AJMER VIDYUT VITRAN NIGAM LIMITED
(Material Management Wing)
Corporate Identification Number (CIN)-U40109RJ000SGC016482
REGD. OFF. VIDYUT BHAWAN, MAKARWALI ROAD, PANCHSHEEL NAGAR, AJMER-305004
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SPECIFICATION NO. AVVNL/SE(MM)/E1A8/TN-1147 FOR SUPPLY OF 11/√3 KV/240V, 5 KVA & 10 KVA RATING OUT DOOR TYPE COMPLETELY SELF PROTECTED SINGLE PHASE ALUMINIUM WOUND DISTRIBUTION TRANSFORMERS ENERGY EFFICIENCY LEVEL-2 WITH INBUILT CIRCUIT BREAKER.

Tenders are hereby invited in e-tender system for Purchase **OF 11/√3 KV/240V, 5 KVA & 10 KVA RATING OUT DOOR TYPE COMPLETELY SELF PROTECTED SINGLE PHASE ALUMINIUM WOUND DISTRIBUTION TRANSFORMERS ENERGY EFFICIENCY LEVEL-2 WITH INBUILT CIRCUIT BREAKER.**

Tenders are to be submitted online in electronic format on website **http:eproc.rajasthan.gov.in**. The details are as under-

S. No.	Name of Item	Quantity (Approx.)
1	**11/√3 KV/240V, 5 KVA & 10 KVA RATING OUT DOOR TYPE COMPLETELY SELF PROTECTED SINGLE PHASE ALUMINIUM WOUND DISTRIBUTION TRANSFORMERS ENERGY EFFICIENCY LEVEL-2 WITH INBUILT CIRCUIT BREAKER.**	
1A	**5 KVA**	**5000 Nos.**
1B	**10 KVA**	**5000 Nos.**

A	NIT No.	**TN-1147**
B	Cost of tender specifications	**Rs. 2950 (Two Thousand Nine Hundred Fifty Only)**
C	Processing fee of RISL	**Rs. 1000.00 (One Thousand Only)**
D	Earnest money	**Rs. 5.0 Lacs /Exemption Certificate / Vendor Registration of Class "A".**
E	Validity	**120 days from the next date of opening of techno- commercial bid.**
F	Base date for price variation	**01.07.2017**

IMPORTANT DATES

S.N.	Events	Date & Time	Location
1	Date of downloading of tender specifications	Up to 24.08.2017 (06:00 PM)	**www.avvnl.com & http:eproc.rajasthan.gov.in**
2	Deposit of cost of Tender Specifications, Processing fee & Earnest Money	Up to 24.08.2017 (2:00 PM)	In the office of the Sr. Accounts Officer (EA & CASH), AVVNL, Panchsheel, Makarwali Road, Ajmer-305004
3	Last Date & time of submission of electronic bid	Up to 24.08.2017 (06:00 PM)	**http:eproc.rajasthan.gov.in**
4	Opening of Technical Bid	**25.08.2017 (3:00 PM)**	**http:eproc.rajasthan.gov.in**
5	Opening of Price Bid	To be intimated separately to the qualified bidders	**http:eproc.rajasthan.gov.in**

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1. Tender documents will be made available on e-Tendering portal **www.eproc.rajasthan.gov.in** &**www.avvnl.com** for viewing. The bidders, in their own interest are requested to read very carefully the tender document before submitting the bid only through online on website **www.eproc.rajasthan.gov.in** up to the time & date as specified above. In case of any discrepancy found in the bidding documents downloaded from the website and appended with the bid (as a bid document) and the original copy of such document available in the office of Superintending Engineer (MM), Ajmer Discom, Ajmer then the copy available with Superintending Engineer (MM), Ajmer Discom, Ajmer will be considered as final document for all purposes

2. The tender processing fees of Rs. 1,000/- (non-refundable) payable by Demand Draft in favour of **Managing Director, RISL (payable at Jaipur)** can be deposited in this office [i.e. SE(MM)]

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The **cost of tender specification i.e. Rs. 2950/-(**non-refundable) and **EMD of Rs.5,00,000.00** in Demand draft/ Banker's cheque in favour of the Sr. Accounts Officer (EA & CASH), AVVNL, Ajmer (payable at Ajmer) **can be deposited in the office of the Sr. Accounts Officer (EA & CASH), AVVNL, Panchsheel, Makarwali Road, Ajmer-305004** upto 2:00 p.m. to one working day prior to schedule **date of opening of bid**. **However the bidders who possess valid vendor registration issued by AVVNL as per Clause No. 1.5.3 of Section-II (General Condition of Contract)** for supply of quoted items under appropriate category are not required to furnish Earnest Money Deposit. The Central and State Govt. undertakings are exempted from furnishing of Earnest money subject to furnishing of such certificate / documentary evidence in support of their being Govt. (Central/State) undertaking. **They shall upload the proof of such valid registration/exemption certificate with their bid.**

3. **The bidders are required to upload the receipt of deposing all above payments along with their tender at the relevant place on the scheduled date & time otherwise their bids are liable to be rejected.**

4. Eligible bidders should submit their bid well in advance instead of waiting till last date. AVVNL will not be responsible for non-submission of Bid due to any website related problems.
5. **The bid offer shall be furnished in two parts & shall comply all provisions of Clause No. 1.02 Section-I (instruction to Bidders) and the Bid offer shall be furnished in the following manner:**

i) First envelope/ cover containing proof of deposition of cost of Bid documents & EMD as under:-

a. **Content proof document of tender fee Rs. 1000/- payable to MD RISL, Jaipur.**
b. **Content proof document of tender specification fee (i.e. Rs. 2950/-) payable to Sr. Accounts officer (EA & Cash), AVVNL Ajmer.**
c. **Content proof document of EMD of Rs. 5,00,000.00 (Rs. Five Lac only) or Exemption Certificate or Vender Registration of Class "A" category or**

above or certificate of being a Rajasthan/ Central Govt. undertaking should be clearly mentioned.

ii) Second envelope/ cover for techno-commercial bid.

iii) Third envelope/ cover for price bid. Cover– III Price Bid' should be clearly furnished on prescribed format to be uploaded online on website.

Note:- Envelope/ Cover III containing price bid will be kept unopened in the safe custody at the website RISL. It will be opened at a later date in respect of those bidders whose offers are found / adjudged technically and commercially acceptable. The date of opening of "Price Bid" shall be intimated to successful bidders in due course of time. In case of deviation from the stipulated clauses of bid specifications, price bid of the bidder will not be opened.

iv) **The bidder shall ensure that bid is furnished / submitted strictly in the manner detailed in the Specification.**

Note :-All eligible interested bidders are required to get enrolled on e-Tendering portal **http://www.eproc.rajasthan.gov.in/nicgep/app.**

Note :-**All eligible interested bidders are required to get enrolled on e-Tendering portal http://www.eproc.rajasthan.gov.in/nicgep/app**

Contact person (Authorized Bid Signatory)	Superintending Engineer (MM), AVVNL, Ajmer
Correspondence Address	VIDYUT BHAWAN, Makarwali Road, Panchsheel Nagar, Ajmer
Mobile No.	9414004258
Telephone & Fax No.	0145-2644529/ 0145-2644542
Website & E-Mail:	1. Web.-www.avvnl.com
	2. E-mail:- Web:-http:/risl.rajasthan.gov.in, Email:-info.risi@rajasthan.gov.in

Address Of RISL:-
Rajcomp Info Services Limited (RISL)
1st Floor, YognaBhawan, TilakMarg, C-Scheme, Jaipur (Rajasthan)
Phone:-0141-5103902, 4031900 Fax: - 0141-2228701
Web:-**http:/risl.rajasthan.gov.in,** Email:-**info.risl@rajasthan.gov.in**

SECTION-III

AJMER VIDYUT VITARAN NIGAM LIMITED

TECHNICAL SPECIFICATION

FOR

11/√3KV/240 V, 5 KVA & 10 KVA RATING OUTDOOR TYPE

COMPLETELY SELF PROTECTED SINGLE PHASE

ALUMINIUM WOUND

ENERGY EFFICIENT LEVEL-2

DISTRIBUTION TRANSFORMERS (WITH CRGO/ AMORPHOUS METAL CORE) WITH INTERNAL CIRCUIT BREAKER

AGAINST TN-1147

TECHNICAL SPECIFICATION FOR SUPPLY OF 11/√3 KV/240 V, 5 KVA & 10 KVA RATING OUT DOOR TYPE COMPLETELY SELF PROTECTED SINGLE PHASE ALUMINIUM WOUND ENERGY EFFICIENT LEVEL-2 DISTRIBUTION TRANSFORMERS WITH INBUILT CIRCUIT BREAKER AGAINST TN-1147

1) SCOPE:

This specification covers design, engineering, manufacture, assembly, stage testing, inspection & testing before supply and delivery at Nigam store(s) anywhere in Rajasthan of the oil immersed, oil natural air natural (ONAN) out door type 11kV / √3 / 240 V, 50 Hz, 5 KVA & 10 KVA Single Phase EEL-2 with **Aluminium wound** complete with fittings and accessories with meter protection unit on LT side of distribution transformers for use in distribution systems.

1.1 The Equipment Offered shall be complete with all parts necessary for their effective and trouble free operation. Such parts will be deemed to be within the scope of the supply irrespective of whether they are specifically indicated in the commercial order or not.

1.1.1 It is not the intent to specify herein complete details of design and construction. The equipment offered shall conform to the relevant standards and be of high quality, sturdy, robust and of good design and workmanship complete in all respects and capable to perform continuous and satisfactory operations in the actual service conditions at site and shall have sufficiently long life in service as per statutory requirements. The dimensional drawings attached with this specification and the notes thereto are generally of illustrative nature. In actual practice, not withstanding any anomalies, discrepancies, omissions, incompleteness, etc. in these specifications and attached drawings, the design and constructional aspects, including materials and dimensions, will be subject to good engineering practice in conformity with the required quality of the product, and to such tolerances, allowances and requirements for clearances etc. as are necessary by virtue of various stipulation in that respect in the relevant Indian Standards, IEC standards, I.E. Rules, I.E Act and other statutory provisions.

1.2 The Tender / supplier shall bind himself to abide by these considerations to the entire satisfaction of the Purchaser and will be required to adjust such details at no extra cost to the purchaser over and above the tendered rates and prices.

1.3 Tolerances on all the dimensions shall be in accordance with provisions made in the relevant Indian/ IEC standards and in these specifications. Otherwise the same will be governed by good engineering practice in conformity with required quality of the product.

2) APPLICABLE STANDARDS:

The materials shall conform in all respects to the relevant Indian Standard Specifications with latest amendments thereof; some of them are listed below:

Note: Wherever ISS are mentioned, equivalent or better International standards are also acceptable.

IS: 1180 (PART-I)/2014: Specifications for outdoor type oil immersed distribution transformers upto and including 2500 KVA, 33 KV Class.

IS/IEC 60947-2:2003 - low voltage switchgear and control gear – Part 2: Circuit Breaker.

IS:9385 Part-II:1980 – High voltage fuses : Part 2: Expulsion and similar fuses.

IS:8603:2008 – Dimensions for porcelain transformers bushings for use in heavily polluted atmospheres 12/17.5 kV, 24 kV and 36kV (Amalgamating IS 8603 (Parts 1,2&3) : 1977.

IS: 5/1961: Colour for ready mixed paints

IS:2026 (PARTI,II,III,IV & V)/1981 – Power Transformers.

IS:6600/1978 : Guide for loading of oil immersed Transformers

IS:335/1983 : New insulation oils for Transformers.

IS:3347 (PartI/Sec. 1 & 2): Dimension of Porcelain parts & Metal parts for Transformer bushing (1.1 KV)

IS:7421 : Porcelain Transformer Bushings for low voltage – upto 1 KV.

IS:2099/1986 : Porcelain Transformer bushing for AC volts above 1000 volts.

IS:3639/1966 : Fittings & accessories for Transformers.

IS:1866/1978:Code of practice for maintenance & supervision of insulating oil in Service.

IS:9335 : Specifications for insulating kraft paper.

IS:1576 : Specifications for solid insulating press Boards for electrical purposes.

IS:104 : Ready mixed paint, brushing zinc chromate, painting.

IS:649 : Testing of steel sheets and strips for magnetic circuits.

IS:2362 : Determination of water content in oil for porcelain bushing transformers.

IS: 4257: Dimensions for clamping arrangements for bushings.

IS 6160 : Rectangular conductor for electrical machines.

IS:10028 : Selection, Installation and maintenance of transformers.

IS: 5484: Specifications for Aluminium wire rods.

REC Specification No. 2.

REC Specification No. 39/1993.

CEA Specification, Chapter 4.

IEC: 994: Specification Part4 for Surge Arresters without gap for AC system.

IS: 3070 (PartIII): Specification for Lightning Arresters for alternating current System Part.III.
IS: 3073/1974 : Specification for Lightning Arresters.

IS: 2629: Recommended practice for hot dip galvanizing of iron and steel.

IS: 2633: Method for testing uniformity of coating on Zinc coated articles.

IS: 5621: Specification for large hollow porcelain for use in electrical installation.

IS: 13947 (PartII) latest : Specification for Single Pole MCCB.

IS: 2147: Degree of protection provided by enclosures for low voltage switchgear and control gear.

IEC Pub 609472: Specification for Low Voltage Switch Gear and Control gear.

Material conforming to other internationally accepted standards, which ensure equal or higher quality than the standards mentioned above would also be acceptable. In case the Bidders who wish to offer material conforming to the other standards, salient points of difference between the standards adopted and the specific standards shall be clearly brought out in relevant schedule. Four copies of such standards with authentic English Translations shall be furnished along with the offer.

Note:- Besides above changes, the technical parameters of the specifications wherever are deviating from the IS:1180 (Part-I/2014) , the same shall be in accordance with IS:1180 (Part-I/2014) and its latest amendments, if any and the changes where the IS:1180 (Part-I/2014) is silent for technical parameters, same shall be applicable as per Discom specification.

3) SERVICE CONDITIONS:

The distribution transformers to be supplied against this specification shall be suitable for satisfactory continuous operation under the following climatic conditions as per IS 2026 (Part I) latest revision.

i)	Peak ambient temperature	:	50°C.
ii)	Minimum Ambient Temperature in shade	:	5°C.
iii)	Maximum average ambient temp in 24 hours period in shade	:	45°C
iv)	Maximum yearly weighted average ambient temperature	:	35°C
v)	Maximum temperature attainable by an object exposed to sun	:	60°C
vi)	Maximum relative humidity	:	100%
vii)	Average number of thunder storm days per annum	:	40
viii)	Average number of rainy days per annum	:	120
ix)	Average annual rainfall	:	15-100 cm
x)	Number of months of tropical monsoon conditions	:	4 Months
xi)	Maximum wind pressure	:	195 kg/mt²
xii)	Altitudes	:	Not exceeding1000 mtrs

The equipment shall be for use in moderately hot and humid tropical climate, conducive to rust and fungus growth.

1. **PRINCIPAL PARAMETERS:**

The single phase transformers of standard ratings 5 KVA & 10 KVA shall be suitable for outdoor installation with Single Phase, 50 Hz, 11KV system in which the neutral is effectively earthed and should be suitable for outdoor service under fluctuations in supply voltage upto plus 10% to minus 15%.

The transformer shall conform to the following specific parameters.

S.N	Particulars	Parameters	
1	Continuous rated capacity	**5 KVA**	**10 KVA**
2	System voltage (max.)	12KV	12KV
3	Rated voltage HV	11/ √3 KV	11/ √3 KV
4	Rated voltage LV	240 V	240 V
5	Line current HV	0.79 A	1.57 A
6	Line current LV	20.83 A	41.67 A
7	Frequency	50 c/s +/ 3%	50 c/s +/ 3%
8	No. of phases	Single	Single
9	Vector Group	IiO	IiO
10	Type of transformer	Outdoor	Outdoor
11	Type of cooling	ONAN	ONAN
12	Class of insulation	Class A	Class A
13	Winding Material	Aluminium	Aluminium
14	Material of core	CRGO/AMORPHOUS	CRGO/AMORPHOUS
15	Type of core construction	Wound	Wound
16	Over fluxing limit (due to combined effect of voltage and	12.5 %	12.5 %

	frequency)		
17	Permissible temperature over ambient under full load condition: i) Of top oil measured by thermometer ii) Of winding measured by resistance	 35 Deg.C 40 Deg.C	 35 Deg.C 40 Deg.C
18	Minimum clearances in air a) Phase to earth (mm) H.T b) Phase to earth (mm) LT	 140 40	 140 40
19	Total losses (watts) at 75 Deg. C. (Max.) (As per Energy Efficient level-2) i)At 50% loading ii)At 100% loading	 **35 watts** **95 watts**	 **60 watts** **170 watts**
20	% age Impedance (with a tolerance of ± 10%)	**2.5 % (±10% Tolerance)**	**4.0 % (±10% Tolerance)**
21	Max. Flux Density at Normal voltage and frequency	1.6 Tesla	1.47 Tesla
22	Max. Current density	1.6 A/mm Sq	1.6 A/mm Sq
23	LT Breaker	Internally mounted	Internally mounted
24	Radiator required	Not required	Not required
25	Magnetizing Current (max.) a) At 100% rated voltage b) At 112.5% rated voltage	2%+30% tolerance on 2% as per IS:2026 of rated full load current 4% + 30% tolerance on 4% as per IS:2026 of rated full load current.	1.5%+30% tolerance on 1.5% as per IS:2026 of rated full load current 3% + 30% tolerance on 3.5% as per IS:2026 of rated full load current.

ELECTRICAL CLEARANCES:

a) Minimum External Clearances (in air as per IS:1180)
   i) HV phase to earth (mm) 140
   ii) LV phase to earth (mm) 40

b) Minimum Internal Clearances
   i) Clearance between inner wall of tank and coil (mm) -- 12
   ii) Radial clearance between HV & LV windings (mm)-- 2(5 KVA) & 3(10/16/25 KVA)
   iii) Radial clearance of LV coil from core (mm) -- 2
   iv) End clearance of HV coil from Yoke (mm) -- 15
   v) Minimum clearance between core & tank bottom (mm)-5(5 KVA) & (10/16/25 KVA)

5) DESIGN & CONSTRUCTION:

5.1 Winding connection & terminal arrangements:

For HV, live end should be brought out through 12kV bushing and the other end of HV, which is intended to be earth, shall be brought out on 1.1kVbushing (HV Neutral bushing). Provision shall be made for connecting the neutral HV terminal to local earth. The secondary (LV) winding shall be connected to LV bushings. The 12 KV HV bushing (live) shall be provided on top cover and the remaining three bushing(s) shall be provided on the sidewall of the tank and below top cover.

Two layer of electrical grade insulation kraft paper (epoxy dotted) of 2 mil thickness or one layer of minimum 4 mil thickness shall be used for interlayer insulation both for HV and LV Coils.

5.2 INSULATION MATERIALS:

The following approved make of electrical grade insulation craft papers and boards shall be used in the transformer.

Sr. No.	Name of insulating material	Name of Firms
1.	Press board	(a) Senapathy whitely (b) Raman Board (c) Techno Electric, Hyderabad
2.	Kraft Paper	(a) Ballarpur (b) Padamjee (c) ITC Tribeni Tissue Paper Ltd., Kolkata (d) Munskjo, Sweden
3.	Press phan paper	Senapathy whitely
4.	Gaskets	(a) New cork (b) Talbros

5.3 Bushings

i) The bushing shall conform to IS: 2099/3347 as amended upto date. Bushings having the creepage distance suitable for highly polluted atmosphere and having type tested as per IS: 3347 and IS:2099 latest version shall only be accepted.

ii) For HV, 12kV class bushings and for earth/neutral of HV winding 1.1kV class bushing(s) shall be used and for LV, 1.1kV class bushing(s) shall be used.

iii) The terminal arrangement shall not require a separate oil chamber.

iv) The HV bushing shall be mounted on top cover and LV bushing(s) shall be mounted on side wall of tank below top cover. The bushing rods and nuts shall be of brass.

v) The HV bushings shall not have arcing horns.

vi) HV bushing mounting bolt should be tag welded.

5.4 CORE, WINDING AND OIL

5.4.1 CORE MATERIAL:

a) **CRGO MATERIAL**:

Transformer core shall be wound core construction in shell type or core type, using prime grade imported M4 or better COLD ROLLED GRAIN ORINTED (CRGO) laminations or any other combination of better grade be acceptable. The bidder shall furnish the core loss (watt per Kg.) and power (VA per Kg.) curves of the laminations used. The core shall be properly stress relieved by annealing in inert atmosphere. The transformer shall be suitable for over fluxing (due to combined effect of voltage and frequency) up to 12.5% without injurious heating. The operating flux density shall be such that there is a clear safe margin over the fluxing limit of 12.5%.

CRGO Laminations used shall be of prime grade and not second grade steel laminations. Only those bidders who directly imported CRGO either from the manufacturer or through their accredited marketing organization of repute (and not through any agent) shall be considered.

ALTERNATIVE

B) **AMORPHOUS METAL CORE**

The core shall be made of high quality Amorphous ribbons having very low loss formed into wound cores of rectangular shape, bolted together to the frames firmly to prevent vibration or noise. The complete design of core must ensure permanency of the core losses with continuous working of the transformers. The value of the maximum flux density allowed in the design shall be clearly stated in the offer. Curve showing the properties of the metal shall be attached with the offer. The transformer core shall be suitable for over fluxing (due to combined effect of voltage and frequency) upto 12.5% without injurious heating at full load conditions and shall not get saturated. The bidder shall furnish necessary data in support of this situation.

Core claming for Amorphous metal transformers.

1. Core clamping shall be with top and bottom U-shaped core clamps made of sheet steel clamped with HT steel strap for efficient clamping.
2. MS core clamps shall be painted with varnish or oil-resistant paint.
3. Suitable provision shall be made in the bottom core clamp/bottom plate of the transformer to arrest movement of the active part.

NOTE: Equal weightage shall be given to the transformer with amorphous metal core and CRGO core.

5.4.2 FLUX DENSITY:

Flux density should not be more than **1.6 Tesla(For 5 KVA) & 1.47 Tesla (For 10, 16, 25 KVA)** at the rated voltage and frequency. Transformer core should be designed in such a way that it will not get saturated for any value of V/f (Voltage/frequency) ratio to the extent of 112.5% of rated value of V/f ratio (i.e., 11000/50) and that the maximum flux density in any part of the core and yoke at rated voltage & frequency shall be such that the flux density with +12.5% combined

voltage & frequency variations from rated voltage & frequency does not exceed 1.9 Tesla. (as per amended IS:1180 (Part-I/2014) Actual core design along with calculations in support of it should be enclosed with the offer.

5.4.3 WINDING:

HV and LV windings shall be wound from Aluminium conductors with DPC/Polyesterimide enamel (Class H) insulation. The enamel covering shall conform to Grade-II of IS:13730 Part8 or IEC 60317 Part8. The windings shall be progressively wound in LVHV coil design for better voltage regulation and mechanical strength. The inter layer insulation shall be of Epoxy resin bond paper. The type of winding i.e. whether LV windings are of conventional type or foil wound shall be indicated in the tender. Winding must be done in cleanest possible atmosphere to prevent possible accumulation of dust particles. The coil shall be further processed for dimensional control, improved bonding and for improving short circuit withstanding capability.

The current density of winding shall not be more than 1.6 Amp./sq.mm for Aluminium. The test reports for material characteristics like density, tensile strength and elongation, moisture content, ash content, dielectric strength, thickness of resin etc. for epoxy dotted paper shall be submitted during stage inspection.

5.4.4 CORE COIL ASSEMBLY:

Core coil assembly shall be further processed in oven for removal of moisture.

Ample provision for free circulation of oil in the radial gap between the core & LV Coil shall be made. The core shall be effectively earthed through copper foil bolted on core clamps, after removing the core clamp paint.
All core-coil assembly shall be indelibly marked / punched on core channel / an identity plate welded on core channel with following details:

1. Name of Supplier:
2. Order / TN No:
3. Rating:
4. Sr. No. of Transformer:`

In case if above marking is not found on the core assembly of physically opened transformer selected for physical verification during final inspection then no further inspection shall be carried out and re-inspection charges shall be payable by the supplier.

5.4.5 OIL:

The transformer shall be supplied complete with first filling of EHV Grade transformer oil, up to the normal oil level. The oil shall conform to IS: 335/1993 (latest amended) and should be ISI Marked and having the specified aging characteristics.

The make of Transformer Oil shall be either APAR/SAVITA/ RAJ LUBRICANTS/ ANAMIKA/SHARAVATI/ MADRAS PETRO/ RAJ PETROL/ LUBRICHEM, MUMBAI/ OPANAMA

PETROCHEM, ANKELSHWAR/ TASHKENT OIL, VADODARA/COLUMBIA. The transformer oil sample taken from the transformer shall be subject to testing as per provisions ofIS:1866.

The oil manufacturer's test certificate shall be made available at the time of inspection to the inspecting officer.

5.5 BUSHING TERMINALS:

5.5.1 H.V. TERMINALS:

HV terminals shall be designed to directly receive ACSR conductor up to 7/3.35 mm (without requiring the use of the lug).

Starting and finishing leads of HT coils shall be covered with empire sleeve(s) or paper tube(s) of proper size. These leads should be clamped with the body of the winding with the help of cotton twine or permacel tape during manufacturing of the coils.

The transformer shall be provided with outdoor type 01 No. porcelain bushings, conforming to IS:3347/1972 & IS:2099/1973 from the manufacturer of repute. The HV bushings shall be on top of the tank and shall be fitted on a pocket made on top cover.. The bushings rods and nuts shall be made of brass. The inner porcelain portion of the bushing shall be projected about 50% of the length inside the bushing pocket. **HT bushing(s) mounting bolts should be tag welded**.

The clamping ring of HV bushing shall be of galvanised MS Sheet having minimum thickness of 1.6 mm. The total weight of all the 12 aluminium caste member of HV bushing shall not be less than 210 grams.

"The HV bushings shall generally confirmed to relevant IS: 3347 (Part-I to V of section I) , IS: 2099 (Part-I to V of section I) and IS: 7421 (As and where applicable). Embossing showing the manufacturer's name and month & year of manufacture shall be clearly visible on HV bushings, even after fixing on transformer(s)".

5.5.2 L.T TERMINALS:

The LV coil shall be taken by cut on the top core clamp duly reinforced to compensate for the mechanical strength.

In case of internal L.T. Breaker, the L.T. bushing and the terminals shall be suitable for being concealed inside the distribution box having insulated aluminium bus bar of suitable size (as per the enclosed drawing) from where the connections shall be taken for two or three numbers single core L.T. Aluminium Bunched Cable of size 16 sq.mm through cable glands for release of single phase connections to the consumer.

"The LV bushings shall generally confirmed to relevant IS: 3347 (Part-I to V of section I) , IS: 2099 (Part-I to V of section I) and IS: 7421 (As and where applicable). Embossing showing the manufacturer's name and month & year of manufacture shall be clearly visible on LV bushings, even after fixing on transformer(s)".

5.6 TANK:

The oil volume inside the tank shall be such that even under the extreme operating conditions, the pressure generated inside the tank does not exceed 0.4 kg/sq.cm positive or negative. There must be sufficient space from the core to the top cover to take care of oil expansion.

The tank cover shall have plasticised surface on live parts to guard against bird faults. Alternately, suitable insulating shrouds shall be provided on the bushing terminals.

a) The tank cover shall have plasticised surface on live parts to guard against bird faults. Alternately, suitable insulating shrouds shall be provided on the bushing terminals.

i) Main Tank : 2.0 mm (Min)
ii) Top Cover : 2.5 mm (min.)
iii) Bottom Cover : 2.5 mm (min.)

b) The tank without oil shall be capable of withstanding a pressure of 0.8 kg/cm^2 (g) above atmosphere at a vacuum of 760 mm of Hg for 30 minutes without any permanent deflection (pressure test shall be conducted as per IS –1180 Part-I). The permanent deflection should not be more than the limits specified in IS:1180 Part-I.

c) MEASUREMENT OF SHEET THICKNESS OF TRANSFORMER TANK/ METER & PROTECTION BOX:

The following measurements shall be carried out at respective Central Testing Lab (CTL) of the Discom(s) on the supplies of distribution transformers:

Measurement of Transformer Tank Thickness shall be done as follows:-

1.	Top Cover	At 2 places to be measured & average is to be taken.
2.	Bottom Cover	-do-
3.	Side Wall(s)	On all four sides (average is to be taken)
4.	M&P Box.	Both sides and front(average is to be taken)

· The nominal value of sheet thickness will be considered as mentioned in the Specification.

·· Rolling tolerance will be as per ISS:1852-1985 with latest amendment and no penalty will be charged on such measured thickness till tolerance limit of ISS.

··· Sheet thickness of transformer tank/ M&P Box for Distribution Transformers as per relevant tender specification are as under for ready reference:

Sr. No.	Rating (Single Phase)	Top Cover (mm)	Bottom Cover (mm)	Side of Tank (mm)	M&P Box (mm)
1	**5, 10, 16, 25 KVA**	2.5	2.5	2.0	2.0

Further it is also intimated that 5% variation beyond tolerance limit in measurement of sheet thickness on negative side shall be acceptable by the Discom with levy of penalty. The rate of penalty will be Rs.80.00 per Kg.

For example:

Weight of 5 KVA & 10 KVA Transformer Tank and M&P Box	80 Kg. (approx.)
Variation in thickness of tank / M&P Box	5% (beyond tolerance limit)
Then penalty levied will be	80x80x5 ---------- = Rs.320.00 100

In case any dimension in transformer tank/ M&P Box sheet thickness found beyond aforesaid limit of (-) 5% will not be acceptable to the Discom and the relevant sub-lot shall stand rejected and the lot of such transformers will have to be replaced by the firm.

The highest percentage variation on negative side in respect of measurement of sheet thickness of any part of tank & M&P Box will be applicable on the entire dimensions for levy of penalty.

Transformer having thickness even more than 5% after allowing rolling tolerance shall be acceptable.

The measurements of sheet thickness & size of Box will be carried out on all those sample transformers which are tested in CTL and test results will be applicable to the respective sub-lot or part thereof from which the sample is drawn.

NOTE_ Firm may supply M.S. Sheet type OR Deep Drawn type Meter & Protection Boxes.

5.7 The following shall also be adhered:

- The long seam joint, CSEAM joint, fittings & accessories and other welds shall be oil tight and no deflection / bulging should occur during service.
- Manufacturer should carry out the all welding operations as per relevant ASME standards and submit a copy of the welding procedure, qualifications and welder qualification certificate.
- The circular bottom plate edges of the tank should be folded upward, for at least 25mm to have sufficient over lap with vertical sidewall of the transformer.

Tank shall have permanent lugs for the lifting the Transformer body and there shall be facilities for lifting the core coil assembly separately.

The Transformer shall be provided with two mounting lugs suitable for fixing the transformer to a single pole by means of 2 bolts of 20 mm diameter as per ANSIC 57.12.201988. Both mounting lugs shall be made of steel of min. 6 mm thickness. Jump proof arrangements shall be provided on upper mounting lugs and lips shall be provided on lower mounting lugs for proper mounting of transformer on the pole. Both mounting lugs faces shall be in one plane (as per drawing enclosed).

The Transformer tank and the top cover shall be designed in such a manner as to leave no external pockets in which water can lodge. The top cover shall be fixed to the tank by proper arrangement to avoid ingression of moisture. Design of the top cover

shall be such that no water can lodge on the topside. HV bushing pocket shall be embossed to topside of the top cover so as to eliminate ingression of moisture and water. The edges of the top cover shall be formed, so as to cover the top end of the tank and gasket (as per drawing enclosed).

Minimum & Maximum Oil level mark shall be embossed inside the tank. Nitrite/neoprene rubber gaskets conforming to latest IS:4253 Part-II shall be provided between tank and top cover.

Continuous welding of one inch length each should be provided at four places on ring (i.e. welding the clamping ring at top cover as well as with tank) and nut bolt of the ring should be tag welded.

On each transformer stainless steel anti theft fastener of suitable size shall be provided for clamping rim to hold fast tank and tank cover. In case of flange provided on top cover 2 Nos. stainless steel anti theft fastener shall be used and in case of rim type tank top cover 1 No. anti theft fastener shall be used. **Alternatively Dome shaped side clamping type construction of clamping bolts with stopper washer with tack welding for antitheft purpose for top cover.**

6) TANK SEALING:

The space on the top of the oil shall be filled with dry air or nitrogen. The dry air (or nitrogen) plus oil volume inside the tank shall be such that even under extreme operating conditions, the pressure generated inside the tank does not exceed 0.4 kg/sq.cm positive or negative The nitrogen shall conform to commercial grade of relevant standards.

7) SURFACE PREPARATION & PAINTING :

7.1 General:

All paints shall be applied in accordance with the paint manufacturer's recommendations. Particular attention shall be paid to the following:

a) Proper storage to avoid exposure as well as extreme of temperature.
b) Surface preparation prior to painting.
c) Mixing and thinning.
d) Application of paints and the recommended limit on time intervals between coats.
e) Shelf life for storage.

All paints, when applied in a normal full coat, shall be free from runs, sags, wrinkles, patchiness, brush marks or other defects.

All primers shall be well marked into the surface, particularly in areas where painting is evident and the first priming coat shall be applied as soon as possible after cleaning. The paint shall be applied by airless spray according to manufacturer's recommendations. However, wherever airless spray is not possible, conventional spray shall be used with prior approval of Purchaser.

The manufacturer shall, prior to painting protect nameplates, 'lettering

gauges, sight glasses, light fittings and similar such items.

7.2 Cleaning and Surface Preparation:

After all machining, forming and welding has been completed, all steel work surfaces shall be thoroughly cleaned of rust, scale, welding slag or spatter and other contamination prior to any painting.

Steel surfaces shall be prepared by SAND/SHOT blast cleaning to Grade Sa. 2.5 of ISO 85011 or Chemical cleaning by Seven Tank Process including Phosphating (IS 3618).

The pressure and volume of the compressed air supply for blast cleaning shall meet the work requirements and shall be sufficiently free from all water contamination to ensure that the cleaning process is not impaired.

Chipping, scraping and steel wire brushing using manual or power driven tools cannot remove firmly adherent millscale and shall only be used where SAND/ shot blast cleaning is impractical. Manufacturer shall indicate such location, for owner's information, in his offer.

7.3 Protective Coating:

As soon as all items have been cleaned and within four hours of the subsequent drying, they shall be given suitable anticorrosion protection.

7.4 Paint Material:

Following are the types of paint that may be used for the items to be painted at shop and supply of matching paint to site:

Heat resistant paint shall be (Hot oil Proof) for inside surface.

Inside of tank Oil shall be painted with varnish or oil resistance paint. For external surface, one coat of thermo-setting powder paint or one coat of epoxy primer followed by 2 coat of polyurethane base paint shall be used .Total Dry film thickness as per IS 1180 Part-1 2014.

The colour of the finishing coats shall be olive green colour conforming to Shade No. 220 of IS –5 of 1961 in order to distinguish of star level transformer.

7.5 Painting Procedure:

All painting shall be carried out in conformity with both specification and with the paint manufacturer's recommendation. All paints in any one particular system, whether shop or site applied, shall originate from one paint manufacturer.

Particular attention shall be paid to the manufacturer's instructions on storage, mixing, thinning and pot life. The paint shall only be applied in the manner detailed by the manufacturer e.g. brush, roller, Conventional air spray and shall be applied under the manufacturer's recommended condition.

Minimum and maximum time intervals between coats shall be closely followed.

All prepared steel surfaces should be primed before visible rerusting occurs or within 4 hours, whichever is sooner. Chemical treated steel surfaces shall be primed as soon as the surface is dry and while the surface is still warm.

Where the quality of the film is impaired by excess film thickness (wrinkling, mud cracking or general softness) the supplier shall remove the unsatisfactory paint coating and apply another. As a general rule, dry film thickness should not exceed the specified minimum dry film thickness by more than 25%. In all instances where two or more coats of the same paint are specified, such coatings may or may not be of contrasting colours.

Paint applied to items that are not to be painted shall be removed at Supplier's expense, leaving the surface clean, unstained and undamaged.

7.6 Damaged Paintwork:

Any damage occurring to any part of a painting scheme shall be made good to the same standard of corrosion protection and appearance as that originally employed.

Any damaged paintwork shall be made good as follows:

a) The damaged area, together with an area exceeding 25 mm around its boundary, shall be cleaned down to bare metal.

b) A priming coat shall be immediately applied, followed by a full paint finish equal to that originally applied and exceeding 50 mm around the perimeter of the original damage.

c) The repainted surface shall present a smooth surface. This shall be obtained by carefully chamfering the paint edges before and after printing.

7.7 Dry Film Thickness:

To the maximum extent practicable the coats shall be applied as a continuous film of uniform thickness and free of pores. Over spray, skips, runs, sags and drips should be avoided. The different coats may or may not be of the same colour.

Each coat of paint shall be allowed to harden before the next is applied as per manufacturer's recommendation.

The requirement for the dry type film thickness (DFT) of paint and the materials to be used shall be as given below.

Sl. No.	Paint Type	Area to be Painted	No. of coats	Total Dry film thickness (min.)
1.	Thermosetting Powder Paint	Inside Outside	01 01	30 microns 60 microns
2.	Liquid Paint a) Epoxy(Primer) b)Polyurethene base(Finish coat) c)Heat resistance paint (Hot oil proof Paint)	 Outside Outside Inside	 01 02 01	 30 microns 25 microns each 35/10 microns

7.8 Tests:

The painted surface shall be tested for paint thickness.
The painted surface shall pass the Cross Hatch Adhesion Test.

8 RATING AND TERMINAL PLATES

8.1 **Rating & terminal marking plate:** Each Transformer shall be provided with non detachable name, rating and terminal marking plate fitted in a visible position. All details shall be given on one plate. Material of the plate shall be stainless steel only. Thickness shall be 0.9 mm (with a tolerance of ±0.1 mm). The plate shall be made absolutely undetechable either through welding or riveting or through any other approved method.
There shall be a rating plate on the transformer containing the information given in the relevant ISS.
The HV winding terminals shall be marked 1U & 1N. The corresponding secondary terminals shall be marked as 2u & 2n. In the diagram to be given on the name plate, the relative position of various terminals when viewed shall be clearly visible. Inspection shall not be undertaken unless all these details are verified by the Inspecting Officer.

Besides other particulars, following details shall also be given on the name plate:

i) P.O. No. month & year.
ii) Sr. No. of transformer.
iii) Date of despatch month & year.
iv) Date of expiry of guarantee period – month & year.
v) Maximum Guaranteed Load Losses at 50% and 100% loading.
vi) Recommended fuse sizes for HV & LV sides.
vii) Name & Full address of the manufacturer.
viii) Capacity of the transformer.
ix) Rating of the transformer.
x) Type – Oil filled naturally cooled.
xi) Energy Efficient level-2 and Standard IS1180 Part-1 with BIS Licence No.

ALL DETAILS ON THE "NAME RATING AND DIAGRAM PLATE" SHALL BE INDELIGIBLY MARKED i.e. BY ENGRAVING OR PUNCHING

8.2 Identity Plate: A.M.S. plate of size 50 x 50 x 2 mm shall be continuously welded to the main tank body and in clearly visible position, with following details clearly punched.

AJMER DISCOM TN –
…… KVA , S.NO. ……
……MAKE ……

8.3 **Identification Mark:-** In addition to above, the following identifying details shall be clearly punched on top cover with minimum 10 mm x 10 mm x 1 mm size punch letters.

MAKE _____
S. No. _____
T N _____

These identification details shall also be punched on two places (i.e. at

the top cover and transformer tank). The punching shall be distinct and visible. The dimensions of letters be 10x10x1 mm

The above identification mark shall also be punched / welded to one of the top core clamping channels.

A) Technical Plate- In addition to existing provision of identity plate and name plate one plate **i.e. Technical Plate of size 60 x 60 x 1.5 mm** also be affixed on the transformer **through continuous welding** mentioning the following details:-

A) Name of the Firm
B) TN No.
C) Make
D) Rating
E) Core : Core Dia. _____And Core Area. _____
F) LV Coil :-
   1. ID/OD Dimensions
   2. Conductor Size
G) HV Coil :-
   1. ID/OD Dimensions
   2. Conductor Size
H) Limb Centre
I) Window Height

9.0 PRESSURE RELEASE DEVICE:-

The transformer shall be equipped with a self sealing pressure release device designed to operate at a minimum pressure of 8 PSI (0.564 Kg/Cm^2).

i. FITTINGS

The following standard fittings shall be provided with each transformer.

a) Two earthing terminals.
b. Two lifting lugs.
c. Rating and terminal marking plates.
d. Pressure relief device.
e. Internal Circuit Breaker (On LV Side).
f. HV Bushings.
g. LV Bushings.
h. HV terminal connectors.
i. Top cover fixing clamps.
j. Mounting lugs – 2 Nos.
k. Bird guard or plasticised cover on live parts.
l. LV earthing arrangement.
m. Operating Mechanism of LT Circuit breaker.
n. Signal Light.
o. Five year Guarantee plate.
p. Any other fitting necessary for satisfactory performance of the manufacturer as per IS:1180 Part-1(2014).
q. Mounting Arrangement with pole will be as per drawing enclosed at Annexure-'B' for 5 KVA & 10 KVA Single Phase Distribution Transformer. The mounting structure/ arrangement shall be in the scope of supplier.

11.0 FASTENERS

▪All bolts, studs, screw threads, pipe threads, bolt heads and nuts shall comply with the appropriate Indian Standards for metric threads, or the technical equivalent. Bolts or studs shall not be less than 6 mm in diameter except when used for small wiring terminals.

- All nuts and pins shall be adequately locked.

▪**All Nuts, Bolts / Washers / Fasteners exposed to atmosphere used in transformers and Meter Protection Box should be of Stainless Steel.**

- Each bolt or stud shall project at least one thread but not more than three threads through the nut, except when otherwise approved for terminal board studs or relay stems If bolts are provided at inaccessible places for ordinary spanners, special spanners shall be provided.
- The length of screwed portion of the bolts shall be such that no screw thread may form part of a sheer plane between members.
- Taper washers shall be provided where necessary. Protective washers of suitable material shall be provided front and back of the securing screws.

12.0 LOSSES:

The total losses at 50% and 100% loading for single phase Transformers at rated voltage, frequency & 75 Deg. C shall not exceed the following values:

Rating in KVA	Voltage ratio in KV	Total losses at 50% loading (Watt) Max.	Total losses at 100% loading (Watt) Max.
5	11/√3 /0.240	**35**	**95**
10		**60**	**170**

These losses are maximum allowable as per Energy Efficient level-2,and there would not be any positive tolerance. Transformer with higher losses than the above specified losses would be rejected.

13.0 IMPEDANCE:

The recommended percentage impedance at rated current and at 75 Deg. C **2.5 % For 5 KVA and 4.0 % for 10, 16, 25 KVA** (with a tolerance of ± 10%).

14.0 TEMPERATURE RISE:

The temperature rise over ambient shall not exceed the limits described below:

Top oil temperature rise measured by thermometer : 35 Deg.C
Winding temperature rise measured by method : 40 Deg.C

Temperature rise test shall be conducted on Maximum measured total loss (No load at rated excitation+Load loss at max. current tap at 75 oC) at 100% loading shall be supplied during temperature rise test at a Govt. approved/ a Govt. recognized/ NABL accredited laboratory/ILAC i.e. International Laboratory Accredited Laboratory/ ILAC i.e. International Laboratory Accreditation Cooperation (in case of foreign laboratory).

The limit of temperature rise mentioned above will have to be satisfied by the manufacturer by carrying the Heat Run Test by feeding guaranteed losses.

In case the temperature rise exceeds the above values, transformers shall be rejected at risk, cost and responsibility of the supplier.

It must be noted carefully that readings for hot resistance after shut down shall be taken separately for HV & LV windings, which means, after completing the readings for one winding (HV or LV), the transformer shall be connected again and rated current passed for another 60 minutes (min.) and shut down taken again to take hot resistance readings for the remaining winding. This is in line with the requirement of CBIP manual, to ensure proper resistance v/s time curves.

Hot Spot temperature not to exceed 98 Deg. C when calculated over an annual weighted average ambient temperature of 35 Deg. C as per IS:2026 (Part-II Clause 4.9.4). **However, the transformer shall be designed for class 'A' insulation.**

The transformer shall be capable of giving continuous rated output without exceeding the specified temperature rise.Bids not conforming to the limits indicated above will be treated as non-responsive.

15.0 GUARANTEED AND OTHER TECHNICAL PARTICULARS FOR TRANSFORMERS

Guaranteed Technical particulars of the transformers offered shall be furnished in A-4 size paper by the Tenderer in the proforma appended herewith at **Annexure-A**. Complete details shall be furnished. Tolerances on weight quantity and dimension figures shall be ± 2% at the tender stage, subject to maintaining the minimum electrical clearances as per the specification. However, no negative tolerance shall be allowed on the short circuit type tested design. Electrical performance data shall be subject to tolerances as per ISS, unless otherwise specified in this specification. However, the Total losses at 50% & 100 % loading shall be maximum guaranteed without any positive tolerance.

16.0 TYPE TEST CERTIFICATE

The bidder shall furnish type test certificate(s) of offered design / similar design, wherever available with the bid.

1. DRAWING AND OTHER DOCUMENTS:

One set of dimensional drawing(s) and internal construction drawing of each transformer rating shall be submitted with the tender. The tender shall be accompanied with the following drawings/calculation sheets, as per the offered designs. Size of the drawings shall be A3 (420 x 297 mm) or A4 size only.

a) Name rating/diagram plate drawings.
b) Outline and General arrangement drawings
c) Core coil assembly drawings
d) Core section along with flux density calculation sheet / drawings.
e) Cooling area calculation sheet

f) Thermal ability short circuit calculation sheet

g) Core loss and magnetization curves of the laminations

h) Heat dissipation calculations (heat dissipation by tank walls excluding top and bottom should be 500 W/ sq.mm.

Any delay in submission of drawings shall be to supplier's account.

i) The Type test certificate of Internal circuit breaker conducted in the manufacturer which should be not older than 5 years from date of opening of the bid.

17.0 PROTECTION:

The transformer shall have the following CSP features for Internal Circuit Breaker:

The Meter Protection Box shall have one chamber only containing LT Bushing & outgoing LT terminal Bushings as per IS 3347 (Brass) for releasing consumer connections. The chamber is fully sealed. The drawing of the LT Box is enclosed at Annexure-A.

In 10% qty. of Meter Protection Box a provision for installation of Meter visible through glass window be kept in separate chamber for which the requirement shall be intimated as and when required during the execution of contract.

Further Following provisions be also ensuredon M&P Box and Transformer:-

1. On each transformers stainless steel anti theft fastener of suitable size shall be provided for clamping rim to hold fast tank and tank cover.

2. The M&P Box is firmly fixed with the transformer tank by providing all the nuts and bolts (total 8 Nos.) as per specification/approved drawing.

3. The Stainless Steel Anti-Theft Nuts and bolts should be provided on all the four corner bolts of box and remaining nuts should be tack welded with the bolts.

4. Hexagonal head of all the anti-theft nuts should be removed/detached so that the purpose of use of anti-Theft nut and bolt be fulfilled

5. It should be ensured that there should be continuous welding on the complete M&P Box and in case if only tack welding is found on the M&P Box body then the complete lot may not be accepted.

6.M&P Box should be properly fixed with LT side flange of transformer by using min. 3 mm thick gasket so that water should not be go inside of M&P Box.

(The above 5-Points appearing at Sr. No. 1 to 6 will be checked in Central Testing Lab)

17.1 The transformer shall have the following CSP features:

(a)**INRERNAL HV FUSES ON THE HT SIDE OF TRANSFORMER as per IS9385 Part-II:1980**

Specification for the HT fuses: Expulsion / any other suitable fuse placed in series with primary winding. This fuse is mounted normally inside of the primary bushing and is connected to the high voltage winding through a terminal block. Fuse shall be mounted in such a way that it should be possible to replace the fuse by opening HV bushing and without opening top cover.

This has to protect that part of the electrical distribution system which is ahead of the Distribution transformers from faults which occur inside the Distribution transformers i.e., either the windings or some other part of the transformer. It shall be ensured that this fuse does not blow for faults on the secondary side (LT side) of the transformer i.e., the blowing characteristic of the fuse and LT breaker shall be so coordinated that the fuse shall not blow

for any faults on the secondary side of the transformer and these faults shall be cleaned by the LT breaker only.

The fuse shall be make of ABB/ERMCO/Global/samrakshna/Transguard or any make approved by AVVNL.

(b) **INTERNALLY MOUNTED OIL IMMERSED LT BREAKER ON THE LV SIDE OF THE TRANSFORMER as per IS/IEC 60947-2:2003**:

LT circuit breaker: All LT faults after the breaker shall be cleared by this breaker. As such, it shall be designed for the perfect coordination with the HT fuse link. The supplier shall furnish the time/current characteristics of LT circuit breaker and 11 kV fuses for various current multiples. The two characteristics shall be drawn on the same sheet to indicate coordination between the circuit breaker and fuse. This shall be based on the type test carried out on one of the transformers. In addition, the supplier shall carry out coordination test as indicated above, and this forms one of the test for acceptance.

The breaker is to be mounted on the secondary side of the transformer under oil to minimize premature operations from primary surges as would be with undersized line fuses. Two single pole elements is preferred. THE BREAKER SHALL BE COORDINATED TRHEMALLY WITH THE TRANSFORMER RATING TO FOLLOW CLOSELY THE VARIATIONS OF COIL TEMPERATURE DUE TO FLUCTUATIONS IN LOADS AND AMBIENT TEMPERATURES.

This is to be accomplished by connecting the breaker in series between the secondary winding and the load current. The breaker shall be located in the same oil as the core and coil assembly so that the bimetal are sensitive to the temperature of oil as well as the load current.

The circuit breaker may be an electromechanical device with three elements viz..

(i) Temperature sensing (ii) latching and tripping and (iii) current interrupting. The temperature sensing function might be accomplished through the use of bimetallic strips, which would be built into the breaker, such that load current of the transformer flows through them. In addition to this, a magnetic tripping device is to be provided for increasing the opening speed of the breaker under high fault conditions. The circuit breaker shall be mounted inside of the transformer so that these bimetallic strips are within the top oil layer of the transformer. The latching and tripping functions of the circuit breaker may be carried out within assembly similar to those used in industrial
type air circuit breaker. The circuit breaker shall also be closed and opened manually standing on ground and with a magnetic trip device also. The current interruption element shall consist of copper current carrying parts plus a set of copper tungsten current interrupting contacts. The magnetic element shall increase the opening speed of the circuit breaker under high fault current conditions. The response of circuit breaker to the activity shall remain unchanged by the addition of the magnetic trip element. The specification to which the breakers conform shall be indicated. **The LT circuit breaker shall be make of samrakshna/Transguard/ Vijai Mercantile/ Global/ P&A/ ARDRY/ERMCO or any make approved by AVVNL.**

LOAD MANAGEMENT SIGNAL LIGHT:

A signal light, controlled by a bimetal in the breaker shall switch on when the transformer load reaches a predetermined level indicating that the transformer has been overloaded. The load management signal light shall perform two functions. It shall show visually when the particular
transformer has been operating in an overload condition and shall provide knowledge that for good system management, the economical change out point for the transformer is fast approaching. The signal light need not indicate temporary overloads and shall turn on only when the overload condition has existed at a given level for a certain length of time.
The LT circuit breaker shall have a set of auxiliary contacts builtin for signal light operation. These, normally open contact, shall form part of the signal light circuit. The signal light circuit shall consist of an auxiliary transformer winding (one or two turns) which generates about 4V, for the signal light contact set within the circuit breaker, and the signal light is to be mounted on the transformer tank. The signal light contact set is mechanically connected to the main circuit breaker latching and bimetal system. The signal light mechanism is adjusted so that the signal light contacts will close at a preset thermal condition which occurs before the main latching system opens the main contact. The net result is a visual external indication that a preset load condition has reached by the transformer. The signal light mechanism does not reset itself when the load drops off, the signal light remains lighted once the signal light contacts closes and can only be turned off by manually operating the external circuit breaker handle.

A distribution box is an enclosure (IP 33) is ready to be used condition and to be mounted on the transformer tank directly. The enclosure shall be made with sheet of thickness not less than 2.0 mm. It shall be painted with colour Shade No. 632 both inside and outside with powder coating. Enclosure shall have provision for pad locking arrangement. Detachable gland plate shall be provided for taking connections from distribution Box and transformer bushing terminal. The distribution box shall have Aluminium bus bar(covered with PVC Insulated tape) along with lugs fitted on bus bar for connecting two or more single core L.T. Aluminum Bunched Cable of size 16 sq.mm.

Instruction and operation Manual

The successful bidder shall be required to submit 5 copies of Instruction and Operation manual for each lot of 100 Transformers (or part thereof) supplied. This instruction manual should give complete details about the pre-commissioning tests/checks and the details of preventive maintenance.

18.0 QUALITY ASSURANCE PLAN

The purchaser intends to purchase Transformers only from Quality conscious manufacturers. Preference shall be given to those who possess ISO 9001 / 9002 Certification.

The bidder shall furnish the details in respect of following, in the schedule prescribed herewith this specification, failing which the offer is liable for rejection.

a) List of testing equipment and instruments available with bidder for inspection, testing and checking the transformers offered, as per tender specification

in the schedule of testing facilities (Schedule VIII). The calibration details should also be included.

b) List of machines. equipment/ T&P available with the bidder for manufacturing the transformers, in the schedule of Plant and machinery (Schedule IX).

c) Details of type tests conducted on the Transformers offered to supply in the schedule of type tests (Schedule X).

d) List of raw material components and sub – assembly to be used for manufacturing the equipment offered, in the schedule of raw materials and components (Schedule XII).

The bidder should possess adequate facilities for inspection and testing of the transformers, as per requirement of the relevant ISS and this specification. In case any supplier is found not having all the instrument /equipment required for testing, the offer shall be ignored. No borrowing of instruments/ equipment shall be allowed. Testing of the transformers shall also not be allowed at the works of any other manufacturer. However, testing may be allowed at any Government testing laboratory. Tenderers will have to produce documentary evidence for the purchase of AMORPHOUS/CRGO metal core laminations, transformer oil and Aluminium conductors.

19.0 INSPECTION AND TESTING:

i) The inspection and testing shall be conducted as per relevant clause of the general conditions of contract (Section II) at the place of manufacturer. The transformers shall be completely assembled and tested at the factory. The inspection may be carried out by the purchaser at any stage of manufacturing. The supplier shall grant free access to the purchaser's representative at all reasonable times when the manufacturing work is in process. Inspection and testing of any material under this specification by the purchaser shall not relieve the supplier of his obligation of supplying the material in accordance with the specification and shall not prevent subsequent rejection if the material is found to be defective.

ii) The supplier shall afford the inspector representing the purchaser. All reasonable facilities, without charge, to satisfy him that the material is being manufactured in accordance with the specification. The bidder must have adequate set of instruments for conducting testing as per class of 0.5 or better. The instruments shall be duly calibrated and Calibration certificates should not be older than one year on the date of presentation to the Inspecting officer. The calibration shall be arranged from NABL accredited testing house only. A comprehensive list of testing equipment / instruments indicating make, Sr.No. type of accuracy, calibrating agency, calibration date etc., should be furnished also with the bid. The calibrated instruments shall be duly sealed by calibrating agency to avoid any tampering with calibration and the details there of shall be clearly mentioned in the calibration certificate(s).

iii) The supplier shall keep the purchaser informed in advance, about the manufacturing programme so that arrangement can be made for inspection. The supplier shall give minimum fifteen days advance intimation to enable the purchaser to depute his authorized representative for stage inspection / witnessing of various tests on the equipment / material as detailed below:

NOTE:- Penal provision shall be made for any short technical parameters found / noticed in the transformers at any time even beyond guarantee period.

20.0 TESTS:

20.1 Routine / Acceptance Tests:

A) 100% testing of the Distribution Transformers shall be carried out at firm's works for measurement of total load losses at 50% & 100 % loading. Remaining testing shall also continue to be carried out as per practice.

All the assembled / finished transformers prior to dispatch shall be subjected to all the Routine Tests as per IS: 2026. Minimum 25% of the lot size samples for Routine tests & checking shall be selected by the inspecting officers at random subject to minimum five (5) Nos. The supplier shall invariably furnish manufacturer's Routine test certificates along with inspection call of the offered transformers for pre-despatch inspection.

The selected transformer samples shall be subjected to the following Routine / Acceptance Tests at the manufacturer's works in accordance with relevant ISS with latest amendments :

1. Measurement of Voltage ratio.
2. Measurement of No load losses & No Load current at 100% and 112.5% of rated voltage and normal frequency.
3. Measurement of load losses at rated voltage and normal frequency (at 50% & 100% loading).
4. Measurement of Impedance voltage at rated current and normal frequency.
5. Measurement of windings resistance cold (at or near the test bed temperature).
6. Insulation resistance.
7. Induced over voltage withstand test.
8. Separate source voltage withstand test.
9. Pressure Test(As per IS 1180 Part-1:2014)
10. Oil leakage Test(As per IS 1180 Part-1:2014)
11. Checking of rating and terminal marking plate.
12. Checking of weights, dimensions, fittings and accessories, tank sheet thickness, oil quantity, material, finish, paint thickness and workmanship as per purchase order and contract drawings.
13. Physical verification of core – coil dimension, internal clearances, provisions of required oil ducts in the HV and LV winding, conductor sizes, individual weights of HV and LV winding core laminations etc., with reference to contract drawings and type test report(s) by dismantling selected unit(s). The physical verification shall be conducted on units equivalent to one unit per 50 Nos. or part thereof of offered quantity randomly selected from the offered lot. The dismantled unit(s) after reassembly shall be accepted by the purchaser after routine testing in presence of his representative.

    During final inspection, sheet thickness shall also be measured of the transformer opened for physical verification. The instrument for measurement of sheet thickness will be provided by the supplier.

14. Oil dielectric strength (break down voltage) test shall be carried out on the transformers opened for physical verification and average value shall be calculated.
15. Checking of manufacturer's test certificates shall be done and copies thereof duly signed by firm's representatives and inspecting officers shall be enclosed with the inspection report.

Invoices of Amorphous/CRGO core material shall be provided by the supplier to the inspecting officer at the time of inspection and same shall be verified by the inspecting officer.

The following tests shall also be carried out at manufacturer's works on one complete unit of 5 KVA & 10 KVA:

i. Salt spray test and Hardness tests as per the relevant standards.

Fifteen days clear notice shall be arranged for predispatch inspection by Purchaser's representative as per General Conditions of Contract.
After successful inspection, the inspecting officer shall seal all the inspected transformers by tamper proof polycarbonate seals **on top cover bolts** of the transformer for identification. Before sealing the inspecting officer will ensure that all the offered transformers are complete and duly fitted with name, rating and diagram plate, identify plate and identification marks, as specified in this specification.

NOTE: Also after inspection/ testing, inspecting officer(s) shall affix Signature Seals also on each Transformer in addition to other seals.

a. The oil leakage test shall be conducted on transformer complete in all respects shall be tested at a pressure equivalent to twice the normal head at the base of tank for 6 hours. There should be no leakage at any point.

20.2 TYPE TESTS & SPECIAL TESTS:

In addition to above tests the following type tests shall be arranged **on one transformer only as per IS :1180 (Part-1/2014)**in accordance with IS 2026 (Part 1 to III) with latest amendments, at laboratories accredited by National Accreditation Board/ Govt. approved lab for testing and calibration laboratories (NABL).

(a) SHORT CIRCUIT TEST FOR DYNAMIC AND THERMAL ABILITY:

The Short circuit test for dynamic and thermal ability shall be arranged on one unit of each rating. The transformers for the test shall be selected /sealed by our inspecting officer from the first lot which shall be of minimum 20 Nos. (if ordered quantity is 500 Nos.) OR 50 Nos. (if ordered quantity is more than 500 Nos.). The Short Circuit test shall be conducted only after successful Routine tests including measurement of No Load and Load Losses (at 50% & 100% loading). The supply shall be accepted only after arranging successful type test on the selected transformer(s).

2. IMPULSE VOLTAGE WITHSTAND TEST:

The Impulse Voltage withstand test as per clause No. 13 of IS:2026 (Part-III) – 1981 shall be arranged. Impulse voltage withstand test shall be **Minimum 75KVp** for 11 KV class transformers. The test shall be conducted on one unit of each rating to be selected by our inspecting officer from the first lot of minimum 20 Nos. (if ordered quantity is 500 Nos.) OR minimum 50 Nos. (if ordered quantity is more than 500 Nos.). The supply shall be accepted only after arranging successful Impulse test on the selected transformer(s).

Note :-If ordered qty. Is less than 500 Nos. In such case first lot shall be of min. One month qty as per scheduled delivery .

3. TEMPERATURE RISE TEST:

Temperature rise test shall be conducted on Maximum measured total loss (No load at rated excitation+Load loss at max. current tap at 75 oC) at 100% loading shall be supplied during temperature rise test at a Govt. approved/ a Govt. recognized/ NABL accredited laboratory/ILAC i.e. International Laboratory Accredited Laboratory/ ILAC i.e. International Laboratory Accreditation Cooperation (in case of foreign laboratory).

The transformer shall be capable of giving continuous rated output without exceeding the specified temperature rise. Bids not meeting the above limits of temperature rise will be treated as non responsive.

d) PRESSURE TEST:(As per IS 1180 (Part 1):2014)

This test shall be conducted as type test at a Govt. approved/ a Govt. recognized/ NABL accredited laboratory. The pressure gauge shall be duly calibrated and sealed by an independent recognised test lab(s).

The test procedure shall be as detailed below :

The tank subjected to air pressure of 100 KPa above atmospheric pressure for 30 min. There should be no leakage at any point and is no deformation of tank.

No extra time shall be allowed for arranging these type tests. The cost of above Type Tests shall be borne by the supplier.

The programmed indicating date and place of type test(s), be intimated enabling purchaser to depute his representative to witness the test if desired. The testing house shall be advised to arrange type test result directly alongwith drawings duly attested by the testing authority for our scrutiny and approval. The type-tested transformer(s) shall also be accepted as the part of the supplies.

The requirement of arranging above type tests shall however not to be insisted on the suppliers who have arranged the above type tests within last 5 years from the date of opening of this tender on similar design. Minor changes in the present

specification will not necessitate repetition of type test(s), if design of core-coil assembly is similar in essential details.

21.0 RANDOM SELECTION AND TESTING (RST):

21.1 The purchaser may select transformer(s) from the supplied lot(s) at random from the stores for conducting the following type tests, at any test house(s) as mentioned above. The supplier shall arrange these tests including loading, unloading and to & fro transportation from our stores to the test house(s). The charges for such tests shall be reimbursable to the supplier on actual basis on production of documentary evidence in case the selected sample successfully withstand type test(s) In case of otherwise, no charges will be reimbursed.

i. Short circuit withstand test for Dynamic & Thermal ability. Measurement of No load&loadLosses at 50% and 100% loading shall form part of tests conducted before and the after the short circuit test and recorded in the report.
ii. Impulse test as per Clause No.13 of IS:2026 (Part-III). Impulse voltage shall be **Minimum 75 KVp**.
iii. Temperature Rise Test as per IS 2026 Part 2
iv. Pressure Test as per IS 1180 Part-1:2014

v. Purchaser reserves the right to carry out any site tests he may decide upon at his own expenses. In case equipment/ material are not found as per P.O., all expenses incurred during the testing will be to supplier's account and material shall be replaced by the supplier at site free of cost.

FAILURE IN TYPE TEST(S):

In the event of failure / unsatisfactory results of the transformer(s) in short circuit test / impulse type tests/ Temperature rise Test/ Pressure Test, the supplier shall have to replace the supplies already made and no further transformers shall be accepted. The purchaser however, at his option, may accept the transformers already supplied with the following conditions-

i) Guarantee period of the supplied transformers issued to the field shall be increased by double the normal Guarantee period.
ii) Bank Guarantee shall be extended to cover the additional Guarantee period.
iii) For failure in any of the type tests listed under RST i.e., short circuit test / Temperature rise Test/ Pressure Test& Impulse withstand test, no further supplies shall be accepted. The type test charges shall also not be reimbursable in this case and shall be borne by the supplier.
iv) The transformers lying in the store(s) shall be replaced as per sub para (v) below.
v) The bidder shall, however, be allowed to check the reasons of failure and if need be, to improve / modify the design. Further supplies, including replacements against supplies already made, shall be accepted only after successful type test(s) are arranged on fresh transformer(s)

selected by the authorized representative of the purchaser. All the type tests shall be arranged in case there is change in the design, otherwise, type test shall be repeated only for the test in which failure has occurred. Charges for such test(s) shall be borne by the supplier. However, in the event of failure of transformer in the repeat type test, the purchaser may take following actions:

a) Cancel pending orders of the rating in which failure(s) has occurred, &
b) Not place any order of Distribution Transformers on the firm for one two year(s).

21.2 Measurement of Total Losses (at 50% & 100% loading):

(i) After pre-dispatch inspection of material at firm's works, the dispatch instructions will be issued for the respective store(s) as per requirement of Nigam. Sample(s) will be drawn from the lot(s) received in store(s) and will be subjected to the following test(s):

b) One transformer will be selected out of every lot of 10 Nos. or part thereof for measurement of No load Losses at rated voltage; No Load current (at 100% and 112.5% of rated voltage); Impedance voltage, thickness of tank body sheet and total Losses at 50% and 100% loading at rated current. The testing shall be arranged either at purchaser's own testing lab and / or at independent test lab. The testing charges for such tests shall be borne by the purchaser. The test results will be applicable to the respective lot of 10 Nos. from which sample was drawn.

c) In case if dispatch instructions are less than 10 Nos. than one sample shall be selected from each store (s) and the test result so obtained shall be for the quantity consigned / received by the store (s).

The percentage impedance voltage at rated current shall not exceed the permissible limit as specified with allowable tolerance failing which the sub lot of transformers represented by the sample shall be rejected. The transformers selected for total Losses shall also be subjected to magnetizing current and in case found beyond the limit, the lot shall stand rejected.

The I.R. values of the sample(s) shall be measured at CTL, Ajmer and it must be more than 50 MEGA-OHM.

One sample out of 100 Nos. transformers or part thereof (whose Sr. No. shall be decided by the committee members) shall be selected for physical verification/ checking of window height, limb centre and checking of insulation of HV and LV windings, make of Inbuilt circuit breaker size of lugs and size of PVC Copper cable at CTL.

Minimum 02 Nos. samples will be tested for Internal Clearances .One sample will be selected from first lot and another sample will be selected from any other lot of balance supply shall be tested at CTL, AS UNDER, for minimum clearances specified in the specification in presence of firm's representative. No negative tolerance shall be admissible. If clearances are not found as per specification then the lot shall be rejected.

Note: The following Internal Clearances shall be checked without opening of core assembly in each of the transformer which is selected for physical verification at CTL (i.e. one sample from a lot of 100 nos. or part thereof):

i) Clearance between inner wall of tank and coil (mm).
ii) Minimum clearance between core and tank bottom (mm).

And checking of **following clearances will not be insisted for measuring at CTL** till sufficient infrastructure, storage and testing facilities are available.

a. Radial Clearance between HV and LV windings (mm).
b. Radial Clearance between LV coil from core (mm).
c. End Clearance of HV coil from Yoke (mm).

These sample(s) tested in CTL will be lifted directly by the firm from CTL after giving the receipt of distribution transformers received and this receipt shall be sent to the concerned consignee(s) by CTL for making entry in the consignee(s) record. The samples will be re-offer by the firm for inspection.

NOTE:

If the total losses are found more than 10% of specified losses at 100% loading then apart from rejecting the lot, firm's balance order would be cancelled and such firms shall not be awarded any order for one year or in next tender of tendered rating to be opened / finalized whichever is later.

The tolerance in window height shall be ±2 mm,If the window height found beyond±2 mm but up to 7.5 mm then the lot shall be rejected. However if the window height is found more than 7.5 mm, then apart from rejecting the lot, firm's balance order would be cancelled and such firms shall not be awarded any order for one year or in next tender of tendered rating to be opened / finalized whichever is later.

No tolerance shall be allowed during CTL testing and in case any parameter which are to be tested in CTL are found beyond guaranteed parameters, the lot/ sublot shall stand rejected.

If the contractor / supplier fails to lift the material declared rejected or any part thereof from the consignee within a period of 15 days from the date of dispatch of information from the purchaser, the purchaser shall be entitled to effect recovery along with other actions as per Clause No. 1.62 of Section-II (General Condition of Contract).

21.3 **CHALLENGE TESTING CLAUSE**:

The other manufacturer who have either participated in the instant tender enquiry can request challenge testing for tests covered in this clause based on specification & losses. The challenger would request for testing with testing fee. The cost of to & fro transportations of all transformer tested under the provision of this clause along with loading & unloading and transit insurance at actual shall be borne by Challenger firm. The challenge testing fees shall be at least three times the cost of testing. The challenger would have the opportunity to select the sample from the store. The party challenged ,challenger & the utility could witness the challenge testing. The challenge testing would cover the

i. Measurement of Magnetizing current
ii. No Load Losses test
iii. Load Losses test
iv. Temperature Rise Test.

The challenge test could be conducted at any Govt. / NABL accredited Lab. like ERDA /CPRI. If the values are within limits as per specification including tolerance allowed in CTL, the products gets confirm else not confirmed. If the product is not confirmed, the manufacturer will pay the challenge fee and challenger would get the fee refunded. However, as a redressal system, the manufacturer (challenged firm) would be allowed to ask for fresh testing of two more samples from the store and the same be tested in a NABL/Govt. laboratory in presence of party challenged, challenger & the utility. If any one or both sample does not confirm the tests then the product is said to have failed the test. In such cases, the manufacturer (challenged firm) will be declared as unsuccessful manufacturer for the said product and balance supply shall not be availed and the balance order shall be cancelled with levy of maximum penalty. Firm shall also be debarred for one year or participating against next tender for that rating, whichever is later. The transformers already supplied (including tested in challenge testing) shall be accepted with the following conditions:
i)Guarantee period of the supplied Transformers shall be increased by double the normal guarantee period.
ii) Bank guarantee shall be extended to cover the additional guarantee period.

22. PRICE:

The prices shall be quoted on F.O.R. destination basis in the manner detailed in schedule of prices (BOQ) indicating details of **ex-works price, freight & insurance charges, and GST** for delivery at our stores. The quoted prices shall be variable as per IEEMA price variation formula attached herewith at **Schedule-II,** without any ceiling for distribution transformers**.** The base date for price variation shall be **01.07.2017** irrespective of date of tender opening.. The prices shall be quoted after considering modvat benefits & benefit of VAT available to the supplier. The offers where the prices have not been quoted in prescribed manner are liable for rejection.
The bidder shall submit transformer cost analysis sheet along-with the tender– including the cost of raw materials, overhead expenses, estimated profit, etc., for each rating separately, as per the annexure attached with the specification. In case the cost analysis sheet is not enclosed Nigam may consider to ignore such offers.

NOTE: Payments shall be made only after receipt of successful test report from our Central Testing Laboratory (CTL) on the samples selected from the material received at the stores, however, the payment priority shall be maintained from the date of submission of bills alongwith receipted challans to the Accounts Officer (CPC), AVVNL, Ajmer.

23. GUARANTEE PERIOD:

Ia) For Out of Rajasthan State Firms

Performance guarantee of the transformer(s) with LT protection unit shall be for the period of 36 (Thirty Six) months from the date of dispatch. The date of expiry of

guarantee period shall be marked on the rating plate. Transformer(s) alongwith LT protection unit failed within such guarantee period shall have to be repaired / rectified free of cost expeditiously.

Further, the firm will repair G.P. failed transformers irrespective of breakage of body seals as well as physical damage of transformer tank body due to bursting. The period during which transformer remained defective / failed will not be accounted in the performance guarantee period. The period of defective will be reckoned from the date of first intimation (i.e. field officer / Consignee whichever is earlier) to date of delivery after repair.

Note:

i) The firm will repair all type of G.P. failed Distribution transformers without asking any segregation on account of manufacturing defect.

ii) The guarantee period failed transformers will directly be lifted by the supplier from the respective circle store and after due repair within a period of 120 days (from the date of intimation by the respective consignee) will deposit the same in the ACOS / Central Store, if operative. After receiving the material at ACOS / Central Store, the same shall be tested at CTL as per provisions of the relevant contracts and will be issued to the circle store as per requirement of Nigam's account.

iii) The loading of G.P. failed Distribution Transformers at circle store and unloading at ACOS will be on supplier account.

Firms shall lift G.P. failed Transformers from the stores within 60 days of its intimation positively and deliver the same after repair in next 60 days. In case firm fails to lift G.P. failed Transformer within 60 days, cost of the transformer(s) shall be withheld from its payment bills and in case firm fails to deliver transformer after due repair within 120 days, a penalty at the rate of ½% per week subject to maximum 10%, shall be levied for the late delivery of repaired Transformer(s). Firm shall lift G.P. failed transformers after furnishing safe custody bank guarantee, the slab of safe custody Bank Guarantee shall be as under.

Safe custody Bank Guarantee :-

The Safe Custody Bank Guarantee (SCBG) shall be 1% of the value of the contract or as per following SCBG slabs whichever is lower.

1. **In case if order is upto 1000 Nos. DT's the firm have to give safe custody Bank Guarantee for Rs.5.00 Lacs and**
2. **if order is more than 1000 Nos. but upto 3000 Nos. then the safe custody BG for Rs.10.00 lacs and**
3. **In case for orders more than 3000 Nos. DT's the value of safe custody BG shall be Rs.20.00 Lacs.**

   In case firm fails to furnish the safe custody BG the amount equivalent to safe custody BG shall be deducted from firm's first bill due for payment. On furnishing of safe custody BG the amount so deducted shall be returned to the firm. The safe custody BG shall be valid for a period of 12 months over and above the normal GP. After a period of 16 months from normal GP the safe custody BG shall be returned back unless there is some specific direction from the purchaser.

FOR AJMER DISCOM:

In case a central store is created in Ajmer Discom then all ACOS(s) shall deposit the G.P. failed distribution transformers to Central Store at Ajmerfrom where respective firm may lift these transformers for repair work after furnishing of required SCBG (as mentioned above). The charges for arranging the transportation of G.P. failed distribution transformers from site to centralize store (to and fro) as decided by AVVNL shall be recovered from you. The separate orders shall be issued by the respective Discoms if central stores is created by them.

Ib) For Rajasthan State Firms

Performance guarantee of the transformer(s) with LT protection unit shall be for the period of 36 (Thirty Six) months from the date of despatch. The date of expiry of guarantee period shall be marked on the rating plate. Transformer(s) alongwith LT protection unit failed within such guarantee period shall have to be repaired / rectified free of cost expeditiously.

Further, the firm will repair G.P. failed transformers irrespective of breakage of body seals as well as physical damage of transformer tank body due to bursting. The period during which transformer remained defective / failed will not be accounted in the performance guarantee period. The period of defective will be reckoned from the date of first intimation (i.e. field officer / Consignee whichever is earlier) to date of delivery after repair.

Note:

i) The firm will repair all type of G.P. failed Distribution transformers without asking any segregation on account of manufacturing defect.

ii) The guarantee period failed transformers will directly be lifted by the supplier from the respective circle store and after due repair within a period of 120 days (from the date of intimation by the respective consignee) will deposit the same in the ACOS / Central Store, if operative. After receiving the material at ACOS / Central Store, the same shall be tested at CTL as per provisions of the relevant contracts and will be issued to the circle store as per requirement of Nigam's account.

iii) The loading of G.P. failed Distribution Transformers at circle store and unloading at ACOS will be on supplier account.

Firms shall lift G.P. failed Transformers from the stores within 60 days of its intimation positively and deliver the same after repair in next 60 days. In case firm fails to lift G.P. failed Transformer within 60 days, cost of the transformer(s) shall be withheld from its payment bills and in case firm fails to deliver transformer after due repair within 120 days, a penalty at the rate of ½% per week subject to maximum 10%, shall be levied for the late delivery of repaired Transformer(s). Firm shall lift G.P. failed transformers after furnishing safe custody bank guarantee, the slab of safe custody Bank Guarantee shall be as under.

Safe custody Bank Guarantee :-

The Safe Custody Bank Guarantee (SCBG) shall be 1% of the value of the contract or as per following SCBG slabs whichever is lower.

1. In case if order is upto 1000 Nos. DT's the firm have to give safe custody Bank Guarantee for Rs.5.00 Lacs and
2. if order is more than 1000 Nos. but upto 3000 Nos. then the safe custody BG for Rs.10.00 lacs and
3. In case for orders more than 3000 Nos. DT's the value of safe custody BG shall be Rs.20.00 Lacs.

In case firm fails to furnish the safe custody BG the amount equivalent to safe custody BG shall be deducted from firm's first bill due for payment. On furnishing of safe custody BG the amount so deducted shall be returned to the firm. The safe custody BG shall be valid for a period of 12 months over and above the normal GP. After a period of 16 months from normal GP the safe custody BG shall be returned back unless there is some specific direction from the purchaser.

FOR AJMER DISCOM:

In case a central store is created in Ajmer discom then all ACOS(s) shall deposit the G.P. failed distribution transformers to Central Store at Ajmer from where respective firm may lift these transformers for repair work after furnishing of required SCBG (as mentioned above). The charges for arranging the transportation of G.P. failed distribution transformers from site to centralize store (to and fro) as decided by AVVNL shall be recovered from you. The separate orders shall be issued by the respective Discoms if central stores is created by them.

II) All the transformers repaired/ rectified by the manufacturer under guarantee clause shall carry a further guarantee of 12 months after repair or unexpired guarantee of 36 (Thirty Six) months from the date of supply, whichever is later, after repair/ rectification. The bank guarantee equivalent to cost of repaired transformers shall be furnished after expiry of performance guarantee period to cover such repair guarantee. The purchaser also reserves the right to with held the payment of supplier firm, under any other contract, if the performance of the supplier in repaired the failed transformers is not satisfactory. Each supplier shall invariably furnish the detailed information about the total number of transformers failed and repaired by them, every month after commencement of supplies.

III) In order to ascertain that transformers have successfully completed guarantee period the following details shall be provided on the transformer body:

i) A repair identification steel plate of size 75 x 75 x 2.5 mm duly engraved with following repair details shall be welded on the transformer body.

Firm'sName / Logo
TN
KVA
Sr.No.
Date of supply

	Ist time	**IInd time**	**IIIrd time**
Date of failure			
Date of repair			
Guarantee period extended.			

ii) Such metallic plate fixed on first repair should not be removed at the time of second repair or any subsequent repair. However, necessary details of failure and repair shall be graved on the repair identification plate, each time it is repaired in guarantee.

iii) The repaired G.P. failed transformer shall be provided with 40 mm wide red colour band all around transformers including radiator each time it is repaired in G.P. Thus if a transformer is repaired three time in G.P. then there should be three coloured bands each of size 40 mm.

i) All due care should be taken to ensure that the original name plate and identification plate provided should not be removed from the position at which they are fixed originally. In case it is felt that these are loose then it should be repaired suitably by welding or riveting.

ii) Test checking of G.P. failed transformers will be allowed to the supplier at Nigam's store before lifting of G.P. failed distribution transformers to repair at supplier's works so that minor mistakes like loosing of connections/ replacement of fuse wire/ replacement of MCCB be carried out at Nigam's stores.

iii) G.P. repaired Distribution may be got tested at CTL as per the sampling plan of new transformer except the physical opening test. The 10% tolerance (as per IS:2026 part –I/1977) be allowed on total losses at 50% and 100% loading for the transformers failed under guarantee period for testing at firms' works as well as in CTL testing

iv) An undertaking shall be furnished by the firms, who will supply the amorphous distribution transformers that in case transformer fails beyond guarantee period, it shall be repaired by them on the rates, terms & conditions of Nigam's existing CRC for repair of distribution transformers and in case firm denies to repair the transformers under CRC, such firms shall not be awarded order in subsequent tender.

NOTE:-1.Firm shall keep the records for at least 8 years of transformers supplied by them.

2.As per GCC, the lifting of G.P. failed transformers and delivery after repair is the responsibility of the firm, therefore, loading and unloading charges may be borne by the supplier as decided by Nigam/CLRC rate time to time. The Central Store/ respective circle stores (as the case may be) will intimate these charges directly to the Sr. A.O. (CPC), AVVNL, Ajmer under intimation to firm every month / year

24. DELIVERY SCHEDULE:

The bidders are required to indicate the delivery period in the schedule attached herewith. The commencement period shall include the time taken for conducting the type test and approval of drawings etc. **The maximum commencement period should not be more than 45 days from the date of receipt of P.O. Further the monthly delivery quoted shall be such that the entire offered quantity shall be completed within a period of 10 months from date of receipt of P.O. including**

commencement period. The offers deviating in deliveries as per above schedule given, shall be considered as non-responsive. The monthly delivery shall be quoted irrespective of the offered / ordered quantity and offers with any conditional deliveries shall be considered as non-responsive.

25. PERFORMANCE BANK GUARANTEE FOR RAJASTHAN BASEDFIRMS:

FOR AJMER DISCOM ONLY:

i) Performance bank guarantee shall be furnished as per provision of relevant clauses of the General Conditions of Contract for amount equivalent to 10% of contract value. The bank guarantee shall be initially valid for 60 months and shall be further extended to cover the balance guarantee period whenever required by the purchaser. The performance bank guarantee shall be furnished in the prescribed proforma on a **Rajasthan Govt. Non-Judicial stamp paper (where-ever applicable) amounting to 0.25% of the B.G value or Rs. 25,000/- , whichever is less. (It will also applicable on other type of Bank guarantee(s) .** Outside the state of Rajasthan firm not furnished the B.G. on non judicial stamp paper of Rajasthan Govt. then they shall to furnish differences of stamp duty required as per Rajasthan Stamp Act in addition to stamp duty of B.G. furnished. You shall also furnish manufacturer's warranty on non-judicial stamp paper worth **Rs. 500/-** of Govt. of Rajasthan as per clause No.1.41.2(a) of GCC in the prescribed proforma.

ALTERNATIVELY

You shall be exempted from furnishing of Performance Bank Guarantee in case you will furnish the Composite Bank Guarantee according to following slab of single order value (total F.O.R. value):

			Amount of Composite Bank Guarantee (CBG) in Rs.
i)	Single order of value upto Rs.1.00 crore	-	Rs.5.00 lacs
ii)	Single order above Rs.1.00 crore to Rs.2.00 crores	-	Rs.10.00 lacs
iii)	Single order above Rs.2.00 crore to Rs.5.00 crores	-	Rs.15.00 lacs
iv)	Single order above Rs.5.00 crore to Rs.10.00 crores	-	Rs.25.00 lacs
v)	Single order above Rs.10.00 crore to Rs.15.00 crores	-	Rs.35.00 lacs
vi)	Single order above Rs.15.00 crore to Rs.25.00 crore	-	Rs.50.00 lacs

This is subject to the condition that total value of orders in hand (under execution) is upto Rs.2.5 crore for each Composite Bank Guarantee (CBG) of Rs.5.0 lac. In case or otherwise, the manufacturer will arrange the CBG of corresponding value or furnish a separate PBG @ 2% of amount exceeding Rs.25.00 crore.

The benefit of composite Bank guarantee be given only before submitting PBG/PBG amount deducted by SrAO (CPC).If once firm submit PBG or amount

deducted by Sr AO (CPC) , the amount of PBG will not be released till performance period over and request for CBG will not be entertained during currency of contract.

26. QUANTITY:

Sr. No.	Item / Rating	Quantity in Nos.
1.	11/√3 KV / 240 V, 5 KVA RATING OUT DOOR TYPE COMPLETELY SELF PROTECTED SINGLE PHASE **ALUMINIUM WOUND ENERGY EFFICIENT LEVEL-2** DISTRIBUTION TRANSFORMERS WITH INBUILT CIRCUIT BREAKER.	**5000 Nos.**
2.	11/√3 KV / 240 V, 10 KVA RATING OUT DOOR TYPE COMPLETELY SELF PROTECTED SINGLE PHASE **ALUMINIUM WOUND ENERGY EFFICIENT LEVEL-2** DISTRIBUTION TRANSFORMERS WITH INBUILT CIRCUIT BREAKER.	**5000 Nos.**

Note: Besides above changes, the technical parameters of the specifications wherever are deviating from the IS:1180 (Part-I/2014), the same shall be in accordance with IS:1180 (Part-I/2014) and its latest amendments, if any and the changes where the IS:1180 (Part-I/2014) is silent for technical parameters, same shall be applicable as per Discom specification.