transformer | Nos. | 11 |
| 4 | LTDB for 63KVA Distribution Transformer | Nos. | 8 |
| 5 | LTDB for 25KVA Distribution Transformer | Nos. | 11 |
| 6 | LTDB for 16KVA Distribution Transformer | Nos. | 1 |
| 7 | 3 phase, 4 wire Trivector Meter for DT Metering | Nos. | 20 |
| 8 | TP&N Distribution Box | Nos. | 1102 |

B. THREE PHASE OIL IMMERSED DISTRIBUTION TRANSFORMERS (OUTDOOR TYPE)

1. This specification covers design, engineering, manufacture, assembly, stage testing, inspection and testing before supply and delivery at site of oil immersed naturally cooled 16, 25, 63 KVA 11kV/415V three phase distribution transformer for outdoor use.
2. 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 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 there with. 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.

3. The transformer and accessories shall be designed to facilitate operation, inspection, maintenance and repairs. The design shall incorporate every precaution and provision for the safety of equipment as well as staff engaged in the operation and maintenance of equipment.
4. All outdoor apparatus, including bushing insulators with their mountings, shall be designed so as to avoid any accumulation of water.

5. STANDARDS

- (i) The materials shall conform in all respects to the relevant Indian Standard, with latest amendments thereof unless otherwise specified herein; some of them are listed below.
- (ii) Material conforming to other internationally accepted standards, which ensure equal or better quality than the standards mentioned above would also be acceptable. In case the bidder who wishes 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 along with guaranteed technical particulars to be furnished as per format enclosed. A copy of such standards with authentic English translations shall be furnished along with the offer.

| Indian Standards | Title | International Standards |
|----------------------|--|-------------------------|
| IS-2026 | Specification for Power Transformers. | IEC 76 |
| IS1180 (Part-I):2014 | Outdoor Type Oil Immersed Distribution Transformers Up to and including 2500kVA, 33kV-Specification. | |
| IS-12444 | Specification for Copper wire rod | ASTM B-49 |
| IS-335 | Specification for Transformer/Mineral Oil. | IEC Pub296 |
| IS-5 | Specification for colors for ready mixed paints. | |
| IS-104 | Ready mixed paint, brushing zinc chromate, priming. | |
| IS-2099 | Specification for high voltage porcelain bushing. | |
| IS-649 | Testing for steel sheets and strips and magnetic circuits. | |
| IS-3024 | Cold rolled grain oriented electrical sheets and strips. | |
| IS -4257 | Dimensions for clamping arrangements for bushings. | |
| IS -7421 | Specification for Low Voltage bushings. | |
| IS -3347 | Specification for Outdoor Bushings. | DIN 42531 to 33 |
| IS -5484 | Specification for Al Wire rods. | ASTM B- 233 |
| IS -9335 | Specification for Insulating Kraft Paper. | IEC554 |
| IS -1576 | Specification for Insulating Press Board | IEC641 |
| IS -6600 | Guide for loading of oil Immersed Transformers | IEC 76 |

| | | |
|-----------|---|-----------|
| IS -2362 | Determination of water content in oil for porcelain bushing of transformer. | IS -2362 |
| IS -6162 | Paper covered Aluminium conductor. | IS -6162 |
| IS -6160 | Rectangular Electrical conductor for electrical machines | IS -6160 |
| IS -5561 | Electrical power connector. | IS -5561 |
| IS -6103 | Testing of specific resistance of electrical insulating Liquids. | IS -6103 |
| IS -6262 | Method of test for power factor and dielectric constant of Electrical insulating liquids. | IS -6262 |
| IS -6792 | Determination of electrical strength of insulating oil. | IS -6792 |
| IS -10028 | Installation and maintenance of transformers. | IS -10028 |
| IS -2362 | Determination of water content in oil for porcelain bushing of transformer. | IS -2362 |

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).

| | | |
|---|---|--|
| 1 | Location | At various locations in the country |
| 2 | Maximum ambient air temperature (°C) | 50 |
| 3 | Minimum ambient air temperature (°C) | -5 |
| 4 | Maximum average ambient air temperature (°C) | 40 |
| 5 | Maximum yearly weighted average ambient air temperature (°C) | 32 |
| 6 | Maximum altitude above altitude of 5000 meters above mean sea level(meters) | For North-Eastern States in India (including Sikkim) |

- The climatic conditions specified above are indicative and can be changed by the user as per requirements.
- The equipment shall generally be for use in moderately hot and humid tropical climate, conducive to rust and fungus growth unless otherwise specified.

6. PRINCIPAL PARAMETERS:

- The Transformer shall be suitable for outdoor installation with single phase, 50Hz, 11kV system in which the neutral is effectively earthed and they should be suitable for service under fluctuations in supply voltage up to +12.5% to -12.5%.
- The transformer shall conform to the following specific parameters. Rated HV side value (11kV) shall be specified in the detailed bill of quantity by purchaser.

| S. No. | ITEM | SPECIFICATION |
|--------|------|---------------|
|--------|------|---------------|

| | | |
|----|---------------------|----------------------------|
| 1. | System voltage(max) | 12kV |
| 2. | Rated HV voltage | 11 kV |
| | Rated LV voltage | 415V-250V* |
| 3. | Frequency | 50 Hz+/-5% |
| 4. | No. of Phases | Three |
| 5. | Connection HV | Delta |
| 6. | Connection LV | Star (Neutral brought out) |
| 7. | Vector Group | Dyn-11 |
| 8. | Type of cooling | ONAN |

Audible sound levels (decibels) at rated voltage and frequency for liquid immersed distribution transformers shall be as below (NEMA Standards):

| kVA rating | Audible sound levels(decibels) |
|------------|--------------------------------|
| 0-50 | 48 |
| 51-100 | 51 |

INSULATION LEVELS

| Voltage(Volts) | Impulse Voltage (kV Peak) | Power Frequency(kV) |
|----------------|------------------------------|---------------------|
| 415 | - | 3 |
| 11000 | 75 | 28 |

7. TECHNICAL REQUIREMENTS:

(i) CORE MATERIAL:

- A. The core shall be stack/wound type of high grade Cold Rolled Grain Oriented or Amorphous Core annealed steel lamination having low loss and good grain properties, coated with hot oil proof insulation, bolted together and to the frames firmly to prevent vibration or noise. The core shall be stress relieved by annealing under inert atmosphere if required. The complete design of core must ensure permanency of the core loss with continuous working of the transformers. The value of the maximum flux density allowed in the design and grade of lamination used shall be clearly stated in the offer.
- B. The bidder should offer the core for inspection and approval by the purchaser during manufacturing stage. CRGO steel for core shall be purchased from vendors having valid BIS certificate.
- C. The transformers core shall be suitable for over fluxing (due to combined effect of voltage and

frequency) up to 12.5% without injurious heating at full load conditions and shall not get saturated. The bidder shall furnish necessary design data in support of this situation.

- D. No-load current up to 200kVA shall not exceed 3% of full load current and will be measured by energizing the transformer at rated voltage and frequency. Increase of 12.5% of rated voltage shall not increase the no-load current by 6% of full load current.

or

No-load current above 200kVA and up to 2500kVA shall not exceed 2% of full load current and will be measured by energizing the transformer at rated voltage and frequency. Increase of 12.5% of rated voltage shall not increase the no-load current by 5% of full load current.

(ii) **WINDINGS MATERIALS:**

- A. HV and LV windings shall be wound from Super Enamel covered /Double Paper covered Aluminum/Electrolytic Copper conductor.
- B. LV winding shall be such that neutral formation will be at top.
- C. The winding construction of single HV coil wound over LV coil is preferable.
- D. Inter layer insulation shall be Nomex/Epoxy dotted Kraft Paper.
- E. Proper bonding of interlayer insulation with the conductor shall be ensured. Test for bonding strength shall be conducted.
- F. Dimensions of winding coils are very critical. Dimensional tolerances for winding coils shall be within limits as specified in Guaranteed Technical Particulars.
- G. The core/coil assembly shall be securely held in position to avoid any movement under short circuit conditions.
- H. Joints in the winding shall be avoided. However, if jointing is necessary the joints shall be properly brazed and the resistance of the joints shall be less than that of parent conductor. In case of foil windings, welding of leads to foil can be done within the winding.

(iii) **TAPPING RANGES AND METHODS:**

- A. No tapping shall be provided for distribution transformers up to 100 kVA rating.
- B. The tapping shall be as per provisions of IS: 1180 Part-I (2014).
- C. Tap changing shall be carried out by means of an externally operated self-positions witch and when the transformer is in de-energised condition. Switch position No.1 shall correspond to the maximum plus tapping. Each tap change shall result in variation of 2.5% in voltage. Arrangement for pad locking shall be provided. Suitable aluminum anodized plate shall be fixed for tap changing switch to know the position number of tap.

(iv) **OIL:**

- A. The insulating oil shall comply with the requirements of IS:335. Use of recycled oil is not acceptable. The specific resistance of the oil shall not be less than 2.5×10^{12} ohm-cm at 27°C when tested as per IS:6103.
- B. Oil shall be filtered and tested for break down voltage(BDV) and moisture content before filling.
- C. The design and all materials and processes used in the manufacture of the transformer, shall be such as to reduce to a minimum the risk of the development of acidity in the oil.

(v) **LOSSES:**

- A. For the transformer of HV voltage up to 11kV, the total losses (no-load + load losses at 75°C) at 50% of rated load and total losses at 100% of rated load shall not exceed the maximum total loss values

given in Table-3 up to 200kVA & Table-6 for ratings above 200kVA of IS1180(Part-1):2014.

- B. The maximum allowable losses at rated voltage and rated frequency permitted at 75°C for 11/0.415kV transformers shall be as per Table-3 up to 200kVA and Table-6 for ratings above 200kVA as per Energy Efficiency Level-2 specified in IS-1180(Part-1):2014 for all kVA ratings of distribution transformers.
- C. 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.

(vi) **PERCENTAGE IMPEDANCE:** The percentage impedance of transformers at 75°C for different ratings up to 200kVA shall be as per Table-3 of IS1180(Part-1):2014.

(vii) **TEMPERATURE RISE:**

- A. The permissible temperature rise shall be as per IS: 1180 (Part-I):2014.
- B. The transformer shall be capable of giving continuous rated output without exceeding the specified temperature rise. Bidder shall submit the calculation sheet in this regard.

(viii) **INSULATION MATERIAL:**

- A. Electrical grade insulation epoxy dotted Kraft Paper/Nomex and pressboard of standard make or any other superior material subject to approval of the purchaser shall be used.
- B. All spacers, axial wedges/runners used in windings shall be made of pre-compressed Pressboard-solid, conforming to type B3.1 of IEC641-3-2. In case of cross-over coil winding of HV all spacers shall be properly sheared and dovetail punched to ensure proper locking. All axial wedges/runners shall be properly milled to dovetail shape so that they pass through the designed spacers freely. Insulations hearing, cutting, milling and punching operations shall be carried out in such a way, that there should not be any burr and dimensional variations.

(ix) **BUSHINGS:**

- A. The bushings arrangement shall be decided by RECPDCL during detailed engineering.
- B. For transformers below 500KVA, for 33kV - 33kV class bushings, for 11kV - 12 kV class bushings and for 0.415 kV - 1 kV class bushings shall be used.
- C. Bushing can be of porcelain/epoxy material. Polymer insulator bushings conforming to relevant IEC can also be used.
- D. Dimensions of the bushings of the voltage class shall conform to the Standards specified and dimension of clamping arrangement shall be as per IS-4257.
- E. Minimum external phase to phase and phase to earth clearances of bushing terminals shall be as follows:

| Voltage | Clearance | |
|---------|----------------|----------------|
| | Phase to phase | Phase to earth |
| 33 kV | 350mm | 320mm |
| 11 kV | 255mm | 140mm |
| LV | 75mm | 40mm |

- F. Arcing horns shall be provided on HV bushings
- G. Brazing of all interconnections, jumpers from winding to bushing shall have cross section larger than the winding conductor. All the Brazes shall be qualified as per ASME, section-IX.
- H. The bushings shall be of reputed make supplied by those manufacturers who are having

manufacturing and testing facilities for insulators.

- I. The terminal arrangement shall not require a separate oil chamber not connected to oil in the main tank.

- (x) **BUSHING TERMINALS:** The LV and HV bushing stems shall be provided with suitable terminal connectors as per IS-5082 so as to connect the jumper without disturbing the bushing stem. Connectors shall be with eye bolts so as to receive conductor for HV Terminal connectors shall be type tested as per IS- 5561.

(xii) **CABLE BOXES:**

- A. No cable box shall be provided in transformer below 200 kVA. Above 200kVA, Cable Boxes shall be provided on both HV & LV side.
- B. In case HV/LV terminations are to be made through cables the transformer shall be fitted with suitable cable box on 11kV side to terminate one 11kV/3 core aluminium conductor cable up to 240 sq. mm. (Size as per requirement).
- C. The bidder shall ensure the arrangement of HT Cable box so as to prevent the ingress of moisture into the box due to rain water directly falling on the box. The cable box on HT side shall be of the split type with faces plain and machined and fitted with Neo-k-Tex or similar quality gasket and complete with brass wiping gland to be mounted on separate split type gland plate with nut-bolt arrangement and MS earthing clamp. The bushings of the cable box shall be fitted with nuts and stem to take the cable cores without bending them. The stem shall be of copper with copper nuts. The cross section of the connecting rods shall be stated and shall be adequate for carrying the rated currents. On the HV side the terminal rod shall have a diameter of not less than 12mm. The material of connecting rod shall be copper. HT Cable support clamp should be provided to avoid tension due to cable weight.
- D. The transformer shall be fitted with suitable LV cable box having non-magnetic material gland plate with appropriate sized single compression brass glands on LV side to terminate 1.1kV/single core XLPE armoured cable (Size as per requirement).

(xiv) **TERMINAL MARKINGS:**

- A. High voltage phase windings shall be marked both in the terminal boards inside the tank and on the outside with capital letter 1U, 1V, 1W and low voltage winding for the same phase marked by corresponding small letter 2U, 2V, 2W. The neutral point terminal shall be indicated by the letter 2N. Neutral terminal is to be brought out and connected to local grounding terminal by an earthing strip.
- B. The following standard fittings shall be provided:
 - Rating and terminal marking plates, non-detachable.
 - Earthing terminals with lugs -2 Nos.
 - Lifting lugs for main tank and top cover
 - Terminal connectors on the HV/LV bushings(For bare terminations only).
 - Thermometer pocketwithcap-1No.
 - Air release device (for non-sealed transformer)
 - HV bushings -3 Nos.
 - LV bushings -4 Nos.
 - Pulling lugs
 - Stiffener
 - Radiators- No. and length may be mentioned (as per heat dissipation calculations)/corrugations.

- Arcing horns on HT side - 3 no. Only clamps for lightning arrestor shall be provided.
- Prismatic oil level gauge.
- Drain cum sampling valve.
- One filter valve on upper side of the transformer (For transformers above 200 kVA)
- Oil filling hole having p.1-¼" thread with plug and drain plug on the conservator.
- Silica gel breather (for non-sealed type transformer)
- Base channel 75x40mm for up to 100kVA and 100mmx50mm above 100kVA, 460mm long with holes to make them suitable for fixing on a platform or plinth.
- 4 No. rollers for transformers of 200kVA and above.
- Pressure relief device or explosion vent (above 200 kVA)
- Oil level gauge
 - a) -5°C and 90°C marking for non-sealed type Transformers.
 - b) -30°C marking for sealed type transformers.
- Nitrogen / air filling device/ pipe with welded cover
- Capable of reuse (for sealed type transformers)
- Inspection hole for transformers above 200 kVA
- Pressure gauge for sealed type transformers above 200 kVA.
- Buchholz relay for transformers above 1000 KVA.

(xv) TANK:

- A. Transformer tank construction shall conform in all respect to clause 15 of IS-1180(Part-1):2014.
- B. The internal clearance of tank shall be such, that its hall facilitates easy lifting of core with coils from the tank without dismantling LV bushings.
- C. All joints of tank and fittings shall be oil tight and no bulging should occur during service.
- D. Inside of tank shall be painted with varnish/hot oil resistant paint.
- E. The top cover of the tank shall be slightly sloping to drain rainwater.
- F. The tank plate and the lifting lugs shall be of such strength that the complete transformer filled with oil may be lifted by means of lifting shackle/Hook Type.
- G. Manufacturer should carry out all welding operations as per the relevant ASME standards and submit a copy of the welding procedure and welder performance qualification certificates to the customer.

PLAIN TANK:

The transformer tank shall be of robust construction rectangular/octagonal/round/elliptical in shape and shall be built up of electrically tested welded mild steel plates of thickness of 3.15 mm for the bottom and top and not less than 2.5 mm for the sides for distribution transformers up to and including 25kVA, 5.0 mm and 3.15 mm respectively for transformers of more than 25kVA and up to and including 100kVA. Tolerances as per IS-1852 shall be applicable.

In case of rectangular tanks above 100kVA the corners shall be fully welded at the corners from inside and outside of the tank to withstand a pressure of 0.8kg/cm² for 30 minutes. In case of transformers of 100kVA and below, there shall be no joints at corners and there shall not be more than 2 joints in total.

Under operating conditions the pressure generated inside the tank should 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 space above oil level in the tank shall be filled with dry air or nitrogen conforming to commercial grade of IS 1747 for DT up to 63 KVA. For DT of 63 KVA and above rating, conservator shall be provided.

The tank shall be reinforced by welded flats on all the outside walls on the edge of the tank.

Permanent deflection: The permanent deflection, when the tank without oil is subjected to a vacuum of 525mm of mercury for rectangular tank and 760mm of mercury for round tank, shall not be more than the values as given below:

(All figures are in mm)

| Horizontal length of flat plate | Permanent deflection |
|---------------------------------|----------------------|
| Up to and including 750 | 5.0 |
| 751 to 1250 | 6.5 |
| 1251 to 1750 | 8.0 |
| 1751 to 2000 | 9.0 |

The tank shall further be capable of withstanding a pressure of 0.8kg/sq.cm and a vacuum of 0.7kg/sq. cm (g) without any deformation.

The radiators can be tube type or fin type or pressed steel type to achieve the desired cooling to limit the specified temperature rise.

CORRUGATED TANK:

The bidder may offer corrugated tanks for transformers of all ratings.

The transformer tank shall be of robust construction corrugated in shape and shall be built up of tested sheets.

Corrugation panel shall be used for cooling. The transformer shall be capable of giving continuous rated output without exceeding the specified temperature rise. Bidder shall submit the calculation sheet in this regard.

Tanks with corrugations shall be tested for leakage test at a pressure of 0.25kg/sq. cm measured at the top of the tank.

The transformers with corrugation should be provided with a pallet for transportation, the dimensions of which should be more than the length and width of the transformer tank with corrugations.

CONSERVATOR:

Transformers of rating 63kVA and above with plain tank construction, the provision of conservator is mandatory. For corrugated tank and sealed type transformers with or without inert gas cushion, conservator is not required.

When a conservator is provided, oil gauge and the plain or dehydrating breathing device shall be fitted to the conservator which shall also be provided with a drain plug and a filling hole [32 mm (1¼")] normal size thread with cover. In addition, the cover of the main tank shall be provided with an air release plug.

The dehydrating agent shall be silica gel. The moisture absorption shall be indicated by a change in the

colour of the silica gel crystals which should be easily visible from a distance. Volume of breather shall be suitable for 500g of silica gel conforming to IS-3401 for transformers up to 200kVA.

The capacity of a conservator tank shall be designed keeping in view the total quantity of oil and its contraction and expansion due to temperature variations. The total volume of conservator shall be such as to contain 10% quantity of the oil. Normally 3% quantity the oil shall be contained in the conservator.

The cover of main tank shall be provided with an air release plug to enable air trapped within to be released, unless the conservator is so located as to eliminate the possibility of air being trapped within the main tank.

The inside diameter of the pipe connecting the conservator to the main tank should be within 20 to 50mm and it should be projected into the conservator so that it ends is approximately 20mm above the bottom of the conservator so as to create a sump for collection of impurities. The minimum oil level (corresponding to -50°C) should be above the sump level.

8. SURFACE PREPARATION AND PAINTING:

(i) GENERAL:

- A. All paints, when applied in a normal full coat, shall be free from runs, sags, wrinkles, patchiness, brush marks or other defects.
- B. All primers shall be well marked in to 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, where ever airless spray is not possible, conventional spray be used with prior approval of purchaser.

(ii) CLEANING AND SURFACE PREPARATION:

- A. 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.
- B. Steel surfaces shall be prepared by shot blast cleaning (IS-9954) to grade Sq. 2.5 of ISO 8501-1 or chemical cleaning including phosphating of the appropriate quality (IS-3618).
- C. Chipping, scraping and steel wire brushing using manual or power driven tools cannot remove firmly adherent mill-scale. These methods shall only be used where blast cleaning is impractical. Manufacturer to clearly explain such areas in his technical offer.

(iii) **PROTECTIVE COATING:** As soon as all items have been cleaned and within four hours of the subsequent drying, they shall be given suitable anti-corrosion protection.

(iv) **PAINT MATERIAL:** Following are the types of paint that may be suitably used for the items to be painted at shop and supply of matching paint to site:

- A. The painting shall be as per specifications given below in this section.
- B. For external surfaces one coat of Thermo Setting paint or 1coat of epoxy primer followed by 2 coats of polyurethane base paint. These paints can be either air-drying or stoving.
- C. In case of highly polluted area, chemical atmosphere or at a place very near the sea coast, paint as above with one intermediate coat of high build MIO (Micaceous iron oxide) as an intermediate coat may be used to give a total dry film thickness of 150 to 180 microns.

(v) **PAINTING PROCEDURE:**

- A. All prepared steel surfaces should be primed before visible re-rusting 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.
- B. Where the quality of film is impaired by excess film thickness (wrinkling, mud cracking or general softness) the supplier shall remove the unsatisfactory paint coating and apply another coating. As a general rule, dry film thickness should not exceed the specified minimum dry film thickness by more than 25%.

(vi) **DAMAGED PAINT WORK:**

- A. 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 was originally employed.
- B. Any damaged paint work shall be made good as follows:
- The damaged area, together with an area extending 25mm around its boundary, shall be cleaned down to bare metal.
 - A priming coat shall be immediately applied, followed by a full paint finish equal to that originally applied and extending 50mm around the perimeter of the original damage.
 - The repainted surface shall present a smooth surface. This shall be obtained by carefully chamfering the painted surface before and after priming.

(vii) **DRY FILM THICKNESS:**

- A. To the maximum extent practicable the coats shall be applied as a continuous film of uniform thickness and free of pores. Overspray, skips, runs, sags and drips should be avoided. The different coats may or may not be of the same colour.
- B. Each coat of paint shall be allowed to harden before the next is applied as per manufacturer's recommendation.
- C. Particular attention must be paid to full film thickness at edges.

| S. No. | Paint type | Area to be painted | No. of coats | Total dry film thickness min. microns |
|--------|---|------------------------------|----------------|--|
| 1. | Thermo setting powder paint | Inside Outside | 01 01 | 30 60 |
| 2. | Liquid paint Epoxy(primer) P.U. Paint (Finish coat) Hot oil paint/ Varnish | Outside Outside Inside | 01 02 01 | 30 25 each 35/10 |

(viii) **TESTS:**

- A. The painted surface shall be tested for paint thickness.
- B. The painted surface shall pass the cross hatch adhesion test and impact test as routine test, Salt spray and Hardness test as type test as per the relevant ASTM standards.
- C. The paint shade shall be as per specifications given below in this section.

Note: Supplier shall guarantee the painting performance requirement for a period of not less than 5 years.

9. **RATING AND TERMINAL PLATES:**

- (i) Each transformer shall be provided with rating plate made of anodized aluminum/stainless steel material securely fixed on the outer body, easily accessible, showing the information given in Fig.2 of IS:1180 (Part-1):2014 for single phase transformers. The entries on the rating plates shall be indelibly marked by engraving.
- (ii) Each transformer shall be provided with a terminal marking plate in accordance with Fig.5 of IS:1180(Part-1):2014. The rating and terminal marking plates may be combined into one plate at the option of manufacturer.
- (iii) The distribution transformer be marked with the Standard Mark and the use of Standard Mark is governed by the provisions of Bureau of Indian Standards Act, 1986 and the Rules and regulations made there under. As per Quality Control Order for Electrical Transformers- 2015, issued by Dept. of Heavy Industries, the Standard / ISI marking on Distribution Transformers is mandatory and the product should be manufactured in compliance with IS 1180 Part-1:(2014).

11. PRESSURE AND VACUUM REQUIREMENTS: For single phase transformers up to 25kVA, the transformer tank shall be of robust construction, round in shape shall be capable of withstanding a pressure of 100kPa and a vacuum of 760mm of mercury.

12. **FASTENERS:**

- A. 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.
- B. Bolts or studs shall not be less than 6mm in diameter except when used for small wiring terminals.
- C. All nuts and pins shall be adequately locked.
- D. Wherever possible bolts shall be fitted in such a manner that in the event of failure of locking resulting in the nuts working loose and falling off, the bolt will remain in position.
- E. All bolts/nuts/washers exposed to atmosphere should be as follows
 - a) Size 12 mm or below – Stainless steel
 - b) Above 12 mm- steel with suitable finish like electro galvanized with passivation or hot dip galvanized.
- F. 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 and nuts are placed so that they are inaccessible by means of ordinary spanners, special spanners shall be provided.
- G. The length of the screwed portion of the bolts shall be such that no screw thread may form part of a shear plane between members.
- H. Taper washers shall be provided where necessary.
- I. Protective washers of suitable material shall be provided front and back of the securing screws.

13. OVER LOAD CAPACITY: The transformer shall be suitable for loading as per latest IS:6600.

14. TESTS:

- (i) All the equipment offered shall be fully type tested in a CPRI/ERDA/NABL accredited laboratory by the bidder as per the relevant standards including all tests mentioned in clause 16. The type test must have been conducted on a transformer of same design during the last Five years at the time of bidding and at the time of conducting acceptance test by the employer or its representative.
- (ii) Special tests other than type and routine tests, as agreed between purchaser and bidder shall also be carried out as per the relevant standards.
- (iii) The test certificates for all routine and type tests for the transformers and also for the bushings and transformer oil shall be submitted with the bid. However, if the same are not available at the time of bidding, the same may be submitted after order but before commencement of supply.
- (iv) The procedure for testing shall be in accordance with IS:1180(Part-1): 2014/2026 as the case may be except for temperature rise.
- (v) Before dispatch each of the completely assembled transformer shall be subjected to the routine tests at the manufacturer's works.

15. ROUTINE TESTS:

- Ratio, polarity tests.
- No load current and losses at service voltage and normal frequency.
- Load losses at rated current and normal frequency.
- Impedance Voltage test.
- Resistance of windings cold (at or near the test bed temperature).
- Insulation resistance.
- Induced over voltage withstand test.
- Separate source voltage withstand test.
- Neutral current measurement-The value of zero sequence current in the neutral of the star winding shall not be more than 2% of the full load current.
Oil samples (one sample per lot) to comply with IS 1866.
- Measurement of no load losses and magnetizing current at rated frequency and 90%, 100% and 110% rated voltage.
- Pressure and vacuum test for checking the deflection on one transformer of each type in every inspection.

16. TYPE TESTS TO BE CONDUCTED ON ONE UNIT: In addition to the tests mentioned above following tests shall be conducted:

- Temperature rise test for determining the maximum temperature rise after continuous full load run. The ambient temperature and time of test should be stated in the test certificate.
- Impulse voltage test with chopped wave as per IS-2026 part-III. BIL for 11kV shall be 75kV peak.
- Short circuit withstand test: Thermal and dynamic ability.
- Air Pressure Test as per IS –1180 (Part-1):2014.
- Magnetic Balance Test.
- Un-balanced current test: The value of unbalanced current indicated by the ammeter shall not be more than 2% of the full load current.
- Noise - level measurement.
- Measurement of zero-phase sequence impedance.
- Measurement of Harmonics of no-load current.
- Transformer tank shall be subjected to specified vacuum. The tank designed for vacuum shall be tested at an internal pressure of 0.35 kg per sq cm absolute (250mm of Hg) for one hour. The permanent deflection of flat plates after the vacuum has been released shall not exceed the values

specified below:

| Horizontal length of flat plate (in mm) | Permanent deflection (in mm) |
|---|------------------------------|
| Up to and including 750 | 5.0 |
| 751 to 1250 | 6.5 |
| 1251 to 1750 | 8.0 |
| 1751 to 2000 | 9.0 |

- Transformer tank together with its radiator and other fittings shall be subjected to pressure corresponding to twice the normal pressure or 0.35kg/sq.cm whichever is lower, measured at the base of the tank and maintained for an hour. The permanent deflection of the flat plates after the excess pressure has been released, shall not exceed the figures for vacuum test.
- Pressure relief device test: The pressure relief device shall be subject to increasing fluid pressure. It shall operate before reaching the test pressure as specified in the above class. The operating pressure shall be recorded. The device shall seal-off after the excess pressure has been released.
- Short Circuit Test and Impulse Voltage Withstand Tests: The purchaser intends to procure transformers designed and successfully tested for short circuit and impulse test. In case the transformers proposed for supply against the order are not exactly as per the tested design, the supplier shall be required to carry out the short circuit test and impulse voltage with stand test at their own cost in the presence of the representative of the purchaser.
The supply shall be accepted only after such test is done successfully, as it confirms on successful with stand of short circuit and healthiness of the active parts thereafter on un -tanking after as short circuit test.

Apart from dynamic ability test, the transformer shall also be required to withstand thermal ability test or thermal withstand ability will have to be established by way of calculations.

It may also be noted that the purchaser reserves the right to conduct short circuit test and impulse voltage withstand test in accordance with the IS, afresh on each ordered rating at purchaser cost, even if the transformers of the same rating and similar design are already tested. This test shall be carried out on a transformer to be selected by the purchaser either at the manufacturer's works when they are offered in a lot for supply or randomly from the supplies already made to purchaser's stores. The findings and conclusions of these tests shall be binding on the supplier.

17. ACCEPTANCE TESTS:

- At least 10% transformers of the offered lot (minimum of one) shall be subjected to the following routine/acceptance test in presence of purchaser's representative at the place of manufacture before dispatch without any extra charges. The testing shall be carried out in accordance with IS: 1180 (Part-1):2014 and IS: 2026.
- Checking of weights, dimensions, fitting and accessories, tank sheet thickness, oil quality, material, finish and workmanship as per GTP and contract drawings on one transformer of each type in every inspection.
- Physical verification of core coil assembly and measurement of flux density of one unit of each rating, in every inspection with reference to short circuit test report.
- Temperature rise test on one unit of the total ordered quantity.

18. **TESTS AT SITE:** The purchaser will conduct the following test on receipt of transformers in their store. The respective DISCOM/ Power Department shall arrange all equipment, tools & tackle and manpower for the testing. The bidder will depute his representative to witness the same. All such test shall be conducted by respective DISCOM/ Power Department not later than 10 days from receipt of transformers.

i) Megger Test

ii) Ratio test

19. **INSPECTION:**

(i) The bidder will intimate the Employer about carrying out of the tests at least 1 day in advance of the scheduled date of tests during which the Employer will arrange to depute his representative(s) to be present at the time of carrying out of the tests. Three (3) copies of the test reports shall be submitted.

(ii) In respect of raw material such as core stampings, winding conductors, insulating paper and oil, supplier shall use materials manufactured/supplied by standard manufacturers and furnish the manufacturers test certificate as well as the proof of purchase from these manufacturers (excise gate pass) for information of the purchaser. The bidder shall furnish following documents along with their offer in respect of the raw materials:

- Invoice of supplier.
- Mill's certificate.
- Packing list.
- Bill of landing.
- Bill of entry certificate by custom.

Please refer to "Check-list for Inspection of Prime quality CRGO for Transformers" provided below in this section. It is mandatory to follow the procedure as given.

INSPECTION AND TESTING OF TRANSFORMER OIL: To ascertain the quality of the transformer oil, the original manufacturer's tests report should be submitted at the time of inspection. Arrangements should also be made for testing of transformer oil as per IS: 335, after taking out the sample from the manufactured transformers and tested in the presence of purchaser's representative.

(iii) To ensure about the quality of transformers, the inspection shall be carried out by the purchaser's representative at following two stages:-

- Anytime during receipt of raw material and manufacture/assembly whenever the purchaser desires.
- At finished stage i.e. transformers are fully assembled and are ready for dispatch.

(iv) After the main raw material i.e. core and coil material and tanks are arranged and transformers are taken for production on shop floor and a few assembly have been completed, the firm shall intimate the purchaser in this regard, so that an officer for carrying out such inspection could be deputed, as far as possible within seven days from the date of intimation. During the stage inspection a few assembled core shall be dismantled to ensure that the laminations used are of good quality. Further, as and when the transformers are ready for dispatch, an offer intimating about the readiness of transformers, for final inspection for carrying out tests as per relevant IS shall be sent by the firm

along with Routine Test Certificates. The inspection shall normally be arranged by the purchaser at the earliest after receipt of offer for pre-delivery inspection.

- (v) In case of any defect/defective workmanship observed at any stage by the purchaser's Inspecting Officer, the same shall be pointed out to the firm in writing for taking remedial measures. Further processing should only be done after clearance from the Inspecting Officer/purchaser.
- (vi) All tests and inspection shall be carried out at the place of manufacture unless otherwise specifically agreed upon by the manufacturer and purchaser at the time of purchase. The manufacturer shall offer the Inspector representing the Purchaser all reasonable facilities, without charges, to satisfy him that the material is being supplied in accordance with this specification. This will include Stage Inspection during manufacturing stage as well as Active Part Inspection during Acceptance Tests.
- (vii) The manufacturer shall provide all services to establish and maintain quality of workmanship in his works and that of his sub-contractors to ensure the mechanical/electrical performance of components, compliance with drawings, identification and acceptability of all materials, parts and equipment as per latest quality standards of ISO-9000.
- (viii) Purchaser shall have every right to appoint a third party inspection to carry out the inspection process.
- (ix) The purchaser has the right to have the test carried out at his own cost by an independent agency wherever there is a dispute regarding the quality supplied. Purchaser has right to test 1% of the supply selected either from the stores or field to check the quality of the product. In case of any deviation purchaser have every right to reject the entire lot or penalize the manufacturer, which may lead to blacklisting, among other things.

20. QUALITY ASSURANCE PLAN:

- (i) The bidder shall invariably furnish following information along with his bid, failing which his bid shall be liable for rejection. Information shall be separately given for individual type of material offered.
- (ii) 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 test normally carried out on raw materials in presence of bidder's representative and copies of test certificates.
- (iii) Information and copies of test certificates as above in respect of bought out accessories.
- (iv) List of manufacturing facilities available.
- (v) Level of automation achieved and list of areas where manual processing exists.
- (vi) List of areas in manufacturing process, where stage inspections are normally carried out for quality control and details of such tests and inspections.
- (vii) List of testing equipment available with the bidder for final testing of equipment along with valid calibration reports shall be furnished with the bid. Manufacturer shall possess 0.1 accuracy class instruments for measurement of losses.
- (viii) Quality assurance plan with hold points for purchaser's inspection.
- (ix) The successful bidder shall within 30 days of placement of order, submit following information to the purchaser.
- (x) List of raw materials as well as bought out accessories and the names of sub-suppliers selected from those furnished along with offer.
- (xi) Type test certificates of the raw materials and bought out accessories.
- (xii) The successful bidder shall submit the routine test certificates of bought out accessories and central excise passes for raw material at the time of routine testing.
- (xiii) ISI marking on the transformer is mandatory. As per Quality Control Order for Electrical Transformers- 2015, issued by Dept. of Heavy Industries, the Standard / ISI marking on Distribution Transformers is mandatory and the product should be manufactured in compliance with IS:1180 Part-1:(2014).

21. DOCUMENTATION:

- (i) The bidder shall furnish along with the bid the dimensional drawings of the items offered indicating all the fittings.
- (ii) Dimensional tolerances.
- (iii) Weight of individual components and total weight.
- (iv) An outline drawing front (both primary and secondary sides) and end-elevation and plan of the tank and terminal gear, where in the principal dimensions shall be given.
- (v) Typical general arrangement drawings of the windings with the details of the insulation at each point and core construction of transformer.
- (vi) Typical general arrangement drawing showing both primary and secondary sides and end-elevation and plan of the transformer.

22. PACKING & FORWARDING:

- (i) The packing shall be done as per the manufacturer's standard practice. However, he should ensure the packing is such that, the material should not get damaged during transit by rail/road.
- (ii) The marking on each package shall be as per the relevant IS.

23. GUARANTEE:

- (i) The manufacturers of the transformer shall provide a guarantee of 18 months from the date of receipt of transformer at the stores of the respective DISCOM/ Power Department. In case the transformer fails within the guarantee period, the supplier will depute his representative within 15 days from date of intimation by respective DISCOM/ Power Department for joint inspection. In case, the failure is due to the reasons attributed to supplier, the transformer will be replaced/ repaired by the supplier within 2 months from date of joint inspection.
- (ii) The outage period i.e. period from the date of failure till unit is repaired/replaced shall not be counted for arriving at the guarantee period.
- (iii) In the event of the supplier's inability to adhere to the afore said provisions, suitable penal action will be taken against the supplier, which may interalia include blacklisting of the firm for future business with the purchaser for a certain period.

24. SCHEDULES: The bidder shall fill in the following schedules as provided in Annexure-IX which will be part of the offer. If the schedule are not submitted duly filled in with the offer, the offer shall be liable for rejection.

Schedule-A : Guaranteed Technical Particulars

Schedule-B : Schedule of Deviations

25. DEVIATIONS:

- (i) The bidders are not allowed to deviate from the principal requirements of the Specifications. However, the bidder is required to submit with his bid in the relevant schedule a detailed list of all deviations without any ambiguity. In the absence of a deviation list in the deviation schedules, it is understood that such bid conforms to the bid specifications and no post-bid negotiations shall take place in this regard.
- (ii) The discrepancies, if any, between the specification and the catalogues and/or literatures submitted as part of the offer by the bidders, shall not be considered and representations in this regard shall not be entertained.
- (iii) If it is observed that there are deviations in the offer in guaranteed technical particulars other than

those specified in the deviation schedules then such deviations shall be treated as deviations.
(iv) All the schedules shall be prepared by vendor and are to be enclosed with the bid.

PAINTING - TRANSFORMER MAIN TANK, PIPES, CONSERVATOR TANK, RADIATOR ETC.

| Parts | Surface Preparation | Primer Coat | Intermediate under coat | Finish coat | Total DFT | Colour shade |
|---|-------------------------------|--|--|---|----------------|------------------------|
| Main tank, pipes, conservator tank, etc. (External surfaces) | Blast cleaning Sa2½ | Epoxy base Zincprimer 30-40 micron | Epoxy base Zinc primer 30-40 micron | Aliphatic Polyurethane (PU Paint) (min 50 micron) | Min 110 micron | 541 shade of IS:5 |
| Main tank, pipes (above 80 NB), conservator tank, etc (Internal surfaces) | Blast cleaning Sa2½ | Hot oil resistant, non-corrosive varnish or paint | -- | -- | Min 30 micron | Glossy white for paint |
| Radiator (External surfaces) | Chemical/ blast cleaning Sa2½ | Epoxy base zinc primer 30-40 micron | Epoxy base Zinc primer Min. 30-40 micron | Aliphatic Polyurethane (PU Paint) min 50 micron | Min 110 micron | 541 shade of IS:5 |
| Radiator and pipes up to 80 NB (Internal surfaces) | Chemical cleaning if required | Hot oil proof low viscosity varnish or hot oil resistant non corrosive paint | -- | -- | -- | Glossy white for paint |

Note: Bidder shall submit General Technical Particulars (GTP) of materials being offered in the bid as per Annexure-XII along with a valid type test reports for the same design from CPRI/ERDA/NABL accredited laboratory not older than 5 (Five) years and shall be valid at the time of inspection and supply of materials.

Note: Specification of any item not mentioned in NIT, the same shall be as per relevant BIS/ IS/IEC standards/ as per latest or approved practices of DISCOM.

C. 16 & 25 KVA L.T. DISTRIBUTION BOXES

This specification covers the design, manufacture, inspection, testing at manufacturer's place and supply of L.T. Distribution Box with energy meter for 10, 16 & 25KVA transformers. Distribution Boxes shall be used for controlling the L.T. feeders from the L.T. side of Distribution Transformers. The system shall be A.C. 3-phase, 4 wires, 415V or AC single phase 2 wires, 230V, 50 Hz with effectively grounded neutral.

1. SERVICE CONDITIONS:

The equipment to be supplied against this specification shall be suitable for satisfactory continuous operation under the climatic conditions of North-eastern states (including Sikkim).

2. SYSTEM DETAILS:

Distribution Boxes are meant for metering, control and protection of Distribution Transformers with relevant parameters as under:

| S. No. | Transformer Capacity kVA | Full Current Amps | Incoming Circuit Configuration | Outgoing Circuits Configuration |
|--------|--------------------------|-------------------|--------------------------------|---------------------------------|
| 1 | 16 KVA (3-Phase) | 22 Amp | 25 A TPN MCCB | 6 x 16 A SP MCCB |
| 2 | 25 KVA (3-Phase) | 34 Amp | 40 A TPN MCCB | 6 x 25A SP MCCB |

Each Distribution box shall have provision for fixing of three phase tri-vector energy meter/single phase meter for DT metering depending upon capacity and type of transformer, 1No. single pole Neutral (SPN)/Three Pole Neutral (TPN) MCCB at incoming and 2 & 6 Nos. single pole MCCB at outgoing circuit as per above table. Incoming and Outgoing MCCB shall be connected through insulated connectors. Cable from the Distribution Transformer shall be connected to the incoming MCCB through energy meter. Cables from the outgoing terminals of the incoming MCCB shall be connected respectively to the R-Y-B Phase and Neutral terminals of the insulated bus bars or insulated Multiple Outgoing Connectors. Cables from insulated bus bars or insulated Multiple Outgoing Connectors shall be connected to the outgoing MCCBs. Aluminium cable of 16mm² for 10 KVA / 16KVA and 35mm² for 25KVA transformer shall be used. Cable shall be fixed with bus bar or connectors with minimum two screws of size not less than M6. Insulation provided shall be such that no live part including the screws for holding the cable shall be accessible by hand/finger.

3. MCCB:

MCCB shall be of reputed make and shall confirm to latest IS. MCCB shall be of fixed rating type. MCCB shall have rated service short circuit breaking capacity of 10 KA at 0.4 P.F. (lag) with rated insulation voltage of 660 V. The time current characteristics of MCCB shall be as per the following details:

| Multiple of normal Current Setting | Tripping Time |
|------------------------------------|---|
| 1.05 | More than 2.5 hrs. |
| 1.2 | More than 10 minutes and less than 2 hrs. |
| 1.3 | Less than 30 minutes |
| 1.4 | Less than 10 minutes |
| 2.5 | Less than 1 minute |
| 6.0 | Less than 5 Seconds |

For above test, the reference calibration temperature of the MCCB shall be 50°C.

4. ENCLOSURE:

- (i) The enclosure shall be made up of CRCA MS sheet of 18 SWG sheet thickness for 10/16 KVA single phase and of 16SWG for 16/25KVA three phase.

- (ii) The inside dimensions of Distribution Box shall be 300 x 500 x 160mm for 10 & 16 kVA single phase transformer and 1000 x 500 x 170 mm for 16 & 25 kVA three phase Transformer. However, the dimensions of the box is for reference only, internal clearance as per our requirement shall be strictly maintained. Overall dimensions of the box shall be such that the box will withstand temperature rise limits as per IS and Company's Specification and to have sufficient space for working during maintenance. The size of the box will depend on the size of Electrical components and other relevant provision made in IS:13947/(P1,2&3), IS:2086 and IS:4237 with latest amendment if any. Adequate slope on the top of box shall be provided to drain out rainwater from the top. The body and door of enclosure shall be individually in one piece without any welding, except for fixing of the accessories like hinges, clamps, mounting clamps, bolts etc. which shall be spot welded or MIG welded only. The door of Distribution box shall be fixed on three tamper proof inside hinges not visible from outside. Hinges shall be welded from inside of the box and door shall be fixed with the two screws in each hinge. Hinges shall be made from 1.6mm MS sheet with hinge pin of diameter 3mm. The hinge pin shall have head on top so that it does not fall down during the normal usage. Base and door shall have flange / collars. Collar of Base and door shall overlap by minimum 8mm. Rubber gasket shall be provided in between base and doors, such that it provides proper sealing between the door and base of box to avoid ingress of water. Degree of protection shall be IP-33 as per IS-13947 (amended up to date). Rubber Gasket shall be fixed with suitable adhesive. Two numbers 'U' shaped latch arrangement shall be provided to seal the door with body for 10 KVA single phase and three numbers 'U' shaped latch arrangement shall be provided for 16/25KVA three phase. 2.5mm & 8mm diameter hole shall be provided in U-shaped latch for sealing wires & padlock. Holes provided for sealing & padlock should be aligned when latch is in closed position. 'U' shaped latch arrangement shall be made from 1.6 mm thick MS sheet and shall be welded from inner side of the box. U-latch shall be joined with stainless steel rivet.
- (iii) Viewing window opening of 80mm x 90mm shall be provided with toughened glass of 5mm thickness. Size of glass shall be 100mm x 110mm. Glass shall be provided with a wraparound single piece rubber gasket (without joint) having minimum depth of 8mm made from good quality rubber so that it can withstand weather effect. Glass along with rubber gasket shall be fixed from inside of the door of distribution box with powder coated glass holder made of 20 SWG MS sheet without any welding joint and by draw process. Glass holder shall be fixed with minimum four welded screws & nuts from inside and not visible from outside.
- (iv) Mounting arrangement of the meter: It should be raised from the base of box by 15mm (minimum). It should be suitable for different makes of meters. Galvanized/Zinc Plated adjustable strip shall be provided on meter mounting arrangement for fixing of the meter. Three mounting MS screws, one for upper hanger (M4 threads x length 12mm) & two (M4 threads x 25 or 35mm length) in moving slotted flat shall be provided for fixing of the meter.
- (v) Two sets of Louvers (One set on each side) shall be provided. The perforated sheet of 20 SWG CRCA MS shall be welded from inside of the louvers.
- (vi) The surface of the enclosure shall be properly Pre-treated / Phosphated in a 7-Tank process and shall be applied with a powder coating of about 40 micron thickness. The powder coating shall be of Light Admiralty Grey colour shade (IS-5:1993 Colour No. 697). Powder coating shall be suitable for outdoor use. Rating and Type of distribution box shall be printed or embossed on the door of the distribution box.
- (vii) EC grade Aluminium Bus bars of 100mm² (minimum) for Phase and Neutral, capable of carrying full load current shall be provided. Bus bar shall be completely insulated such that no live part

including screws are accessible by hand/finger after fixing of cables. Insulation shall be Fire retardant. Bus bars shall be isolated with respect to body. Two earthing bolts of diameter 10mm and 25mm long shall be welded from inside of the box and shall be provided with 2 nuts & washer. Earth marking shall be duly embossed near the earth bolts. There shall be no powder coating on the earthing bolts.

- (viii) 1 No. Incoming & 2 Nos. outgoing cable holes shall be provided. Cable holes shall be provided with superior quality rubber cable glands of internal diameter 30mm. Rubber glands shall be made such that internal diameter of glands provided for cables should be closed with the rubber film of minimum 1mm thickness. Cable will go through the glands by piercing the film of the glands.
- (ix) For mounting of box on pole, four holes shall be provided the back side of the box.
- (x) Danger marking shall be provided on the box in red color.
- (xi) Name of Utility and name of scheme i.e. DDUGJY shall be embossed on the distribution box.
- (xii) Each distribution box shall be supplied with proper packing in 3 ply corrugated box.
- (xiii) Tolerance permissible on the overall dimensions of box shall be $\pm 3\%$.

5. FINISHING OF DISTRIBUTION BOX: The surface of the box shall be properly pretreated/ phosphated in 7-tank process and shall be applied with powder coating. The process facility shall be in house of the manufacturer to ensure proper quality for outdoor application.

6. ACCEPTANCE TESTS :

Following acceptance tests shall be carried out while inspecting lot of material offered:

a. Visual Examination:

The Distribution box shall be inspected visually, externally and internally for proper Powder Coating layer, fitting of all the components in accordance with technical Specification.

b. Verification of dimensions:

Verification of dimensions, external/ internal clearances will be carried out as per technical specifications.

c. Verification of fittings:

Components like insulated bus bars, MCCBs, Hinges, Rubber Glands etc. will be verified as per technical specification.

d. High voltage withstand test at 2.5KV:

The A.C. voltage of 2.5KV, 50HZ shall be applied for one minute as follows:

- i. Between Live Parts of each insulated bus bar.
- ii. Between each insulated bus bar and earthing screw/bolts.
- iii. On bus bar insulation.
- iv. On PVC coating of PVC cables.

There shall not be any puncture or flash over during this test.

e. MCCB:

Time current characteristics of each rating of MCCB shall be checked as per the requirement of the specifications.

f. Current Carrying Capacity:

The current of 200 Amp shall be applied for 30 minutes through high current source on each insulated bus bar. There shall not be overheating of the insulated bus bars during this test.

7. TESTING & MANUFACTURING FACILITIES: The Tenderer must clearly indicate what testing and manufacturing facilities are available in the works of manufacturer and whether the facilities are adequate to carry out all Routine & Acceptance Tests. These facilities should be available to inspection Engineers, if deputed to carry out or witness the tests in the manufacturer's works. The tenderer must have all the in-house testing facilities to carry out the acceptance tests on the Box.

8. TESTS: The Distribution box shall comply with the requirement of IP33. Each type of LV Switchboard shall be completely assembled, wired, adjusted and tested at the factory as per the relevant standards and during manufacture and on completion.

i) Routine Test

The tests shall be carried out in accordance with IS 13947 and 8623 include including but not necessarily limited to the following:

(a) Visual Check

(b) Verification of Component Rating

(c) Other Checks

- Easy Accessibility and Maintenance
- Color Coding provided by colored tapes.
- Bus bar dimensions
- Degree of Protection check by paper.

(d) Dimension check

(e) Insulation Resistance Tests

(f) Mechanical Operation Tests

(g) Bus bar support and clearances

(h) Continuity of circuits and Function

(i) Powder Coating

(j) Overload Release setting of the Circuit Breakers

ii) Type Test

The box shall be fully type tested as per the requirement of IS 13947 (Part-1):1993 with latest amendment. The type test shall be carried out from the Govt. approved laboratories duly accredited by National Board of Testing & Calibration Laboratories (NABL) of Govt. of India. Type test report shall be submitted to RECPDCL along with bid. The type test reports shall not be older than 5 (Five) years and shall be valid at the time of inspection and supply of materials.

9. Prototype & Drawings:

The manufacturer has to manufacture the prototype Unit for each rating as per this specification before bulk manufacturing. The manufacturer should intimate the readiness of prototype to employer. The Project Manager will inspect the prototype for approval. The manufacturer should submit the final drawings in line with this specification and prototype to employer for approval before bulk manufacturing. The approval of prototype & drawings shall be a responsibility of manufacturer/Contractor.

D. 63 KVA L.T. DISTRIBUTION BOXES

This Specification covers the design, manufacture, testing at works and supply of Distribution Boxes made out of CRCA MS for controlling the L.T. feeders from the L.T. side of Distribution Transformers. The system shall be A.C. 3 phase, 4 wire, 415 V, 50 HZ with effectively grounded neutral.

1. SERVICE CONDITIONS:

The equipment to be supplied against this specification shall be suitable for satisfactory continuous operation under isoceraunic and ambient conditions as prevailing in the North Eastern states (including Sikkim). Moderately hot and humid tropical climate conducive to rust and fungus growth.

2. SYSTEM DETAILS:

Distribution Boxes are meant for control and protection of Distribution Transformers with relevant parameters as under:

| S. No. | Particulars | Details |
|--------|--|-----------------------------------|
| 1 | KVA rating | 63 KVA |
| 2 | Voltage | 415 V, 3 Ph, (3x 250 V) |
| 3 | Frequency | 50 HZ |
| 4 | Phases | 3 phase, solidly grounded neutral |
| 5 | Approximate full load current of transformer | 84 A |
| 6 | No. of Outgoing circuits | 2 nos. |

3. APPLICABLE STANDARDS:

- IS:13947/ (Part 3) (amended up to date) for Isolator (Switch Disconnecter).
- IS: 13947/ (Part2) (amended up to date) for L.T. MCCBs.
- IS: 8623 (amended up to date) for enclosure Box & for degree of protection provided by enclosures of electrical equipments.
- IS: 4237, IS:8623 (amended up to date) – for general requirement of L.T. switchgears.
- IS: 13703 (Part I & II amended up to date) for HRC Fuse Base and HRC Fuse Link.
- IS: 5 /2007 -Colours of Ready Mixed paints and Enamels.
- IS: 13871/1993 (amended up to date) – Powder coatings – specifications .
- IS : 6005/1998 (amended up to date) – Code of Practice for phosphating of iron and steel.

- IS: 13411/1992 (amended up to date) – Glass Reinforced Polyester Dough Moulding Compounds

4. MANUFACTURE/CONSTRUCTION OF BOXES:

Distribution Boxes shall have Isolator (Switch Disconnecter) and HRC fuse base with links on incoming circuit and single pole MCCBs & Link Disconnecter on outgoing circuits with necessary interconnecting Bus Bars/ Links. Standard General Arrangement of Isolators, HRC fuse base with links, MCCBs, Link Disconnecter, Neutral Links, Bus Bars, connecting links, Cable termination arrangement etc. inside the Box shall be done by the manufacturer.

5. INCOMING CIRCUIT:

(i) Isolator (Switch Disconnecter):

- Each distribution box shall have one triple pole Isolator (Switch Disconnecter), conforming to relevant latest IS. The supplier shall indicate makes and types of offered isolator in GTP. The supplier shall submit Type Test Report of the Isolator as specified in Cl. No. 13.C (ii) in this specification for approval of Employer before commencement of production. The Switch disconnecter to be provided in the Distribution Box will be as per Employer specification.
- The Isolator should be front operated triple pole type. The casing of Isolator shall be of non-tracking, heat resistant insulating material of Dough Moulding Compound (DMC) of D3 Grade as per IS:13411 (amended upto date), no separate enclosure is required. Isolator Base should withstand the breaking capacity of 80 kA. To extinguish the arc immediately in isolators, in each phase arc-chutes with minimum 12 strips shall be provided.
- The isolator shall be robust in construction and easy for operation. The handle of the isolator should be detachable easily for security purpose while working on L.T. circuits.
- The characteristics of Isolator shall be as follows:

| S. No. | Characteristics | Rating |
|--------|---------------------------|--|
| | | 63 KVA |
| 1 | Basic uninterrupted duty | 200 A |
| 2 | Mechanism | Manual quick make quick break |
| 3 | Standard applicable | IS : 13947 amended upto date |
| 4 | Utilization category | AC –23 A |
| 5 | Mechanical Endurance | As per IS 13497 amended upto date |
| 6 | Electrical Endurance | As per IS: 13947 amended upto date |
| 7 | Rated Duty | Uninterrupted |
| 8 | Making /Breaking capacity | Not less than requirement of AC –23 A category |
| 9 | Two seconds rating | 4 KA |
| 10 | Rated insulation voltage | 660 V |

- The terminal connector strips of the isolator shall be projecting out of isolator of 80 mm (minimum) in length on cable connection side and 60mm (minimum) on HRC fuse base side. In 63 & 100 KVA distribution box, the cross section of the strips on outside of the isolator shall be provided as below:

63 KVA - 25X5 mm.

- The material of isolator strips shall be EC grade tin-plated copper. The terminal strips shall be continuous from the point of contact separation inside the Isolator with cross section as mentioned above throughout the length. Gap of 50mm shall be maintained between each terminal throughout the length.

(ii) **HRC FUSE:**

HRC Fuse of suitable capacity shall be provided between outgoing terminal of Switch Disconnecter (Isolator) and incoming Busbar to facilitate electrical breaking of the circuit. Each Distribution Box shall have 3 Nos. of HRC Fuse Base with HRC Fuse Links (Blade type Contacts).

The supplier shall indicate in GTP, the make, type and capacity of HRC Fuse Base and Fuse Links offered.

a. **HRC FUSE BASE**

- The base of the HRC Fuse shall be of non-tracking, heat resistant insulating material of Dough Moulding Compound (DMC) of D3 Grade as per IS:13411/1992. The Fuse Base shall be sturdy in construction.
- The extension terminal connector strips of the Fuse Base shall be projecting out on both sides, made with two pieces (half portion of the terminal contact and extension strip should be continuous in one piece), as shown in the drawing. The dimensions shall be as shown in the drawing. The material for both strips shall be tin plated EC Grade copper. HRC Fuse Base & fuse link should have withstand the breaking capacity of 80 kA.
- HRC Fuse base shall be suitable for fuse of 200A for 63/100 KVA distribution box.

b. **HRC FUSE LINK**

- The HRC Fuse Links shall be sturdy in construction of "Din Type". Breaking Capacity shall be 80 kA. For fault indication red pop up indicator should come out instantly on fusing. Manufacturer's name, current rating, breaking capacity and type shall be marked on HRC fuse link.
- HRC Fuse link Current rating for 63/100 /200 KVA distribution box shall be as follows:

63 KVA - 100 A

- The supplier shall submit Type Test Report of the HRC fuse base and HRC fuse link as specified in Cl. No. 13.C (iii) in this specification for approval of Employer before commencement of production. The HRC fuse base with links to be provided in the Distribution Box will be as per Employer approval given in the detailed purchase order.

6. OUTGOING CIRCUITS:

(i) **MCCBs**

- Each distribution box shall have 6 nos. of single-pole MCCBs in 63 KVA Box, 9 nos of single-pole MCCBs in 200 KVA box to protect outgoing circuits. MCCB shall be of reputed make and shall confirm to latest IS. The supplier shall indicate the makes and types of MCCBs offered in GTP. The supplier shall submit Type Test Report of the MCCB as specified in Cl. No. 13.C (iv) in this specification for approval of Employer before commencement of production. The MCCBs to be provided in the Distribution Box will be as per Employer approval as given in the detailed purchase order.
- MCCB shall have quick make quick break mechanism. Making of MCCB shall only be manual but breaking of MCCBs shall be electrical as well as manual.
- The detailed specification for MCCBs shall be as under:

| S. No. | Particulars | Details |
|--------|-------------|---------|
| 1 | KVA rating | 63 KVA |

| | | |
|---|---|---------------------------|
| 2 | Rated current | 150 A |
| 3 | Fixed overload release setting (A) | 60 A |
| 4 | No. of poles | Single pole |
| 5 | Rated service short circuit breaking capacity (kA) which is equal to ultimate breaking capacity as per IS 13947 (amended up to date) | 10 KA at 0.4 p. f. (lag) |
| | The sequence of operation for this test shall be, O - t - CO - t - CO, and t = 3 min.). The test shall be done at 250V at 0.4 p. f. (lag). Voltage rating phase to phase 433 V and phase to earth 250V. | |
| 6 | Power factor for short circuit (Max.) | 0.4 lag |
| 7 | Utilization category | A |
| 8 | Rated Insulation Voltage | 660 V |

- The Busbar dropper and Terminal connection strip of Link Disconnecter shall be placed in contact terminal of MCCB.
- The rated service short circuit breaking capacity as specified above, shall be based on the rated service short circuit test carried out at specified power factors.
- To extinguish the arc immediately in MCCBs, arc-chutes with minimum 8 strips shall be provided.
- While the above stipulation regarding the test power factor and the sequence of operation shall be binding, the other procedure for making the short circuit test and circuit etc. shall generally be in accordance with the Indian Standard applicable to the type of circuit breakers under test.

(ii) TIME CURRENT CHARACTERISTICS OF MCCB:

The L.T. MCCBs shall have time current characteristics as follows:

| Multiple of normal Current setting | Tripping time |
|------------------------------------|---|
| 1.05 | More than 2.5 hrs. |
| 1.2 | More than 10 minutes and less than 2 hrs. |
| 1.3 | Less than 30 minutes |
| 1.4 | Less than 10 minutes |
| 2.5 | Less than 1 minute |
| 4.0 | Not less than 2 seconds |
| 6.0 | Less than 5 seconds |
| 12.0 | Instantaneous (less than 40 milli seconds.) |

For above time/current characteristic, the reference calibration temperature of the breaker shall be 50°C. Deration, if any, up to 60°C. Ambient temperature shall not exceed 10% of the current setting indicated above.

7. LINK DISCONNECTOR:

Link Disconnecter of 200 A capacity shall be provided between outgoing terminal of MCCB & cable connection to facilitate mechanical breaking (manual isolation) of the circuit. 63 & 100 kVA Distribution Box shall have 6 Nos. of link Disconnectors. 200 kVA distribution box shall have 9 nos of link Disconnectors

- The supplier has to indicate the makes and types of Link Disconnectors offered in GTP. The supplier shall submit Type Test Report of Link Disconnector as specified in Cl.No. 12.3 (V) for approval of Employer before commencement of production. The link Disconnectors to be provided in the Distribution Box will be as per EMPLOYER's approval as given in the detailed purchase order.
- The base of the Link Disconnector shall be of non-tracking, heat resistant insulating material of Dough Moulding Compound (DMC) of D3 Grade as per IS:13411 (amended upto date). The Link Disconnector shall be sturdy in construction and easy in operation.
- The link of Link Disconnector shall be of Tin-plated E.C. grade copper. The construction of the Link Disconnector shall be such that it shall be hinged type on cable connection end and disconnectable at the MCCB end. The disconnection will be with the help of special handle/puller. One handle/puller shall be supplied alongwith each Distribution Box. The terminal connector strips of the Link Disconnector of 25 x 3 mm cross section, shall be projecting out of Link disconnector for minimum length of 80 mm. on cable connection side and 40 mm on MCCB outgoing side. The cross section of knife edge link shall be 20 x 5 mm. The material for both the strips and links shall be tin-plated E.C. grade copper. The size of bimetallic lugs hole & the hole on the disconnectors strip on cable side should be same.

8. BUSBARS AND CONNECTIONS:

- The Incomer feeder should be on right side of the distribution box and all outgoing feeders will be on left side of the distribution box, with phase sequence RYB to be maintained. The phase busbars, incoming droppers and feeder droppers from busbars shall be of EC Grade Aluminium. The phase busbar strips shall be of size 25X8 mm for 63 KVA & 100 KVA and 40X10 mm for 200 KVA. Feeder droppers shall be 25X8 mm. Incomer dropper of 25 x 8 mm cross section for 63 KVA & 100 KVA box and 40 x 10 mm cross section for 200KVA box. All busbars and droppers shall be properly drilled and de-burred. Each bus bar shall be of one single strip without any joint.
- Busbars shall be provided with durable PVC insulating sleeves of standard colour code for different phases. Corrugated/Spring & Plain washers shall be used for Nut-Bolt connections.
- Busbars shall be mounted on suitable size support insulators which should be tightened from inside. i.e. once fitted, should not be able to removed.
- Minimum clearances, wherever shown, shall be as per General Arrangement. Other clearances shall be as per requirement of IS: 4237 amended up to date.

9. ENCLOSURE:

- (i) The Box & Doors shall be made up of CRCA MS sheet of 2mm thickness.
- (ii) The welding process of distribution boxes shall be done by MIG (Metal Inert Gas) welding and workmanship/finishing should be good enough.
- (iii) The general clear dimensions of 63 KVA & 100 KVA Distribution Box shall be 1000 x 1010 x 325 (LXHXW) mm. The center height of distribution box on front side shall be 1000 mm. The center height of the distribution box on front side shall be 1050 mm. general clear dimensions of 200 kVA distribution box shall be 1305 x 1050 x 325 (LXHXW) mm and for 315 kVA distribution box shall be 1545 x 1050 x 325 (LXHXW) mm. The center height of the distribution box on front side shall be 1050 mm.
- (iv) The Base and doors of enclosure shall be individually in one piece without any welding, except for fixing of the accessories like hinges, clamps, mounting clamps, bolts etc.
- (v) 63 KVA & 100 KVA boxes shall have two doors fixed on right & left side of the box with four hinges provided from inside of box. On closing of doors, right door shall rest on the left door. Hinges shall not be visible and approachable after closing the box.
- (vi) 200 KVA boxes shall have two doors as shown in drawing fixed on right side & left side of the box with four hinges on both sides shall be provided from inside of box. On closing of doors, right door

- shall rest on the left door. Hinges shall not be visible and approachable after closing the box.
- (vii) Base and doors shall have flange / collars. Collar of Base and doors shall overlap by 10mm. Rubber gasket of suitable size shall be provided in between base and doors, such that it provides proper sealing between the door and base of box to avoid penetration of dust & ingress of water. Degree of protection shall be IP- 33 as per IS-8623 (amended up to date). Rubber Gasket shall be fixed with suitable adhesive. Four hinges on each side shall be provided from inside of the box to fix the doors. Hinges shall be minimum 50 mm in length & made from 2mm thick sheet. Hinge stainless steel pin diameter shall be 4mm. The hinges shall not be visible from outside.
 - (viii) The MCCBs, Link Disconnect, Isolator and HRC fuse base with link shall be housed inside the enclosure. Isolator operating handle shall be accessible only after opening of the doors.
 - (ix) Four set of Louvers (two sets on each side) of suitable size shall be provided. The louvers shall be provided such that heat dissipation is proper. The perforated sheet of 20 SWG with 2.5 mm holes shall be welded from inside of the louvers.
 - (x) Mounting of components inside the enclosure shall allow free air circulation keeping the clearances as per specification.
 - (xi) **Locking Arrangement to the Box:** The doors shall be closed with a push fit locking arrangement such that on pressing/pushing the right door, the distribution box gets locked from inside from top & bottom. This arrangement shall be operational for opening of the door with a handle provided outside the door. Handle shall be removable type only. A Nylon washer shall be provided between the handle and door to avoid penetration of water. One central lock with brass levers shall be provided inside the door. Key way shall be provided on the door for operating the central lock from outside. Key way shall be provided with cover.
 - (xii) A suitable cable termination arrangement with support insulators shall be provided on Isolators and Link Disconnects. The bimetallic lugs of adequate size, as per enclosed specification, shall be provided. Clearances, Creepages and convenience in making connections shall be ensured.
 - (xiii) EC grade Aluminium Neutral Busbar of 300 x 25 x 8 mm for 63 KVA & 100 KVA box and 525 x 40 x 10 mm for 200 KVA box capable of carrying for full load current. Neutral Busbar shall be isolated with respect to body. The bimetallic lugs of adequate size, as per enclosed specification, shall be provided. Neutral Busbar shall be as per the specifications.
 - (xiv) Bolts of M10 mm and 35 mm length with 2 Nos. plain washer and two Nos. nut are to be provided on both the sides for earthing of the distribution box. Earthing bolt is to be fixed on U-structure (Earth Clamp) welded on both sides of the distribution box. Thickness of earth clamp shall be 2mm. The top surface of the earth clamp shall be properly Zinc plated. Earthing nut bolt and washer should be zinc plated. There should be no powder coating on top surface of the earthing clamps.
 - (xv) Three bottom plates for 63 KVA & 100 KVA and 4 bottom plates for 200 KVA shall be provided for incoming and outgoing cables. Bottom plate of size 125mm x 125mm fixed with four screws from inside shall be provided for incoming and outgoing cables. Bottom plates shall be provided with suitable holes and rubber glands for the cables. Rubber glands shall be made such that internal diameter of glands provided for cables should be closed with the rubber film of minimum 1mm thickness. Cable will go through the glands by cutting the film of the glands. Bottom plates shall also be provided with cable clamps.
 - (xvi) Necessary fixing arrangement shall be provided at the back of the enclosure to ensure proper fixing on double pole structure by means of suitable clamps at 4 places.
 - (xvii) Danger marking shall be provided in red colour on the right door of the distribution box. Marking shall be scratch proof and properly readable.
 - (xviii) All the components inside the Box shall be mounted on CRCA MS strips of 2mm thickness. The mounting strips shall be provided with required bends or ribs to give the extra strength and shall be powder coated or zinc plated.
 - (xix) All joints of current carrying parts shall be bolted with 8.8 grade High Tensile MS Nuts & Bolts, Corrugated/spring & Plain Washers. The nuts & bolts should be of hexagonal type. All the nuts, bolts & washers should be properly zinc plated.
 - (xx) Each distribution box shall be supplied with proper packing in five ply - corrugated box.

- (xxi) Name plate having details such as Month & year of manufacturing, Sr. No., and rating of Distribution box, "Name of Employer" shall be riveted on the Distribution box door. Name of Manufacturer shall be duly embossed on the door of the distribution box. The name plate should be of stainless steel of thickness 1 mm.
- (xxii) Incoming and outgoing circuit should be duly highlighted with paint by stencil printing.
- (xxiii) Adequate slope on the top of box shall be provided to drain out rainwater from the top.
- (xxiv) 3 Nos. MCCBs and 3 Nos. HRC fuse links in spare should be invariably provided with each box.
- (xxv) Good-quality plastic sticker leaflet should be pasted inside of distribution box door. The matter of instruction leaflet shall be provided by the employer. All the instructions in leaflet should be in Hindi/English/Local language.

10. CABLE TERMINATION:

Adequate size of Bi-metallic lugs shall be provided for 3½ core, LT XLPE cable on incoming side and outgoing side for 63/100 KVA boxes as below:

| | Incoming side | Outgoing Side |
|--------|---------------|---------------|
| 63 KVA | 70 sq.mm | 50/ 70 sq.mm |

11. LUG:

Bimetallic lug should be made for electrolytic grade aluminum. Each lug should be copper coated by electrolytic process and rich layer of tin should be mounted throughout the lug to protect from Galvanic Corrosion. The lugs shall be such that the rich layer of tin should not peel off during operation. Individual lot should be pre filled with conductive inhibition compound and lug should be duly capped to prevent oozing of compound. The ductility of material should be such that flow ability of material be adequate to flow in to the strand of the conductor and withstand on crimping pressure of 8500 PSI. The cut cross section of the joints shall be homogeneous.

12. FINISHING OF DISTRIBUTION BOX:

The outer side and inside surface of the box shall be properly Pre-treated /Phosphated in seven tank process as per IS: 6005 and shall be applied powder coating of minimum 40 micron thickness. The Colour shade of light Admiralty gray (as per employer requirement) for 63, 100, 200 and 315 KVA box as per IS: 5/2007 (Colours of Ready Mixed paints and Enamels) shall be applied inside & outside surface of the box or as per state practice. Powder coating shall be suitable for outdoor use, conforming IS: 13871 (amended upto date) – Powder coatings. The process facility shall be in-house to ensure proper quality for outdoor application.

13. TESTS & TEST CERTIFICATES:

In case of bought out items, routine and acceptance tests as per relevant IS and this specification shall be carried out at the original manufacturers' works.

a) Routine Test (Carried out on all boxes):

- Overall Dimensions Checking.
- Insulation Resistance Tests.
- High Voltage Test at 2500 V, 50 Hz AC for one minute.
- Operation Test on MCCB/Isolator/Link Disconnectors / HRC fuse base and fuse links.

b) Acceptance Tests (on complete Distribution Box):

Following tests shall be carried out as per acceptance tests in addition to routine tests on one random sample of each rating out of the lot offered for inspection:

(i) Temperature rise test on one sample of each rating:

Temperature rise test will be carried out as per the procedure given below:

For temperature rise test, a distribution box with all assembly of MCCBs / Link Disconnectors / Isolator / HRC fuse base with link shall be kept in an enclosure such that the temperature outside the box shall be maintained at 50 ° C.

20% more current than transformer secondary capacity i.e. for 63 KVA Distribution Transformers full load current 84A, 20 % more is 100 A shall be kept in incoming circuit keeping outgoing circuits short, till the temperature stabilizes and maximum temperature rise should be recorded.

(ii) Time-Current Characteristics:

The MCCB should be tested for time current characteristics at 1.05 & 1.2 times of overload release setting current and should pass the requirement given in Cl. No. 6 (ii) in this specification.

c) TYPE TESTS:

(i) On complete box:

- Temperature rise test: The temperature rise test should be carried out as per IS: 8623.
- High voltage test shall be carried out as per IS:8623 amended upto date.
- Short Time Withstand Current Test on Distribution Box shall be carried out as per IS 8623 or latest version.
- The Distribution Box should be subjected to Short Time Withstand Current Test for 4KA for 2 seconds for 63/100 KVA Box) all the circuits independently. The test should be carried out after by- passing MCCBs.
- Degree of protection for **IP-33** on complete box shall be carried out as per IS: 13947/1993 or the latest version thereof.
- Time /current characteristic test on MCCBs shall be carried out as per Cl. No. 6 (ii) in this specification.

(ii) On isolator (switch disconnecter):

All type tests on Isolator (Switch Disconnecter) as per IS: 13947 (Part III) amended up to date shall be carried out.

(iii) On HRC fuses base and HRC fuse links:

All type tests on HRC fuses and HRC fuse links IS 13703 (Part I & II amended up to date) for HRC Fuse Base and HRC fuse link shall be carried out.

(iv) On MCCB:

All type tests on MCCB as per IS-13947 amended up to date shall be carried out.

(v) On Link Disconnecter:

Following tests shall be carried out on link disconnecter as per IS:

- Short Circuit Withstand Strength.
- Temperature rise Limits.
- Mechanical Operations.

14. TYPE - TEST CERTIFICATES:

The Distribution Box, Isolator (Switch Disconnecter), HRC fuse, HRC Fuse Link and MCCB offered shall be fully type tested as per relevant IS and this specification. The Supplier shall furnish detailed type test reports before commencement of production. The detailed Type Test Reports shall be furnished with relevant oscillogram and certified Drawings of the equipment tested. The purchaser reserves the right to demand repetition of some or all the Type Tests in presence of purchaser's

representative at purchaser's cost.

All the type tests shall be carried out from laboratories accredited by National Accreditation Board of Testing And Calibration Laboratories (NABL), Department of science & technology, Govt. of India to prove that the complete Box, Isolator, HRC fuse, Link Disconnecter & MCCB meet the requirements of the specification. The Manufacturer should also furnish certificate from laboratories that laboratories are having all the requisite test facility available in house. The type test Reports conducted in manufacturers own laboratory and certified by testing institute shall not be acceptable.

The Supplier should furnish the particulars giving specific required details of Distribution Boxes, MCCBs, Isolator and Link Disconnecter.

15. TESTING & MANUFACTURING FACILITIES:

Supplier must be an indigenous manufacturer. The Supplier must clearly indicate what testing facilities are available in the works of manufacturer and whether the facilities are adequate to carry out all Routine & Acceptance Tests. These facilities should be available to Employer's Engineers, if deputed to carry out or witness the tests in the manufacturer's works. The supplier must have all the in-house testing facilities to carry out the acceptance tests on the Box.

The supplier shall furnish detailed process of manufacturing & Powder coating.

16. PROTOTYPE & DRAWINGS:

The manufacturer has to manufacture the prototype Unit for each rating as per this specification before bulk manufacturing. The manufacturer should intimate the readiness of prototype to employer. The Project Manager will inspect the prototype for approval. The manufacturer should submit the final drawings in line with this specification and prototype to employer for approval before bulk manufacturing. The approval of prototype & drawings shall be a responsibility of manufacturer/Contractor.

E. THREE PHASE 4 WIRE L.T. DISTRIBUTION BOX FOR AERIAL BUNCHED CONDUCTOR

The LT Distribution box for ABC single phase is used for Connection through overhead conductors or ABC line and for giving connections to the consumers. This specification covers the design, manufacture, inspection, testing and supply of the LT Distribution box. The LT Distribution box suited for ABC single phase cable will be installed at the Poles and it shall withstand solar radiations, rain, wind pressure and pollution.

1. CONSTRUCTIONAL AND TECHNICAL PARTICULARS:

- The Distribution Box shall be made from 20 SWG CRCA MS sheet. Internal size of the box shall be 225mm x 285mm x 120mm as shown in drawing. Roof of the box shall be tapered on both sides to drain the rain water.
- Distribution Box shall have insulated Multiple Outgoing Connector for Phase and Neutral. Each Multiple Outgoing Connector shall have arrangement for one incoming cable of Single phase of size up to 25/35mm² and 4-8 outgoing cables of single phase of size up to 10mm². Each Incoming & outgoing cable shall be fixed inside the Multiple Outgoing Connector by two screws of size not less than M6. The Multiple Outgoing connector shall be such that the outgoing cables can be fixed or removed easily without disconnecting the power supply. No current carrying part shall be approachable by hand or finger. Any current carrying part should be at a minimum distance of 5mm from the outer edge of the insulation. Insulation shall be Fire retardant.

- Multiple Outgoing Connectors shall be mounted horizontally. Mounting arrangement shall be such that minimum clearance of 40mm is maintained between phase and neutral. Fixing of Multiple Outgoing Connectors preferably shall be non-removable type to avoid theft of connectors.
- Box shall be provided with U-latch sealing arrangement. A hole of 8mm & 2.5mm shall be provided in the U-latch to provide a padlock & sealing of the box respectively. U-latch shall be joined with stainless steel rivet. Box should be duly powder coated after 7-tank Phosphating process. Box should be of Light Admiralty Grey color (IS-5:1993, COLOUR NO-697). The LT Distribution box for ABC single phase shall be powder coated only. The facility for 7-Tank Phosphating and powder coating shall be in-house of the tenderer / manufacturer to ensure proper quality, since these boxes are for outdoor applications.
- One Hole for incoming cable and 8 Nos. holes for outgoing cables shall be provided on the lower wall of the box. Cable holes shall be provided with rubber / plastic glands duly pasted with the box. Incoming and outgoing cable gland shall have internal diameter of 30mm & 15mm respectively. Cable Glands shall be made such that internal diameter of glands provided for cables should be closed with the film of minimum 1mm thickness. Cable will go through the cable glands by piercing the film of the glands. Gap of minimum 100mm shall be maintained between the lower wall and neutral mounted inside the Distribution Box for easy handling of incoming and outgoing cables.
- **MARKING:** Following shall be provided on the cover of box.
 - a) Manufacturers name duly embossed
 - b) Utility name duly embossed
 - c) Name of the scheme
 - d) Danger marking in red color
 - e) Name of Scheme "DDUGJY/SAUBHAGYA".
- M.S. Earthing screw of diameter 6mm with washer shall be provided in the threads of the earth clamp welded to the main body of the box.
- The box shall comply with the requirement of IP54. The box shall be fully type tested along with dimensional drawings as per the requirement of relevant Indian Standard (latest edition) IS13947: Part-I and latest amendments. Tests shall be carried out from laboratories which are accredited by the National Board of Testing & Calibration Laboratories (NABL) of Govt. of India to prove that the complete box meet the requirement of IP54. The tests report shall be submitted along with inspection call failing which the tender of the firm shall not be opened. Government approved laboratories should be accredited by the National Board of Testing & Calibration Laboratories (NABL) of Govt. of India. The type test reports shall not be older than 5 years. In case order is placed on a firm, no change in design / manufacturer of LT Distribution box shall be allowed in supplies.
- Box shall be duly packed in 3Ply corrugated box. The tolerance permissible on the overall dimensions shall be (±) 3%.

2. TESTS:

Following tests shall be performed on the box during inspection:

(i) **Visual Examination:**

The L.T. Distribution box will be inspected visually, externally and internally for fitting of all the components in accordance with technical Specification.

(ii) **Verification of dimensions:**

Verification of dimensions, external / internal clearances will be carried out as per technical specifications.

(iii) **Verification of fittings:**

Components like insulated Multiple Outgoing Connectors, screws etc will be verified as per technical specification.

(iv) **High voltage withstand test at 2.5KV:**

The A.C. voltage of 2.5KV, 50HZ shall be applied for one minute as follows:

- a) Between each Phase.
- b) Between each Phase and earth screw.
- c) On the insulation of Multiple Outgoing Connectors.

There shall not be any puncture or flash over during this test.

F. Three Phase, Four Wire, 0.5 Class, Energy Meter for 3-Phase Distribution Transformer

1. CT REQUIREMENT

The Meter shall be supplied with four nos of C.T's with primary current capacity as required for its intended use. Since the meters are to be used with external CT of suitable ratio please refer CT specification provided separately.

Alternatively meters with Integrated CT complying with IS 13779 for outdoor installation shall be acceptable.

2. DISPLAY

The Three phase meters shall be capable to measure & display parameters as given below. The meter should have provision for automatic recording of cumulative kWh at 24 hrs on the last day of the month for each calendar month and same should go to memory.

The digitally measured and processed value shall be displayed through LCD having minimum six digits to read upto one-tenth of kWh. The minimum character height shall not be less than 7 mm.

The Meter should have appropriate facilities to be read in absence of Power Supply.

3. AUTO SCROLL DISPLAY

- i) Cumulative kWh
- ii) Instantaneous Voltages
- iii) Instantaneous Currents
- iv) Cumulative kVAh
- v) Instantaneous pf phase-wise
- vi) Power on hours

4. DISPLAY PARAMETERS (PUSH BUTTON)

The display of following parameters shall be continuously scrolling one after another thru Push Button. The scrolling time for each display parameters for minimum of 10 secs..

- i) Cumulative active Energy (kWh) for each calendar month for previous Six months.
- ii) Cumulative apparent energy (kVAh) for each calendar month for previous Six months
- iii) Maximum demand (MD) in apparent for last billing month
- iv) Maximum demand (MD) in apparent for current month

- v) Tamper Data :
 - a) Present status of Tamper
 - b) Date & time of last tamper occurrence & tamper identification.
 - c) Date & time of last tamper removal.
 - d) Cumulative tamper occurrence count.

5. LOAD SURVEY CAPABILITY & BILLING POINT REQUIREMENTS

Meter shall have load survey capabilities as per table 28 of IS 15959.

The predefined date and time for registering the billing parameters of kWh, kVAh, PF and kVA MD as well as Tamper Count and Power-On hours readings shall be 00.00 hours of the first day of each calendar (billing) month. All billing parameters shall be transferred to billing registers and shall be displayed on auto cyclic display mode referred to as "BILLING PARAMETERS".

6. INTERFACE BETWEEN METER AND CMRI

The interface between a meter and CMRI shall be with a flexible cable of adequate length having suitable female connector. This cable shall be supplied along with meter. **TAMPER & FRAUD PROTECTION**

The meter registration shall be immune to reversal in current direction. The meter shall have following anti-tamper features and shall record forward under the following conditions:

- a) Potential failure: The meter shall be capable of detecting and recording occurrences and restoration of potential failure (one phase/two phases) which can happen due to intentional / accidental disconnection of potential leads. The meter should also record event as a potential failure, when one phase line fuse failure from the main side.
- b) Current Circuit Bypass: The meter shall be capable of detecting and recording occurrences and restoration of CT circuit bypass.
- c) Current Circuit Open: The meter shall be capable of detecting and recording occurrences and restoration of opening of any one or two phases of current circuit which can happen due to intentional / accidental disconnection of current circuits. No load condition should record in meter memory as a Current circuit open event.
- d) Current Unbalance: The meter shall be capable of detecting and recording occurrences and restoration of current unbalance as an event. The above information should be possible to download from the meter through hand held unit and available at BCS end. The current unbalance more than 30 % should be recorded as an event in the meter memory.
- e) Voltage Unbalance: The meter shall be capable of detecting and recording occurrences and restoration of voltage unbalance as an event. The voltage unbalance more than 30 % should be recorded as an event in the meter memory.
- f) The meter shall comply to influence of external magnetic field (AC Electro Magnet or DC Magnet) as per IS 14697.

All types of abnormality event with date and time shall be available in the meter memory on first-in, first-out basis as per IS 15959. It shall be possible to retrieve the event data along-with all related snap-shots' data through the meter's optical port with the help of a CMRI and download the same to the BCS where it shall be available for viewing. All this information shall be available in simple and easily understandable format.

7. NON INFLAMMABILITY

The terminal block, the terminal cover and the case shall ensure reasonable safety against spread of fire. They shall not be ignited by thermic over load of live parts in contact with them. To comply with this these parts shall fulfill the conditions of the glow wire test as per IS 14697.

8. CONSTRUCTIONAL REQUIREMENTS

Meters shall be designed and constructed in such a way so as to avoid causing any danger during use and under normal conditions. The following should be ensured:-

- i. Personal safety against electric shock
- ii. Protection against spread of fire.
- iii. Protection against effects of excessive temperature.
- iv. Protection against penetration of solid objects, dust & water
- v. Protection against fraudulence
- vi. Protection against pilferage
- vii. Meter base and meter cover shall be break to open type

9. METER CASE

The meter should be housed in a safe, high grade engineering polycarbonate meter casing of projection mounting type and is dust, vermin and moisture proof, with enclosure having degree of protection conforming to IP-51 as per IS 14697. The meter case shall seal the meter such that the internal parts of meter are accessible only after breaking the seals of meter cover.

All insulating material used in the construction of meters shall be non-hygroscopic, non-ageing and of tested quality. All parts that are likely to develop corrosion shall be effectively protected against such corrosion during operating life by providing suitable protective coating.

10. COVER

The cover shall be transparent, made of UV stabilized polycarbonate / engineering plastic material, which would enable easy reading the display. It should not fade in course of time and become opaque causing inconvenience for reading.

The cover shall permit clear view of the register.

11. TERMINAL AND TERMINAL BLOCK

The meter terminal block and terminal cover shall ensure safety against the spread of fire. They should not be ignited by overload of live parts in contact with them. To comply with this, these parts shall fulfill the conditions of the glow wire test as per IS 14697.

The terminal block cover shall be fixed to the meter terminal block by at least one screw. The terminal block cover shall be provided with minimum one seal.

The meter terminal block and terminal cover shall be moulded type and made of high grade non-hygroscopic, fire retardant, low tracking, reinforced poly-carbonate (not bakelite) or equivalent high grade engineering plastic which should form an extension of the meter case and have terminal holes and shall be of sufficient size to accommodate the insulation of the conductors. The terminals shall be of suitable rating to carry 150% of I_{max} and made of electro-plated (or tinned brass). Terminals shall be of adequate size so as to ensure proper tightening of the cable and shall be of replaceable type.

12. TERMINATION

The terminals shall have suitable construction with barriers to provide firm and safe connection of current and voltage leads of stranded copper conductors or copper reducer type terminal ends (thimbles).

The manner of fixing the conductors to the terminal block shall ensure adequate and durable contact such that there is no risk of loosening or undue heating. Screw connections shall be such that the risk of corrosion resulting from contact with any other metal part is minimized. Electrical connections shall be so designed that contact pressure is not transmitted through insulating material. The meter shall have a design life of 10 years against design defects. The Manufacturer shall stand 24 months Guarantee from date of installation on the meter against any kind of failure/defects/mal-operation within above period. Meter shall be replaced by manufacturer free of cost within two months of intimation by owner / Employer.

13. CONNECTION DIAGRAM

Each meter shall be indelibly marked with a connection diagram which shall be provided on the terminal block cover. In case any special precautions need to be taken at the time of testing the meter, the same may be indicated along with circuit diagram. The meter terminals shall also be marked and this marking should appear in the above diagram.

14. TERMINAL ARRANGEMENT

Three phase: The terminal arrangement and connection diagram shall be marked in accordance with clause 7.2 of IS 14697. Terminal arrangement shall be in sequence : $I_r(in)$, V_r , $I_r(out)$, $I_y(in)$, V_y , $I_y(out)$, $I_b(in)$, V_b , $I_b(out)$, Neutral (in), V_n , Neutral(out)

15. SEALING OF METER

Reliable sealing arrangement should be provided to make the meter tamper evidence and avoid fiddling or tampering by unauthorized persons by way of providing adequate no. of seals on meter, meter terminal cover, wherever necessary. All the seals shall be provided in front side only. Rear side sealing arrangement will not be acceptable.

The manufacturer shall provide minimum two seals for the meter at the factory after calibration and testing. The meter cover shall have provision for placing minimum two nos. additional seals by the Employer. The manual switch and the terminal block cover shall be provided with minimum one seal each.

The holes for sealing wire shall be minimum 2 mm dia.

16. ELECTRO-MAGNETIC COMPATIBILITY AND INTERFERENCE

The meter shall remain un-influenced with EMI/EMC interference. The meter shall withstand impulse voltage test of 6 kV as per IS 14697-1999. It shall also withstand ac high voltage test as per IS 14697.

17. TESTS

Routine & Acceptance Tests : All routine & acceptance tests shall be carried out as stipulated in IS 14697.

Type Tests

Energy Meters offered shall be fully type tested as per IS 14697 & IS 15959 with latest amendments at any of the NABL accredited test laboratories.

Type test certificate shall not be older than 3 years from the date of bid submission. Bid shall not be accepted without valid type test certificate.

G. Conditions of Contract:

1. Sanctioned Period:

- I. Total sanctioned period for complete design, engineering, manufacture, testing and supply of single phase and three phase distribution transformers as per Scope of Work including transportation & insurance up to sub-divisional headquarters of Namsai District in Arunachal Pradesh in **15 days** from the date of issuance of Letter of Intent/Purchase Order as per below:
- II. The Bidder will submit delivery schedule of three phase distribution transformers in suitable lots along with Technical Bid in compliance with Point-I above. This will be effective subject to approval by RECPDCL.

However, RECPDCL reserves right to modify above schedule on case to case basis as per requirement of the project at its sole discretion.

2. **Insurance:** The bidder shall be responsible and take an Insurance Policy for transit for all the materials to cover all risks and liabilities for supply of materials up to destination stores. Being a difficult terrain and assignment it is desirable that a copy of insurance may be submitted to RECPDCL.
3. **Type & Quality of Materials and Workmanship:** The design, engineering, manufacture, supply, testing and performance of material shall be in accordance with latest appropriate IEC/Indian Standards as detailed in this section above. Any supplies which have not been specifically mentioned in this tender but which are necessary for the design, engineering, manufacture, supply & performance/ completeness of single phase & three phase distribution transformers shall be provided by the bidder without any extra cost and within the time schedule for efficient and smooth operation and maintenance of the system.
4. **Warranty Period:** The bidder shall guarantee the materials/ items supplied against any defect of failure, which arise due to faulty materials, workmanship or design for the entire warranty period. The warranty period shall be 18 months from the date of delivery. Warranty shall be on-site comprehensive. Bidder shall provide a warranty certificate to this effect. If during the warranty period any materials / items are found to be defective, these shall be replaced or rectified by the bidder at his own cost within 45 days from the date of receipt of such intimation from RECPDCL. In case, bidder fails to replace/rectify the defective materials, RECPDCL reserves right to purchase/rectify such materials/ items from any third party at the cost of bidder. The expenditure so incurred shall be deducted from the Bidder's pending claims, security/ performance guarantee deposit or in other lawful manner by RECPDCL.
5. **Coordination & Report:** Bidder shall inform the name, address, contact number of the Nodal Officer(s), assigned by the agency for this work, who will report about their weekly/ fortnightly progress & performance of the assignment. In case, absence of any information is adversely affecting the progress of work, the issue could be escalated to Addl. CEO, RECPDCL. Bidder shall submit the progress report weekly/ fortnightly to RECPDCL in Prescribed Performa as desired. RECPDCL will have the right to depute its representatives to ascertain the progress of supply at the premises of works of the bidder or at site.

In addition to this, bidder should also provide contact details and email id of Management & key Officials of the company.

6. Inspection & Testing:

- The bidder shall comply with the testing requirements as mentioned in Part-A of this section. These tests shall be conducted at no extra cost to the RECPDCL.
- The inspections and tests shall be conducted at the manufacturing unit of the Bidder or its sub-supplier(s), at point of delivery and/or at the Goods final destination. If conducted at the manufacturing unit of the Bidder or its sub-supplier(s), all reasonable facilities and assistance, including access to drawings and production data - shall be furnished to the inspectors at no cost to the RECPDCL.
- Pre dispatch inspection shall be carried out on sampling basis (10% or as specified in applicable Indian Standard) by authorized representative of RECPDCL.
- Should any inspected or tested Goods fail to conform to the specifications, the RECPDCL may reject the goods and the Bidder shall either replace the rejected Goods or make alterations necessary to meet specification requirements free of cost to the RECPDCL.
- The RECPDCL's right to inspect, test and, where necessary, reject the Goods after the Goods' arrival at Project Site shall in no way be limited or waived by reason of the Goods having previously been inspected, tested and passed by the RECPDCL or its representative prior to the Goods shipment.

- Nothing in this shall in any way release the Bidder from any warranty/guarantee or other obligations under this Contract.

Note:

1. Materials may be inspected jointly by REPDCL/REC/DISCOM/Power Department or by RECPDCL alone as the case may be, for which a notice of minimum 5 working days shall be given by the supplier.
2. If there is any item(s) for which technical specifications have been mentioned in the Scope of Work, but not included in the Bill of Quantity (BOQ)/Financial Bid, such item(s) shall be included in the financial bid in the event of requirement arises later on.
3. Note: Specification of any item not mentioned in NIT, the same shall be as per relevant BIS/ IS/IEC standards/ as per latest or approved practices of DISCOM.
4. Bidder should submit GTP as per attached Annexures as per applicable IS & prevailing industry practices. However RECPDCL reserve right to finalize GTP as per requirement of project/DISCOM and may provide the same at the time of issuance of LoA if desired so.
5. Note: Bidder shall submit General Technical Particulars (GTP) of materials being offered in the bid as per Annexure-XII along with a valid type test reports for the same design from CPRI/ERDA/NABL accredited laboratory not older than 5 (Five) years and shall be valid at the time of inspection and supply of materials.

SECTION-V

COMMERCIAL TERMS, CONDITIONS & OTHER PROVISIONS

1. PRICE:

- 1.1 Price should be quoted as per format of Annexure-X which must be inclusive of all costs involved in the supply contract i.e. complete design, engineering, manufacture, testing and supply of three phase distribution transformers with other materials as mentioned in including transportation & insurance up to sub-divisional headquarter in Namsai District in Arunachal Pradesh and all applicable taxes and duties of Central & State Governments etc.
- 1.2 If it is found that the tax quoted is higher than the applicable tax, in that case actual applicable taxes will only be paid by RECPDCL and if the tax quoted is lower than the applicable tax, in that case only the quoted taxes will be paid by the RECPDCL.
- 1.3 Bidder shall ensure timely payment of all taxes as per Income Tax & GST rules of Central & State Governments.
- 1.4 TDS will be deducted from the payment of the Bidder as per the prevalent laws and rules of Central & State Governments as the case may be.
- 1.5 Price quoted by the bidder shall remain firm & fixed and shall be binding on the Successful Bidder till completion of warranty period irrespective of actual cost of supply. No escalation/price variation will be granted on any reason whatsoever. The bidder shall not be entitled to claim any additional charges, even though it may be necessary to extend the completion period for any reasons whatsoever.
- 1.6 The offer must be kept valid for a period of 180 days from the last date of bid submission. No escalation clause would be accepted. The validity can be further extended with mutual consent.
- 1.7 Bids with non-conformity to above will be considered as non-responsive.

2. EARNEST MONEY DEPOSIT (EMD):

- 2.1 The Bidder shall furnish Earnest Money Deposit of Rs. 50,000/- (Rupees Fifty Thousand only) in the form of Demand Draft/ Bank Guarantee (BG) from a scheduled bank (as per Annexure-V) drawn in favour of REC Power Distribution Company Ltd.' payable at New Delhi.
- 2.2 In case of inadequacy or non-submission of EMD amount, the submitted bid shall be deemed to be disqualified and summarily rejected in the technical evaluation.
- 2.3 The initial validity of EMD shall be for a period of 180 days from the last date of bid submission. The validity of EMD shall have to be suitably extended, if necessary, on request by RECPDCL, without which the tender/work order shall be rejected.
- 2.4 Request for adjustment of Earnest Money Deposit against any previous dues with RECPDCL will not be considered.
- 2.5 EMD will be refunded to the unsuccessful bidders within 30 days after finalization of the tender without any interest.
- 2.6 EMD of successful bidder will be returned after acceptance of Letter of Intent/ Purchase Order issued by RECPDCL and submission of required PBG.
- 2.7 MSMEs:
 - (i) The firms registered with National Small Industries Corporation (NSIC)/ Micro, Small and Medium Enterprises (MSME) are exempted from furnishing bid guarantee/EMD, cost of tender

documents provided that such small scale units are registered under single point registration scheme of NSIC / MSME and are valid on the scheduled date of tender opening and the product range mentioned in the certificate is the same or similar to the tender requirement. The NSIC / MSME certificate duly attested by any Notary Public with seal and date shall only be accepted.

- (ii) The bidders claiming to be MSME and/or MSME-SC/ST and/or Start Ups and/or Domestically Manufactured Producer under Make in India initiatives etc., the relaxations and concessions as per Government of India notifications/ instructions/guidelines issued from time to time and as adopted/allowed by RECPDCL are allowed to same subject to submission and production of requisite documents/proofs etc.
- (iii) In addition, RECPDCL reserves the right to verify/confirm all original documentary evidence including references and clients as submitted by bidders in support of above mentioned clauses of eligibility criteria.
- (iv) Bidders claiming exemptions should enclose UAN and submit the same on tender portal and adhere to all Guidelines as issued and amended from time to time by Government of India.

2.8 EMD shall be forfeited without prejudice to the Bidder being liable for any further consequential loss or damage incurred to RECPDCL under following circumstances:

- a. Hundred percent (100%) of EMD amount, if a Bidder withdraws/revokes or cancels or unilaterally varies his bid in any manner during the period of bid validity specified in the tender document.
- b. Hundred percent (100%) of EMD amount, if the Successful Bidder fails to unconditionally accept Letter of Intent/Purchase Order issued by RECPDCL within 3 days from the date of issuance of such Letter of Intent/Purchase Order.
- c. Hundred percent (100%) of EMD amount, if the Successful Bidder fails to furnish PBG as specified in the tender document.

3. PERFORMANCE BANK GUARANTEE (PBG): The bidder need to submit unconditional & irrevocable Performance Bank Guarantee (PBG) as per Annexure-VII amounting to 10% of total contract value with a validity till completion of warranty period of 18 months plus 3 months' claim period. PBG shall be submitted within 5 days from the date of issuance of Letter of Intent/ Purchase Order. The PBG shall be forfeited as follows without prejudice to the Bidder being liable for any further consequential loss or damage incurred to RECPDCL:

- a. If the Supplier is not able to supply materials to the satisfaction of RECPDCL within sanctioned period, PBG amount submitted shall be forfeited.
- b. If the supplier does not fulfill its obligations as mentioned in the scope of work, PBG amount shall be forfeited.

PBG shall be returned to the bidder on successful completion of warranty period and fulfillment of all responsibilities by the Bidder as furnished in the tender.

4. DELIVERY: The materials must be delivered timely to sub-divisional headquarters of DISCOMs/ Power Departments in Namsai District so as to complete the work within sanctioned period. Materials must be delivered tentatively as per defined schedule or as per requirement of the project.

5. PERMIT: The Bidder will arrange for all necessary Permits to supply material as per Tender specified locations. Bidder should note that RECPDCL will not provide Form "C"/ "D". For any additional GoI/ State Govt. Taxes/ Duties/ Levies etc., the Bidder shall produce original payment receipts for payments.

- 6. QUANTITY:** Quantities of items as mentioned in the financial bid are indicative for evaluation purpose only and are not exhaustive. Quantities of items may vary up to +/- 20% of total quantity at same rate, term & conditions. However, RECPDCL reserves right to place order for sub-set or super-set of bill of materials mentioned in the financial bid as per requirement of the project.
- 7. TAX EXEMPTIONS:** Bidder shall claim any kind of tax exemption on its own.
- 8. LIQUIDATED DAMAGES:** For the delay in supply of materials, the Liquidated Damages (LD) @ 0.5 % of the contract value per week or part thereof subject to the maximum of 10% of the contract value shall be deducted from bill of the supplier.
- 9. SPLIT OF WORKS:** In view of targeted capacity and limited time available for completion of the task, RECPDCL reserves the right to increase / decrease / split of the work to three agencies (max.) at the sole discretion of the RECPDCL. Suitable amendment / communication shall be issued in the event of variations in quantities.
- 10. PAYMENT TERMS:** All Payments shall be made in Indian Rupees only on pro-rata basis towards quantities of items dispatched/ delivered at designated location. Any payment shall be released only after submission of 10% of the purchase/work order value as bank guarantee by the Bidder valid for a period of three months after warranty and verification of the same from issuing bank.

| Milestone No. | Milestone | Details of milestone | % payment |
|---------------|---|--|--|
| 1 | Advance Payment (On request of supplier, interest bearing adjustable initial advance of 10% shall be released to successful bidder. The annual interest rate shall be calculated based on SBI Base Rate as applicable from time to time.) | Requisites: 1. Submission of unconditional acceptance of LOA 2. Proforma invoice of supplier 3. Unconditional & irrevocable Advance Bank Guarantee as per Annexure-VI with a validity up to sanctioned delivery period plus 3 months' claim period in favor of RECPDCL amounting to 110% of total advance amount 4. Unconditional & irrevocable Performance Bank Guarantee (PBG) as per Annexure-VII for ten percent (10%) of the total Contract price towards Contract Performance with a validity till completion of warranty period of 18 months plus 3 months' claim period. | 10% within 5 working days from receipt of eligible invoice along with necessary documents. |
| 2 | Dispatch of material from manufacturer's premises after receiving dispatch clearance from RECPDCL | Requisites: 1. Submission of documents except for Advance Bank Guarantee as indicated in milestone-1. 2. Proforma invoice of supplier 3. Material Dispatch Clearance Certificate 4. Evidence of dispatch (GR/LR copy) 5. Packing list identifying contents of each shipment 6. Copy of insurance 7. Warranty Certificate If supplier has opted for advance, the same shall be adjusted proportionately while making payments of this installment. Also, up-to-date accrued interest shall also be recovered. | 30% within 5 working days from receipt of eligible invoice along with necessary documents. |

| | | | |
|---|--|--|--|
| 3 | Receipt and acceptance of Materials at store of respective DISCOM/ Power Department | Requisites: 1. Proforma invoice of supplier 2. Material Receipt Note (MRN)/ Material handing over certificate duly signed by authorized representative of supplier, RECPDCL and respective DISCOM/ Power Department. | 60% within 5 working days from receipt of eligible invoice along with necessary documents. |
| 4 | After completion of warranty period | Requisites: 1. Proforma invoice of supplier 2. Expiry of warranty period of 18 months from the date of delivery of material | 10% |
| | | | 100% |

11. FORCE MAJEURE: Force majeure shall mean any cause, existing or future, which is beyond the reasonable control of Bidder or RECPDCL including, but not limited to, acts of God, storm, fire, floods, explosion, epidemics, quarantine, earthquake, strike, riot, lock out, embargo, interference by civil or military authorities, acts, regulations or orders of any governmental authority in their sovereign capacity, acts of war (declared or undeclared) including any acts of terrorism, and all other such acts of similar or analogous nature (where all such acts to be collectively referred to as "Force Majeure"). RECPDCL and Bidder shall not be liable for the failure to perform any obligation in terms of this Proposal if and to such extent such failure is caused by a Force Majeure, provided that none of such acts of Force Majeure will relieve the Customer from meeting its payment obligations.

12. SUCCESSORS & ASSIGNS: In case RECPDCL or successful bidder may undergo any merger or amalgamation or a scheme of arrangement or similar re-organization & this contract is assigned to any entity (ies) partly or wholly, the contract shall be binding mutatis mutandis upon the successor entities & shall continue to remain valid with respect to obligation of the successor entities.

13. INDEMNITY CLAUSE:

- (i) The bidder shall indemnify and hold harmless the RECPDCL and its employees and officers from and against any and all losses, liabilities, and costs (including losses, liabilities, and costs incurred in defending a claim alleging such a liability), that the RECPDCL or its employees or officers may suffer as a result of any infringement or alleged infringement of any Intellectual Property Rights patent, trademark/copyright or industrial design rights arising from the use of the supplied goods/ materials etc. and related services or any part thereof.
- (ii) Such indemnity shall not cover:
 - a) any use of supplied materials, other than for the purpose indicated by or to be reasonably inferred from the Contract,
 - b) any infringement resulting from the use of goods, products of the material produced thereby in association or combination with any other goods or services not supplied by the bidder, where the infringement arises because of such association or combination and not because of use of the system in its own right.
- (iii) If any proceedings are brought or any claim is made against the RECPDCL arising out of the matters referred to in Clause (i), the RECPDCL shall promptly give the bidders notice of such proceedings or

claims, the bidder shall have sole control on the conduct of such proceedings or claim and any negotiations for the settlement of any such proceedings or claim and the RECPDCL shall provide the bidder with the assistance, information, and authority reasonably necessary to perform the above.

- (iv) If the Goods/ Materials is held or is believed by the bidder to infringe, the bidder shall have the option, at its expense, to
- a) modify the goods, including the Materials or the Bidder Property to be non-infringing,
 - b) obtain for the RECPDCL a license to continue using the goods/ Material, or
 - c) terminate the license for the infringing part and refund a pro rata portion of the fees paid for that portion. This provides for the bidder's entire liability and the RECPDCL's exclusive remedy for claims of infringement of intellectual property rights related to the goods/ materials and the bidder Properties.

14. NO SUSPENSION OF WORK & RISK PURCHASE:

NO SUSPENSION OF WORK

The obligations of the RECPDCL and the bidder shall not be altered by reasons of conciliation/ arbitration being conducted during the progress of works. Neither party shall be entitled to suspend the work on account of conciliation/arbitration nor shall payments to the bidder continue to be made in terms of the contract. Subject to the above including the sub-clauses that is pending conciliation or arbitration on any issue between the RECPDCL and the bidder, it shall be agreed that the RECPDCL shall be entitled to claim any amount as reimbursement as per the claim in writing for any works done by the RECPDCL from the outside agency for the default of the bidder in respect of any item for which such conciliation or arbitration as stated above is pending and the bidder shall jointly and severally be liable to pay such amount or amounts immediately on receipt of such demand from the RECPDCL without demur, and in case of the award in such arbitration is given by the arbitrators in favour of the bidder, then the amount/s under the award shall be refunded to the bidder, as the case may be by the RECPDCL, immediately on receipt of such award, if not challenged in a court of law.

If the selected bidder is not able to fulfil its obligations under the contract, which includes non-completion of the work, the RECPDCL reserves the right to accomplish the work through another bidder and EMD / Security Deposit of bidder will be forfeited. Also any costs, damages etc. resulting out of the same shall have to be borne by the selected bidder. However, the bidder will continue to offer transition services.

RISK PURCHASE

Notwithstanding what is stated above, it is agreed upon that the bidder will be responsible to RECPDCL for implementation of the contract. In case of non-performance of contract by the bidder or the bidder fails to take proper corrective action to perform the contract satisfactorily within a reasonable period as given by RECPDCL, RECPDCL in addition to levy of liquidated damages, may terminate the contract and award the same to any other party at the risk and cost of the bidder for carrying out the balance work after giving due notice to the bidder. This clause may be invoked during the period of project implementation as well as warranty period with effect from the date of acceptance of Letter of Intent or Letter of Award by the Bidder. The limitation of liability of bidder in case of risk purchase will be to the extent of immediate next higher financial quote (total bid value as per price schedule). The percentage of liability of Risk Purchase will be quantified while placing the letter of award.

15. TERMINATION OF CONTRACT:

- a. In case of award of work to successful bidder, the contract shall remain in force as per the timeline of award of work or till satisfactory completion of awarded work, whichever is earlier.
- b. However, in case, in the opinion of RECPDCL if the Supplier is not likely to make up for the delay or test checks by RECPDCL are indicating poor quality work or the Supplier is acting in anyway prejudicial to the completion of project or on adoption of unethical practices, the contract may be terminated partly or fully by giving 15 days' notice and the balance supply shall get executed at the risk & cost of the Supplier.
- c. In case of default in services or denial of services, RECPDCL, at its sole discretion, will be free to avail services of other service providers at the "Risk & Cost" of the defaulter.

16. DISPUTE:

- Disputes under the agreement shall be settled by mutual discussion.
- However, in the event amicable resolution or settlement is not reached between the parties, the differences of disputes shall be referred to and settled by the Sole Arbitrator to be appointed by Chairman, RECPDCL.
- The arbitration proceedings shall be in accordance with the prevailing Arbitration and Conciliation Act, 1996 and Laws of India as amended or enacted from time to time.
- The venue of the arbitration shall be New Delhi, India.
- The fee & other charges of Arbitrator shall be shared equally between the parties.
- The Arbitrator will give the speaking & reasoned award. The party will not be entitled to any Pendent late interest during arbitration proceedings.

SECTION-VI

FINANCIAL BID EVALUATION METHODOLOGY

1. OPENING AND EVALUATION OF FINANCIAL BID:

Opening of financial bids will be through online mode only.

- a. Bidders have to submit documents as per Section-III, Clause-C (Submission of Bid Documents).
- b. Financial Bids duly submitted, will be opened on the date and time indicated in this document in the presence of bidders or their authorized representatives who desire to present. The bidders' representatives present there, shall sign a register evidencing their attendance.
- c. Price Bids (Financial Bids) of Bidders whose EMDs received in original (DD or BG) within due date/time will only be opened. Rest of the Financial bids without submission of requisite EMDs in original (DD or BG) within due date/time will not be opened.
- d. If due date of receipt of Financial Bids/ opening of Financial Bids happens to be a closed holiday, the bids would be received and opened on the next working day.
- e. RECPDCL reserves the right to postpone and/or extend the date of receipt/opening of Financial Bids or to withdraw the Financial Bid notice, without assigning any reason thereof. In any such cases, the bidders shall not be entitled to any form of compensation from the Company.
- f. Financial Bids shall be evaluated on the basis of total price inclusive of all taxes and duties quoted as per Annexure-X. Based on total price quoted by the bidders, RECPDCL shall award the work to L-1 bidder (L1 being the lowest quote).
- g. RECPDCL reserves the right to award or not to award work to the L1 bidder based on the assessment by RECPDCL for implementation of the project as may be deemed fit by company.
- h. RECPDCL may or may not conduct reverse auction.

SECTION-VII

GENERAL CONDITIONS OF BID

1. Each bidder should submit **ONLY SINGLE** bid.
2. The bidder shall ensure that deputed personnel are trained and experienced for jobs as defined in scope of work for ensuring the high quality and correctness of jobs and to be carried out in a highly professional, safe, and sound managerial manner.
3. RECPDCL reserves the right to accept or reject any or all Bid requests without assigning any reason.
4. RECPDCL reserves the right to waive off any shortfalls; accept the whole, accept part of or reject any or all responses to this tender.
5. RECPDCL reserves the right to cancel the bids at any stage and call for fresh tender.
6. RECPDCL reserves the right to modify, expand, restrict, scrap, re-float the tender without assigning any reason for the same.
7. The responder shall bear all costs associated with the preparation and submission of its Bid and RECPDCL will in no case be responsible or liable for these costs, regardless of the conduct or the outcome of the tender process.
8. The Bidder shall be well capable of supplying desired quantum of materials as mentioned in the tender within permissible timeline. RECPDCL reserves right to conduct capacity & capability assessment of participating bidders at the time of technical evaluation process.
9. RECPDCL reserves the right to withdraw the work & get it completed at the risk & cost of the agency, if performance of the agency is unsatisfactory, to whom work has been awarded. Further, the said agency may be black-listed for a period of one year or more for participating in any of the bids invited by RECPDCL. Also, RECPDCL would be free to intimate such black-listing to various state/central utilities/ Ministry of Power/ State Governments/ Other agencies not to consider the said agency for any assignment including of the same on websites.
10. RECPDCL reserves the right to conduct reverse auction.
11. Bidder has to submit test certificates/reports as specified in technical specifications from IECQ / NABL accredited laboratory for relevant IEC/ Equivalent BIS Standard as applicable.
12. In case of supply of any defect material or substandard material, the materials will be rejected & it will be the responsibility of the bidder for taking back & replacing the rejected materials at their own cost.
13. The supplied materials should be strictly as per specifications mentioned in this tender, otherwise the material would be liable for rejection.
14. Validity of Bid shall be 180 days from the last date of bid submission. The Bid with validity of less than 180 days from the last date of bid submission shall not be considered. The validity can be further extended with mutual consent.
15. No price escalation is applicable on account of any statutory payments increase or fresh imposition of custom duty, excise duty, sales tax or duty leviable in respect of the major components in the said acceptance of the tender.
16. Bidder's quoted rates should be firm and fixed. No price variation and escalation will be allowed.
17. Bids must be submitted in English language only.
18. Incomplete, telegraphic or conditional tenders are not accepted.
19. Canvassing in any manner is strictly prohibited. The same will lead to rejection of the submitted bid.

20. The last date of receipt of financial bids from bidders is XX.07.2018 at XX:00 Hrs. Original, Sealed EMD will only be accepted during office hours on working days through deposit in the tender box kept for the purpose at REC Power Distribution Corporation Ltd. (RECPDCL), 4th Floor, KRIBHCO Bhawan, A10, Sector-1, Noida (U.P.)-201301.
21. EMDs received after due date & time due to any reason including postal delay will not be considered.
22. If due to any reason, the due date is declared as a holiday, the tender will be opened on next working day at the same time.
23. The Price bid shall be opened on XX.07.2018 at XX:00 Hrs in RECPDCL office, Noida in the presence of such Bidders /their representatives, who desire to be present at the time of opening.
24. Any or all Bids may be rejected or accepted partially or fully without assigning any reason thereof by Chief Executive Officer, RECPDCL.
25. Bidders are requested to watch out RECPDCL website for change of events/additional information from time to time.
26. There are no actions, suits or proceedings pending, or to the knowledge of the bidder threatened, against the bidder, in any court, or before any arbitrator of any kind, or before or by any Governmental Authority. The bidder is not in default with respect to any order of any court, arbitrator or Governmental Authority.
27. The Bidder should not be black-listed by any Central/State Govt. organization, PSU etc.
28. Bidders should take cognizance of geography, terrain, all site conditions, factors etc. at their discretion/will, if they desire so before quoting the rate. However, in any case, it will be assumed that bidder has understood all site conditions, factors etc. for this work before submission of bid.
29. It will be imperative on each bidder to fully acquaint itself of all the local conditions and factors which would have effect on the performance of the work and its cost. And it will be deemed that while quoting all such factors have been taken into account.

LETTER FOR SUBMISSION OF BID

(To be submitted on Company's letterhead duly signed)

To,

Addl. Chief Executive Officer
REC Power Distribution Company Ltd.
4th Floor, KRIBHCO Bhawan,
A10, Sector-1, Noida (U.P.)-201301

Sub.: Engagement of Agency Supply of Single Phase & Three Phase Distribution Transformers in North-Eastern States for electrification work under SAUBHAGYA/DDUGJY

Dear Sir,

We wish to submit bid against RECPDCL's NIT No: NIT No: RECPDCL/TECH/Arunachal-DTR/18-19/
Date: 01.08.2018 for "Supply of Three Phase Distribution Transformers and other materials in the State of Arunachal Pradesh for electrification work under SAUBHAGYA/DDUGJY" as per the requirements of RECPDCL.

Further, I hereby certify that:

1. I have read the provisions of all clauses and confirm that notwithstanding anything stated elsewhere to the contrary, the stipulation of all clauses of Bid are acceptable to me and I have not taken any deviation to any clause.
2. I, Confirm that, there are no actions, suits or proceedings pending, or to the knowledge of the bidder threatened, against the bidder, in any court, or before any arbitrator of any kind, or before or by any Governmental Authority. We, are not in default with respect to any order of any court, arbitrator or Governmental Authority.
3. I further confirm that any deviation to any clause of Tender found anywhere in my Bid, shall stand unconditionally withdrawn, without any cost implication whatsoever to the RECPDCL.
4. Our bid shall remain valid for period of 180 days from the last date of bid submission.
5. I, hereby give undertaking that we, as a company are not black-listed by any Central/ State Government/ Semi-Government Organization/ Public Sector Undertaking/ Private Institution in India.
6. I Further confirm that if information furnished above stands false at any stage, we shall be completely liable for actions taken by RECPDCL as per terms & conditions of the tender including disqualification and exclusion from future contracts/assignments

Date:

Place:

Signature:

Full Name:

Designation:

Address:

Note: In absence of above declaration/certification, the Bid is liable to be rejected and shall not be taken into account for evaluation.

BIDDER'S GENERAL DETAILS*(To be submitted on Company's letterhead duly signed)*

NIT No: RECPDCL/TECH/Arunachal-DTR/18-19/

Date: 01.08.2018

Name of Work: Supply of Three Phase Distribution Transformers and other materials in the State of Arunachal Pradesh for electrification work under SAUBHAGYA/DDUGJY

GENERALDETAILS

1. Name of Company: _____
2. Year of Incorporation: _____
3. Name of Authorized Person: _____
4. Regd. Address:
 - a) Address of Office: _____

 - b) Contact Person's
 - i. Name & Designation: _____
 - ii. Address: _____

 - iii. Tel. No. (Landline& Mobile): _____
 - iv. Email ID : _____
5. Type of Firm (Please tick): Private Ltd./ Public Ltd./ LLP/ Joint Venture Company
6. Permanent Account Number: _____
7. GSTIN: _____
8. EMD Details: Rs. _____
 DD/BG No. _____
 Name & Address of Bank: _____

Signature.....

Full Name.....

Designation.....

Address.....

LETTER OF TRANSMITTAL

To,

Addl. Chief Executive Officer
REC Power Distribution Company Ltd.
4th Floor, KRIBHCO Bhawan,
A10, Sector-1, Noida (U.P.)-201301

Dear Sir,

I/We, the undersigned, have examined the details given in your Tender No. NIT No: RECPDCL/TECH/Arunachal-DTR/18-19/ Date: 01.08.2018 for Supply of Three Phase Distribution Transformers and other materials in the State of Arunachal Pradesh for electrification work under SAUBHAGYA/DDUGJY. We accept all the terms & conditions of the bid document without any deviation and submit the Bid. We hereby certify that M/s _____ or its group companies have not been awarded any work for & shall not be a competitor to REC during contract period in case the contract is awarded.

Also, M/s _____ or its group companies is not executing or providing any type of consultancy services either directly or as a sub-contractor for the particular work for which Bid is submitted.

It is confirmed that M/s. _____ is not banned or blacklisted by any Govt./Pvt. Institutions in India.

Authorized Signature [In full and initials]:

Name and Title of Signatory:

Name of Firm:

Address:

BID BANK GUARANTEE (EARNEST MONEY DEPOSIT) FORMAT

This deed of Guarantee made this day of 2018 by
 **(Name of the Bank)** having one its branch at
 acting through its Manager (hereinafter called the "Bank") which
 expression shall wherever the context so requires includes its successors and permitted assigns in favour
 of REC Power Distribution Company Ltd., registered under the Companies Act, 1956, having its office at 4th
 Floor, KRIBHCO Bhawan, A10, Sector-1, Noida (U.P.)-201301 (hereinafter called "RECPDCL") which
 expression shall include its successors and assigns.

WHEREAS RECPDCL has invited tender vide their Tender Notice No:
 Dated to be opened on
 AND WHEREAS M/s
 **(Name of Tenderer)** having its office at
 (hereinafter called the "Tenderer"), has/have
 in response to aforesaid tender notice offered to supply/ do the job of Supply of Three Phase Distribution
 Transformers and other materials in the State of Arunachal Pradesh for electrification work under
 SAUBHAGYA/DDUGJY as contained in the tender.

AND WHEREAS the Tender is required to furnish to RECPDCL a Bank Guarantee for a sum of ₹ /-
 (Rupees..... only) as Earnest Money for participation in the Tender
 aforesaid.

AND WHEREAS, we
 **(Name of Bank)** have at the request of the tender agree to give RECPDCL this as
 hereinafter contained.

NOW, THEREFORE, in consideration of the promises we, the undersigned, hereby covenant that, the
 aforesaid Tender shall remain open for acceptance by RECPDCL during the period of validity as mentioned
 in the Tender or any extension thereof as RECPDCL and the Tender may subsequently agree and if the
 Tender for any reason back out, whether expressly or impliedly, from his said Tender during the period of
 its validity or any extension thereof as aforesaid or fail to furnish Bank Guarantee for performance as per
 terms of the aforesaid Tender, we hereby undertake to pay RECPDCL, New Delhi on demand without demur
 to the extent of ₹ /-(Rupees only).

We further agree as follows:

1. That RECPDCL may without affecting this guarantee extend the period of validity of the said Tender or
 grant other indulgence to or negotiate further with the Tender in regard to the conditions contained in the
 said tender or thereby modify these conditions or add thereto any further conditions as may be mutually
 agreed to in between RECPDCL and the Tender AND the said Bank shall not be released from its liability

under these presents by an exercise by RECPDCL of its liberty with reference to the matters aforesaid or by reason of time being given to the Tender or any other forbearance, act or omission on the part of the RECPDCL or any indulgence by RECPDCL to the said Tender or any other matter or thing whatsoever.

2. The Bank hereby waive all rights at any time in consistent with the terms of this Guarantee and the obligations of the Bank in terms thereof shall not be otherwise affected or suspended by reason of any dispute or dispute having been raised by the Tender (whether or not pending before any arbitrator, tribunal or court) or any denial of liability by the Tender stopping or preventing or purporting to stop or prevent any payment by the Bank to RECPDCL in terms thereof.

3. We the said Bank, lastly undertake not to revoke this Guarantee during its currency except with the previous consent of RECPDCL in writhing and agree that any charges in the constitution, winding up, dissolution or insolvency of the Tender, the said Bank shall not be discharged from their liability.

NOTWITHSTANDING anything contained above, the liability of the Bank in respect of this Guarantee is restricted to the said sum of ₹ /-(Rupees only).and this Guarantee shall remain in force till unless a claim under this guarantee is filed with the bank within 30 (thirty) days from this date or the extended date, as the case may be i.e. up to all rights under Guarantee shall lapse and the Bank be discharged from all liabilities hereunder.

In witness whereof the Bank has subscribed and set its name and seal here under.

Note: The date shall be thirty (30) days after the last date for which the bid is valid.

POWER OF ATTORNEY

(To be on non-judicial stamp paper of appropriate value as per Stamp Act relevant to place of execution.)

(a) Power of Attorney to be provided by the Bidding Company in favour of its representative as evidence of authorized signatory's authority.

Know all men by these presents, We (name and address of the registered office of the Bidding Company as applicable) do hereby constitute, appoint and authorize Mr./Ms. (name & residential address) who is presently employed with us and holding the position of as our true and lawful attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to submission of our Bid for Supply of Three Phase Distribution Transformers and other materials in the State of Arunachal Pradesh for electrification work under SAUBHAGYA/DDUGJY in response to the NIT No. dated issued by REC Power Distribution Company Ltd. (RECPDCL), Noida including signing and submission of the Bid and all other documents related to the Bid, including but not limited to undertakings, letters, certificates, acceptances, clarifications, guarantees or any other document which RECPDCL may require us to submit. The aforesaid Attorney is further authorized for making representations to REC Power Distribution Company Ltd., Noida and providing information/responses to RECPDCL representing us in all matters before RECPDCL and generally dealing with RECPDCL in all matters in connection with Bid till the completion of the bidding process as per the terms of the above mentioned NIT.

We hereby agree to ratify all acts, deeds and things done by our said attorney pursuant to this Power of Attorney and that all acts, deeds and things done by our aforesaid attorney shall be binding on us and shall always be deemed to have been done by us.

All the terms used herein but not defined shall have the meaning ascribed to such terms under the NIT.

Signed by the within named

..... (Insert the name of the executant company)

through the hand of

Mr.

duly authorized by the Board to issue such Power of Attorney

Dated this day of

Accepted

.....

Signature of Attorney

(Name, designation and address of the Attorney)

Attested

.....

(Signature of the executant)

(Name, designation and address of the executant)

.....

Signature and stamp of Notary of the place of execution

Common seal of has been affixed in my/our presence pursuant to Board of Director's Resolution dated.....

WITNESS

1.

(Signature)

Name.....

Designation

2.

(Signature)

Name.....

Designation

Notes:

The mode of execution of the power of attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and the same should be under common seal of the executant affixed in accordance with the applicable procedure. Further, the person whose signatures are to be provided on the power of attorney shall be duly authorized by the executant(s) in this regard.

The person authorized under this Power of Attorney, in the case of the Bidding Company / Lead Member being a public company, or a private company which is a subsidiary of a public company, in terms of the Companies Act, 1956, with a paid up share capital of more than Rupees Five crores, should be the Managing Director / whole time director/manager appointed under section 269 of the Companies Act, 1956. In all other cases the person authorized should be a director duly authorized by a board resolution duly passed by the Company.

Also, wherever required, the executant(s) should submit for verification the extract of the chartered documents and documents such as a Board resolution / power of attorney, in favour of the person executing this power of attorney for delegation of power hereunder on behalf of the executant(s).

ADVANCE BANK GUARANTEE (PBG) FORMAT

M/s REC Power Distribution Company Ltd.,
 Core-4, Scope Complex, Lodhi Road,
 New Delhi — 110003 (INDIA)
 (With due stamp duty if applicable)

OUR LETTER OF GUARANTEE NO.: _____

In consideration of REC Power Distribution Company Ltd., having its office at _____
 _____ (hereinafter referred to
 as "RECPDCL" which expression shall unless repugnant to the content or meaning thereof include all its
 successors, administrators and executors) and having issued Work Order No.
 _____ dated _____ with/on M/s
 _____ (hereinafter referred to as "The Agency" which
 expression unless repugnant to the content or meaning thereof, shall include all the successors,
 administrators, and executors).

WHEREAS the Agency having unequivocally accepted to perform the services as per terms and conditions
 given in the Letter of Intent/ Purchase Order No. _____
 dated _____ and RECPDCL having agreed that the Agency shall furnish to RECPDCL an Advance
 Bank Guarantee for the advance taken (to the extent of 10% of contract amount), of the value of
 ₹ _____.

We, _____ ("The Bank") which shall include
 OUR successors, administrators and executors herewith establish an irrevocable Letter of Guarantee No.
 _____ in your favor for account of _____
 _____ (The Agency) in cover of performance guarantee in accordance
 with the terms and conditions of the Work Order/ Sanction Order.

Hereby, we undertake to pay up to but not exceeding _____ (say _____
 _____ only) upon receipt by us of your first written demand
 accompanied by your declaration stating that the amount claimed is due by reason of the Agency having
 failed to perform the Work Order/ Sanction Order and despite any contestation on the part of above
 named-agency.

This letter of Guarantee will expire on _____ including 90 days of claim period and any
 claims made hereunder must be received by us on or before expiry date after which date this Letter of
 Guarantee will become of no effect whatsoever whether returned to us or not.

 Authorized signature
 Chief Manager/ Manager
 Seal of Bank

Note: ABG shall be valid till completion of sanctioned delivery period plus 3 months' claim period.

PERFORMANCE BANK GUARANTEE (PBG) FORMAT

M/s REC Power Distribution Company Ltd.,
 Core-4, Scope Complex, Lodhi Road,
 New Delhi — 110003 (INDIA)
 (With due stamp duty if applicable)

OUR LETTER OF GUARANTEE NO.: _____

In consideration of REC Power Distribution Company Ltd., having its office at _____
 _____ (hereinafter referred to
 as "RECPDCL" which expression shall unless repugnant to the content or meaning thereof include all its
 successors, administrators and executors) and having issued Work Order No.
 _____ dated _____ with/on M/s
 _____ (hereinafter referred to as "The Agency" which
 expression unless repugnant to the content or meaning thereof, shall include all the successors,
 administrators, and executors).

WHEREAS the Agency having unequivocally accepted to perform the services as per terms and conditions
 given in the Letter of Intent/ Purchase Order No. _____
 dated _____ and RECPDCL having agreed that the Agency shall furnish to RECPDCL a Performance
 Guarantee for the faithful performance during the entire contract, of the value of
 ₹ _____.

We, _____ ("The Bank") which shall include
 OUR successors, administrators and executors herewith establish an irrevocable Letter of Guarantee No.
 _____ in your favor for account of _____
 _____ (The Agency) in cover of performance guarantee in accordance
 with the terms and conditions of the Work Order/ Sanction Order.

Hereby, we undertake to pay up to but not exceeding _____ (say _____
 _____ only) upon receipt by us of your first written demand
 accompanied by your declaration stating that the amount claimed is due by reason of the Agency having
 failed to perform the Work Order/ Sanction Order and despite any contestation on the part of above
 named-agency.

This letter of Guarantee will expire on _____ including 90 days of claim period and any
 claims made hereunder must be received by us on or before expiry date after which date this Letter of
 Guarantee will become of no effect whatsoever whether returned to us or not.

 Authorized signature
 Chief Manager/ Manager
 Seal of Bank

Note: PBG shall be valid till completion of warranty period of 18 months plus 3 months' claim period.

ACCEPTANCE FORM FOR PARTICIPATION IN REVERSE AUCTION EVENT

(To be signed and stamped by the bidder)

In a bid to make our entire procurement process more fair and transparent, RECPDCL intends to use the reverse auctions in case to case at sole discretion of RECPDCL when financial bids are invited later on. Techno-Commercially acceptable bidders up to the level of L6 or lower as the case may be shall be allowed to participate in the Reverse Auctioning at sole discretion of RECPDCL.

The following terms and conditions are accepted by the bidder on participation in the bid event:

1. RECPDCL shall provide the user id and password to the authorized representative of the bidder. (Authorization Letter in lieu of the same shall be submitted along with the signed and stamped Acceptance Form).
2. RECPDCL decision to award the work would be final and binding on the supplier.
3. The bidder agrees to non-disclosure of trade information regarding the purchase, identity of RECPDCL, bid process, bid technology, bid documentation and bid details to any other party.
4. The bidder is advised to fully make aware itself of auto bid process and ensure its participation in the event of reverse auction and failing to which RECPDCL will not be liable in any way.
5. In case of bidding through Internet medium, bidders are further advised to ensure availability of the infrastructure as required at their end to participate in the auction event. Inability to bid due to telephone line glitch, internet response issues, software or hardware hangs, power failure or any other reason shall not be the responsibility of RECPDCL.
6. In case of intranet medium, RECPDCL shall provide the infrastructure to bidders. Further, RECPDCL has sole discretion to extend or restart the auction event in case of any glitches in infrastructure observed which has restricted the bidders to submit the bids to ensure fair & transparent competitive bidding. In case an auction event is restarted, the best bid as already available in the system shall become the basis for determining start price of the new auction.
7. In case the bidder fails to participate in the auction event due any reason whatsoever, it shall be presumed that the bidder has no further discounts to offer and the initial bid as submitted by the bidder as a part of the tender shall be considered as the bidder's final no regret offer. Any offline price bids received from a bidder in lieu of non-participation in the auction event shall be out rightly rejected by RECPDCL.
8. The bidder shall be prepared with competitive price quotes on the day of the bidding event.
9. The prices as quoted by the bidder during the auction event shall be inclusive of all the applicable taxes, duties and levies and shall be FOR at site.
10. The prices submitted by a bidder during the auction event shall be binding on the bidder.
11. No requests for time extension of the auction event shall be considered by RECPDCL.
12. The original price bids of the bidders shall be reduced on pro-rata basis against each line item based on the final all inclusive prices offered during conclusion of the auction event for arriving at Contract amount.

**Signature & Seal of the Bidder
(Authorized Signatory)**

TECHNICAL Parameters
(To be submitted through Online)

NIT No: RECPDCL/TECH/Arunachal-DTR/18-19/

Date: 01.08.2018

Name of Work: Supply of Three Phase Distribution Transformers and other materials in the State of Arunachal Pradesh for electrification work under SAUBHAGYA/DDUGJY

SCHEDULE-A (GUARANTEED TECHNICAL PARTICULARS FOR THREE PHASE DISTRIBUTION TRANSFORMERS)

Guaranteed Technical Particulars for 3- Phase Distribution Transformers

| S. No. | Particulars | | |
|--------|--|--|--|
| 1 | Make & Manufacturer | | |
| 2 | Place of Manufacture | | |
| 3 | Voltage Ratio | | |
| 4 | Rating in KVA | | |
| 5 | Core Material used & Grade | | |
| | a) Flux density | | |
| | b) Over fluxing without saturation (Curve to be furnished by the Manufacturer in support of his claim) | | |
| 6 | Maximum temperature rise of | | |
| | a) windings by resistance method | | |
| | b) Oil by thermometer | | |
| 7 | Magnetising (No load) Current at | | |
| | a) Normal Voltage | | |
| | b) Maximum Voltage . | | |
| 8 | Core loss in watts . | | |
| | a) Normal Voltage | | |
| | b) Maximum Voltage | | |
| 9 | Resistance of Windings at 20 deg. C (with 5% tolerance) | | |
| | a) HV Winding (ohms) | | |
| | b) LV Winding (ohms) | | |
| | b) LV Winding (ohms) | | |
| 10 | Full load losses at 75°C | | |
| 11 | Current density used for | | |
| | a) HV Winding | | |
| | b) LV Winding | | |
| 12 | Clearance | | |
| | a) Core & LV | | |
| | b) LV&HV | | |
| | b) HV phase to phase | | |
| | d) End insulation clearance to earth | | |

| | | | |
|----|--|----------------|---------------|
| | e) Any point of winding to tank | | |
| 13 | Efficiency at 75°C at (In %) | Unity (P.F) | 0.8 (P.F.) |
| | i) 125% load | | |
| | ii) 100% load | | |
| | iii) 75% load | | |
| | iv) 50% load | | |
| | v) 25% load | | |
| 14 | Regulation at | | |
| | a) Unity P.F. | | |
| | b) 0.8 P.F. at 75°C | | |
| 15 | % impedance at 75°C | | |
| 16 | Flash Test | | |
| | HV 28 kV/50 Hz for 1 minute | | |
| | LV-3 kV/50 Hz for 1 minute | | |
| 17 | Over potential Test | | |
| | Double voltage & double frequency For 1 Minute. | | |
| 18 | Impulse test value in Kvp | | |
| 19 | Weight content of | | |
| | a) Core lamination (min.) | | |
| | b) Winding (min.) Copper | | |
| | c) Tank and Fittings | | |
| | d) Oil | | |
| | e) Oil qty(min.) | | |
| | e) Total weight | | |
| 20 | Oil data | | |
| | 1. Qty for first filling (min) | | |
| | 2. Grade of Oil used | | |
| | 3. Maker's name | | |
| | 4. BDV at the time of filling . | | |
| 21 | Transformer: | | |
| | 1) Overall length x breadth x height. | | |
| | 2) Tank length x breadth x height. | | |
| | 3) Thickness of plates for | | |
| | a) Side plate | | |
| | b) Top & Bottom Plates | | |
| | 4) Conservator Dimensions | | |
| 22 | Radiation: | | |
| | 1) Heat dissipation by tank walls exclusive top & bottom. | | |
| | 2) Heat dissipation by cooling tube | | |
| | 3) Dia & thickness of cooling tube | | |
| | 4) Whether calculation sheet for selecting cooling area to ensure that the transformer is capable of giving continuous rated output without exceeding temperature rise is, enclosed. | | |

| | | | |
|----|---|--|--|
| 23 | Inter layer insulation provided in design for: | | |
| | 1) Top & bottom layer | | |
| | 2) In between all layer | | |
| | 3) Details of end insulation | | |
| | 4) Whether wedges are provided at 50% turns of the HV coil. | | |
| 24 | Insulation materials provided | | |
| | a) For conductors | | |
| | (1) HV | | |
| | (2) LV | | |
| | b) For core | | |
| 25 | Material and Size of the Wire used | | |
| | 1)HV: a) 5WG/mm | | |
| | b) Dia. | | |
| | 2) LV: a) Strip size - | | |
| | b) No. of Conductors in parallel | | |
| | c) Total area of cross section | | |
| 26 | Is the name plate give all particulars as required in Tender. | | |
| 27 | Particulars of Bushings HV/LV | | |
| | 1) Maker's name | | |
| | 2) Type 15-3347/15-1180 | | |
| | 3) Rating | | |
| | 4) Dry power frequency voltage withstand test | | |
| | 5) Wet power frequency voltage withstand test | | |
| 28 | Total losses at 50% Loading | | |
| 29 | Total losses at 100% Loading | | |
| 29 | Total losses at 100% Loading | | |

Guaranteed Technical Particulars for 3- Phase Distribution Transformers

| S. No. | Particulars | |
|--------|-----------------------|--|
| 1 | Make | |
| 2 | Type | |
| 3 | Phases No. | |
| 4 | Rating level | |
| 5 | Voltage: | |
| 6 | HV V | |
| 7 | LV V | |
| 8 | Tapping | |
| 9 | Frequency Hz | |
| 10 | Vector Group | |
| 11 | Insulation Level(BIL) | |
| 12 | HV KV peak | |
| 13 | LV KV peak | |
| 14 | Winding material | |

| | | |
|----|-------------------------|--|
| 15 | Core Material | |
| 16 | Temperature Rise: | |
| 17 | Oil °C | |
| 18 | Winding °C | |
| 19 | Losses | |
| 20 | Total Losses@100%Load W | |
| 21 | Total Losses@50%Load W | |
| 22 | Impedance Voltage % | |
| 23 | Percentage Resistance % | |
| 24 | Regulation at: | |
| 25 | Full Load UPF % | |
| 26 | Full Load 0.8 PF % | |
| 27 | Efficiency at UPF at | |
| 28 | Full Load % | |
| 29 | % Full Load % | |
| 30 | Y, Full Load % | |
| 31 | Efficiency at 0.8 PF: | |
| 32 | Fcll Load % | |
| 33 | % Full Load % | |
| 34 | Y, Full Load % | |
| 35 | Terminal Arrangement: | |
| 36 | HV | |
| 37 | LV | |
| 38 | Overall Dimensions: | |
| 39 | Length | |
| 40 | Width | |
| 41 | Height | |
| 42 | Overall Weight , | |
| 43 | Total Weight | |

Note:

1. All weights and Dimensions are subject to $\pm 1.0\%$ tolerance, Except Where ever minimum or maximum specified in GTP and Technical Specification.
2. All the efficiencies and regulations are calculated at the nominal values of NLL, LL AT 75°C and %Z at 75°C
3. Bidder should submit GTP as per attached Annexures as per applicable IS & prevailing industry practices. However RECPDCL reserve right to finalize GTP as per requirement of project/DISCOM and may provide the same at the time of issuance of LoA if desired so.

SCHEDULE-B (DEVIATIONS FOR THREE PHASE DISTRIBUTION TRANSFORMERS)

(to be furnished by the bidder, if any)

Note: Bidder shall furnish relevant/ necessary drawings and a valid type test reports for the same design from CPRI/ERDA/NABL accredited laboratory not older than 5 (Five) years and shall be valid at the time of inspection and supply of materials.

(AUTHORIZED SIGNATORY)

NAME:

SEAL

FINANCIAL BID
(To be submitted through Online)

NIT No: RECPDCL/TECH/Arunachal-DTR/18-19/

Date: 01.08.2018

Name of Work: Supply of Three Phase Distribution Transformers and other materials in the State of Arunachal Pradesh for electrification work under SAUBHAGYA/DDUGJY

| S. No. | Item Description | Unit | Quantity | Per Unit Rate (in Rs.) | Total Amount without GST (in Rs.) | GST Percent age | GST Amount (in Rs.) | Total Amount including GST (in Rs.) | Freight & Insurance (including taxes) (in Rs.) | Total Amount (including GST, Freight & Insurance) |
|-------------------------------|--|------|----------|------------------------|-----------------------------------|-----------------|---------------------|-------------------------------------|--|---|
| A | B | C | D | E | F = D x E | G | H = F x G | I = F + H | J | K = I + J |
| 1 | Designing, Manufacturing & Supply of 63 KVA step down outdoor type 3 phase 11/0.415 kV 50Hz oil immersed naturally cooled doubled wound copper winding out door type conventional step down transformer conforming to IS: 11870(Part-I) and IS:2026 | Nos. | 8 | | | | | | | |
| 2 | Designing manufacturing & Supply of 16 KVA step down outdoor type 3 phase 11/0.415 Kv 50 Hz oil immersed naturally cooled doubled wound copper winding outdoor type conventional step down distribution transformer conforming to IS 11870(Part -I) and IS 2026 | Nos. | 1 | | | | | | | |
| 3 | Designing manufacturing and supply of 25 KVA step down outdoor type 3 Phase 11/0.415 kv 50 Hz oil immersed naturally cooled double wound copper winding outdoor type conventional step down distribution transformer conforming to IS:11870(Part-I) and IS:2026 | Nos. | 11 | | | | | | | |
| 4 | Designing, Manufacturing and supply of weather proof pole mounted, LT panel board with adequated rating of MCCB, RCB as main LT breakers, space dully provided for mounting DB, Energy meter and service connection distribution board within the same panel with locking arrangement made | Nos. | 8 | | | | | | | |
| 5 | Designing manufacturing and supply of weather proof pole mounted, LT panel board with adequated ratings of MCCB/RCB as main LT breakers, space dully provided for mounting DB, Energy meters & service connection distribution board within the same panel with locking arrangement made | Nos. | 11 | | | | | | | |
| 6 | Designing manufacturing and Supply of weather proof pole mounted ,LT Panel Board with adequated ratings of MCCBs/RCBs as main LT breakers,space dully provided for mounting DB,Energy meter & service connection distribution board within the same panel with locking arrangement made | Nos. | 1 | | | | | | | |
| 7 | Designing, Manufacturing and supply of 3 phase 4 wire LT CT operated Tri-vector meter with class 10 accuracy LCD display Engineering Plastic Box and 4 CTs | Nos. | 20 | | | | | | | |
| 8 | Manufacturing and supplying of TP & N Distribution box with accessories. | Nos. | 1102 | | | | | | | |
| Sub-Total (in Rs.) | | | | | | | | | | |
| Grand Total in figure(in Rs.) | | | | | | | | | | |

Note:

- Price should be quoted as per format of Annexure-X which must be inclusive of all costs involved in the supply contract i.e. complete design, engineering, manufacture, testing and supply of three phase distribution transformers with other materials as mentioned in including transportation & insurance

up to sub-divisional headquarter in Namsai District in Arunachal Pradesh and all applicable taxes and duties of Central & State Governments etc.

2. If it is found that the tax quoted is higher than the applicable tax, in that case actual applicable taxes will only be paid by RECPDCL and if the tax quoted is lower than the applicable tax, in that case only the quoted taxes will be paid by the RECPDCL.
3. Bidder shall ensure timely payment of all taxes as per Income Tax & GST rules of Central & State Governments.
4. TDS will be deducted from the payment of the Bidder as per the prevalent laws and rules of Central & State Governments as the case may be.
5. Price quoted by the bidder shall remain firm & fixed and shall be binding on the Successful Bidder till completion of warranty period irrespective of actual cost of supply. No escalation/price variation will be granted on any reason whatsoever. The bidder shall not be entitled to claim any additional charges, even though it may be necessary to extend the completion period for any reasons whatsoever.
6. The offer must be kept valid for a period of 180 days from the last date of bid submission. No escalation clause would be accepted. The validity can be further extended with mutual consent.
7. Bids with non-conformity to above will be considered as non-responsive

Annexure- XI

| S.No | List of Vendor | Registered Address |
|------|---|---|
| 1 | Marsons Electrical Industries | 1/189, Delhi Gate, Civil Lines, Agra-282002 Ph: 0562-2642327 info@marsonselectricals.com |
| 2 | Marsons Energy Pvt. Ltd. | 403, Paradise Garden A25, Vidyalaya Marg Tilaknagar, Jaipur-302004 Ph- 9024529006 info@marsons.co.in |
| 3 | Andrew Yule & Co.Ltd. | 14. Mayurbhanj Road Kolkata-700023 03324491184 mkt.ko.elec@andrewyule.com |
| 4 | Shirdi Sai Electricals Ltd. | 13/82, Industrial Estate Kadapa, A.P Pin-516004 Ph-7799885809 kirankumar.k@ssel.in |
| 5 | Vijai Electricals | Plot No. Sec-12, IIE, SIDCUL Haridwar Pin- 249403 Ph- 9045093072 chakradhar.s@vijaielctricals.com |
| 6 | D.S. Enterprise | Duplexpatty Mohadangr Road Po-Chandannagar Hoogly-712136 033-2683-1909 Fax- 26836704 |
| 7 | Stanlec Pvt. Ltd. | 282,B.B Chatterjee Road Kolkata-700042 9831012108 03324421204/2063 |
| 8 | Toshiba Transmission & Distribution system(India) Pvt. Ltd. | Unit No. 1702,17th Floor, Ecostation Plot No.7, Block-BP,Sector-V Salt Lake,Kolkata- 700091 04030712215 04030712245 mahesh.katepalli@toshiba-ttdi.com |
| 9 | P.P Industries Pvt. Ltd. | A-16 New Focal Point Dabwali Road, Bathinda, Punjab 01642284935 01642280037 |
| 10 | Truvolt Engineering Co. Pvt. Ltd. | Electronic Centre,3rd floor 1/1A Biplabi Anukul chandra Street Kolkata-700072 03322126064/6314/7018 truvoltengg@gmail.com |
| 11 | CGL | Vatika city point, M.G Road, Gurgaon, Ph-9654443350/ 01244392050 sundeep.sharotri@cgglobal.com |
| 12 | Alstom India Limited | Alstom India Limited Ravindara Anthwal(Assistant Manager) Vadodara Halol Highway, Mile Stone No. 87, Village Kotambi, Vadodara - 390002, Gujarat, India Ph. +91-9601279204/ +91-26-68661042 |
| 13 | BHARAT BIJLI | Electric Mansion 6th Floor Appasaheb Marathe Marg Prabhadevi Mumbai 400 025 Ph. T: +91 22 2430 6237 / 6071 Email: bblcorporate@bharatbijlee.com |
| 14 | PRAG Electricals (P) Limited | 47 Industrial Estate Bamunimaidan Guwahati, Assam - 781021 India, Email Address pragelectricals@gmail.com Ph. 361- 2653907 |
| 15 | EASTERN TRANSFORMER & EQUIPMENT PVT LTD | 2 Church Lane Oswal Chambers 4th Floor Kolkata, West Bengal - 700001 India, Email Address- eastern_trfr@vsnl.net, a.k.saha@vsnl.net, Ph- 33-22109177/78 |
| 16 | Technovel | Chhotahapjan, PO Makum Jn, District- Tinsukia, Assam |
| 17 | North East Electricity Industry | Shed No C/3 & C/4, Industries Easte, borgure, tinsukia, Assam |
| 18 | Strudy industries Pvt Ltd. | Industrial Estate, Bamuni Maidan, Guwahati, Assam |
| 19 | M/s ABC Transformers Pvt. Ltd | A. B. C. Transformers Private Limited Unit-I : A-41, Sector-58, Noida (U.P.) -201301 T: +(91)-9555886099 T: (91)-(120)-4325219 F: +(91)-(120)-2581989 info@abctransformers.in |
| 20 | M/s SB Engineering Works, | Yamuna Estate, Near Municipal Garden, Shakriba Party Plot, Near Municipal Garden, Amraiwadi, |
| 21 | M/s Goswami Engineering, | C-101, Sanidhya Township, New VIP Ring Road Near Raghukul School, Near Raghukul School, New VIP Ring Road, Vadodara-390019, Gujarat, India |
| 22 | M/s Shree Sai Electricals | 6-3-8-879/B,3rd Floor Green Lands ,G Pulla Reddy Sweets Building Beside CM Camp Office Begumpet Hyderabad, Telangana-500016 Phone: 040- 30759966/77 /040-66255266 |
| 23 | M/s Hertz Electrical Pvt. Ltd | 39/1,BOSE PUKUR ROAD,2ND FLOOR P.S-KASBA KOLKATA WB 700042 IN |
| 24 | M/s TBEA Energy (India) Pvt. Ltd. | 1048, Block C Rd, Block C, Sushant Lok Phase I, Sector 43, Gurugram, Haryana 122002 |
| 25 | M/s Siliguri Electric Works | Subhash Market, 266/2 gerge robert road, factory adress- khaprail road matigara, George Mahbert Road, Siliguri - 734001 |
| 26 | M/s Tesla Transformer Ltd | 30-B, Industrial Area, Govindpura, Bhopal-462023 (M.P.), India. : +91 - 755 - 2586778, 2586328, 4271973 : +91 - 9893055810 |
| 27 | M/s NK Power, | Ganesh Puri, Ganesh Puri, Guwahati-781006, Assam, India |
| 28 | M/s Trishul Trading Co Pvt. Ltd., | Room No. 203, Hotel Brahmaputra, BG Road, Shiv Sagar, Sivasagar, Guwahati-785640, Assam, India |
| 29 | M/s Power Maker | Amin Gaon, Amin Gaon, Guwahati-781031, Assam, India |
| 30 | M/s Technoval, | Tinsukia (R) |
| 31 | M/s Kamakhya Transformer, | Dag No 20 & 26, Patta No 21, A K Azad Roadsaw Kuchi, Guwahati - 781001, Near Survey Office, United Bakers Campus |
| 32 | M/s Kalita Electricals Pvt. Ltd., | Nh-37, Garchuk, Guwahati - 781035 |
| 33 | M/s Fabcon Engineers, | 8-M Block, Johar Town, Lahore - Tel: +92 423 531 5657. |
| 34 | M/s Vidyut Techno Trade, | 1-A-42, F.A.Road, Kumarpura, Guwahati - 781008, Kumarpura |
| 35 | M/s Pragjyotish Transformer Pvt. Ltd. | J. B. Road, Chenikuthi Guwahati,Assam,781003 |
| 36 | M/s Telawne Power Equipments Pvt. Ltd. | R-457, Thane - Belapur Rd, MIDC Industrial Area, Rabale, Navi Mumbai, Maharashtra 400701 |
| 37 | M/s Rangghar Electrotech, | 66 Adithanar Salai Near Egmore Court Chennai 600002 99624 09525 (Hindi) help@trademarking.in |
| 38 | M/s ABB India Ltd. | Rajiv Gandhi Colony, New Industrial Town, Faridabad, Haryana 121001 |
| 39 | M/s Schneider Electric | 9th Floor, DLF Building No. 10, Tower C, DLF Cyber City, Phase II, Gurugram, Haryana 122002 Ph. 0124 394 0400 |
| 40 | M/s Voltamp Transformer | 202-203, Aditya, 4, Preet Vihar, Commercial Complex, New Delhi, Delhi 110092 Phone: 011 2243 9457 |
| 41 | M/s RTS Power Corporation Ltd. | 56, Netaji Subhas Road Kolkata 700001. West Bengal, India Phone: 91 33 2242 6025/6054. Fax: 91 33 2242 6732 |
| 42 | M/s ICI Transformers | H.O. F-783 (E) Road No. 13 VKI Area Jaipur - 302013 |
| 43 | M/s CenturyInfra Power pvt Ltd | S-23, Alankar Plaza, Sector 2, Central Spine, Vidhyadhar Nagar, Jaipur, Rajasthan 302023 Phone: 0141 223 0988 |
| 44 | M/s STS Utility Services | Udyog Kendra 2, Ecotech III, Greater Noida, Uttar Pradesh 201306 Phone: 0120 293 5010 |
| 45 | M/s Mangal Electrical Industries Pvt Ltd, Jaipur | C- 61, Road Number 1C, Vishwakarma Industrial Area, Jaipur, Rajasthan 302013 Phone: 0141 233 0182 |
| 46 | M/s East India Udyog Ltd,Ghaziabad. | 145, G.T. Road, Sahibabad, Ghaziabad, Uttar Pradesh 201005 Phone: 0120 417 5700 |