



JODHPUR VIDYUT VITRAN NIGAM LIMITED

Office of the Superintending Engineer (MM&C)

Regd. Office: New Power House Premises, Industrial Area, Jodhpur-342003.

Corpote Identity Number (CIN)-U40109RJ2000SGC016483

Ph. No. : 0291 - 2742223: /Fax No. 0291- 2746539 / E-mail-semmcjdvvn@gmail.com

TENDER SPECIFICATION NO. JdVVNL/SE (MM&C)/EIAI/TN-1516

Tenders are hereby invited in e-tender system for Purchase of 11/0.433 KV, DISTRIBUTION TRANSFORMERS WITH ENERGY EFFICIENCY LEVEL-2, STAR-1 of 500 KVA rating.

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.	500 KVA, 11/0.433 KV, 3 PHASE, ENERGY EFFICIENCY LEVEL-2, STAR-1, COPPER WOUND, DISTRIBUTION TRANSFORMER	33 Nos.

A	NIT No.	TN-1516
B	Cost of tender specifications	Rs. 2500.00 + GST@18% = Rs. 2,950.00 (Non -Refundable) (Rs. Two Thousand Nine Hundred & Fifty Only)
C	Processing fee of RISL	Rs. 1000.00 (One Thousand Only) (Non -Refundable)
D	Estimated Tender Value	Rs. 1,94,00,000.00
E	Bid Security to be deposited with the tender	(i) General Bidder: Rs.3,88,000.00 (ii) Sick Unit : Rs. 1,94,000.00 (iii) SSI Units of Rajasthan : Rs. 97,000.00*
F	Validity	120 days from the next date of opening of techno-commercial bid.
G	Base date for price variation	01.02.2019 (Irrespective of tender opening date)

IMPORTANT DATES

S.N.	Events	Date & Time	Location
1	Date of downloading of tender specifications	Up to 28.03.2019 (06:00 PM)	www.jdvvn.com & http://eproc.rajasthan.gov.in
2	Deposit of cost of Tender Specifications, Processing fee & Earnest Money	Up to 28.03.2019 (3:00 PM)	Office of Sr. A.O (Cash & CPC), JdVVNL , New Power House, Industrial Area, Jodhpur
3	Last Date & time of submission of electronic bid	Up to 29.03.2019 (12:00 PM)	http://eproc.rajasthan.gov.in
4	Opening of Technical Bid	29.03.2019 (03:00 PM)	http://eproc.rajasthan.gov.in
5	Opening of Price Bid	To be intimated separately to the qualified bidders	http://eproc.rajasthan.gov.in

***In case SSI unit of Rajasthan quotes the less than the tendered quantity , then they are required to furnish Bid security @ 0.5% of the estimated value of the quantity offered by them, failing which bid shall be considered non-responsive.**

The Micro, Small & Medium Scale Industries of Rajasthan and Sick Industries, other than Small Scale Industries, whose cases are pending before the Board of Industrial and Financial Reconstruction (BIFR) shall furnish self attested documentary evidence duly attested by notary to claim the above.

The bid security may be given in the form of banker's cheque or demand draft in favour of Senior Accounts Officer (Cash & CPC), JDVVNL, Jodhpur payable at Jodhpur or bank guarantee, in specified format, of a scheduled bank in favour of Superintending Engineer (MM&C), JDVVNL, Jodhpur, be deposited to the Sr. Accounts Officer (MM&C), JDVVNL, Jodhpur up to stipulated date & time, and obtain a receipt/acknowledgement thereof. No other mode of deposit shall be accepted.

At the time of depositing the Bid security amount in the office of the Sr. Accounts Officer (MM&C), JDVVNL, Jodhpur, the bidder shall also furnish self-attested documentary evidence duly attested by Notary of SSI unit of Rajasthan and of sick unit and also to submit a letter of quantity offered by them alongwith an Affidavit for MSME unit of Rajasthan in the enclosed format as per Schedule XI is to be furnished on non-judicial stamp paper of Rs.100/- duly attested by Notary public, to the office of Sr. Accounts Officer (MM&C), JDVVNL, Jodhpur. The Bid Security bank guarantee of requisite amount shall be furnished on non-judicial stamp paper of Rajasthan State. Also furnish the undertaking for the CA certificate in the enclosed format as per Annexure-I on non-judicial stamp paper of Rs.100/- duly attested by Notary public alongwith the original / notorised CA certificate as per requirement of tender specifications.

NOTE:-

- 1. Wherever EMD and Security Bank Guarantee (SBG), are appearing in the ITB, GCC & other Bidding Documents, same is hereby replaced by BID SECURITY as above.**
- 2. VENDOR REGISTRATION: The relaxation/exemption given to the registered vendors of the Nigam in respect of EMD/SBG, wherever appearing in the ITB, GCC & other Bidding documents, are hereby WITHDRAWN.**

INDEX

Section-I	Instructions to bidders	For e-Tendering
Section-II	General Conditions of Contract	
Section-III	Technical Specification	
Schedule-I	Schedule of Requirement	
Schedule-II	Price Variation Formula	
Schedule-III	Details of Standards	
Schedule-III A	Pre Qualification Requirement (PQR)	
Schedule-III B	Performa for Bank Guarantee in lieu of Type Test	
Schedule-IV	Price Schedule(Bill of Quantity)	To be uploaded on line on website in BOQ
Schedule-IVA	Details of tendered quantity, quantity offered along with justification with reference to qualifying Requirement.	The bidder is required to justify quantity offered as per qualifying requirement.
Schedule V	Departure from Guaranteed Technical Particulars	
Schedule V (A)	Guaranteed Technical Particulars For Transformer.	
Schedule VI (A)	Departure from the requirement of Technical Specification.	
Schedule VI (B)	Departure from commercial terms & conditions of specification	
Schedule VII	List of Past Supplies	
Schedule VII A	C.A. Certificate for Quantity Justification.	
Schedule VIII	Delivery schedule.	
Schedule IX	List of equipment & technical hands available with the bidding firm.	
Schedule X	General Particulars about the bid in brief.	
Schedule XI	Format of Affidavit for Rajasthan MSME	
General	Amendment in ITB and GCC	
Annexure-I	Performa for Undertaking for CA certificate	
Appendix-A	Performa for Bank Guarantee in lieu of Bid Security	
Appendix-B	INSTRUCTIONS	

1. Tender documents will be made available on e-Tendering portal <http://www.eproc.rajasthan.gov.in/nicgep/app> . The bidders, in their own interest are requested to read very carefully the tender document before submitting the bid only through online on website <http://www.eproc.rajasthan.gov.in/nicgep/app>. The bidders can download bid upto 6.00 p.m. one day prior to schedule date of opening of respective bid mentioned above documents and submit their bids online upto 12.00 p.m. on schedule date of opening of respective bid mentioned above.
2. Eligible bidders should submit their bid well in advance instead of waiting till last date. JDVVNL will not be responsible for non-submission of Bid due to any website related problems.
3. The cost of Tender specification **Rs. 2,950/- (Non-Refundable)** to be paid by Demand Draft/Banker's Cheque in favour of the Sr. Accounts officer (Cash & CPC), JdVVNL, Jodhpur (payable at Jodhpur) and tender processing fees **Rs. 1000/- (Non- Refundable)** shall be payable by Demand Draft/Banker's Cheque in favour of The Managing Director

RISL, Jaipur (payable at Jaipur). The bidders are required to deposit all these payments in the office of the SE(MM&C), JdVVNL, Jodhpur up to 3.00 PM one WORKING day prior to schedule date of opening of respective bid otherwise their bids are liable to be rejected. Further, as per notification SO 165 issued by Fin. Dept. dt. 19.11.2015 on reference to RTPP rules, " clause 8(A)" bidding document shall be provided to MSME at 50% of prescribed cost.

4. The Bid Security amount (as applicable) to be paid by Demand Draft/Banker's Cheque in favour of SR. AO (CASH & CPC), JDVVNL, Jodhpur (payable at Jodhpur) **upto 3.00 p.m. upto one WORKING day prior to schedule date of opening** of respective bid or Bank Guarantee, in specified format, of a scheduled bank in favour of The Superintending Engineer (MM&C), JDVVNL, Jodhpur, be deposited to the Sr. Accounts Officer (MM&C), JDVVNL, New Power House, Industrial Area, Jodhpur-342003 **upto 3.00 p.m. upto one WORKING day prior to schedule date of opening** of respective bid **and obtain a receipt / acknowledgement thereof. No other mode of deposit shall be accepted.**
5. ***In case SSI unit of Rajasthan quotes the less than the tendered quantity , then they are required to furnish Bid security @ 0.5% of the estimated value of the quantity offered by them, failing which bid shall be considered non-responsive.**
6. **Further, while depositing the bid security in the office of the Sr. Accounts Officer (MM&C), JDVVNL, Jodhpur, the bidder shall also furnish self-attested documentary evidence duly attested by Notary of SSI unit of Rajasthan or of sick unit (as applicable) and also to submit a letter of quantity offered by them alongwith an Affidavit for MSME unit of Rajasthan in the enclosed format as per Schedule XI is to be furnished on non-judicial stamp paper of Rs.100/- duly attested by Notary public, to the office of Sr. Accounts Officer (MM&C), JDVVNL, Jodhpur. The Bid Security bank guarantee of requisite amount shall be furnished on non-judicial stamp paper of Rajasthan State. Also furnish the undertaking for the CA certificate in the enclosed format as per Annexure-I on non-judicial stamp paper of Rs.100/- duly attested by Notary public alongwith the original / notarised CA certificate as per requirement of tender specifications.**
7. The Bank Guarantee against Bid Security be issued by Nationalized / Scheduled Bank. The same may be accepted after confirmation by issuing Bank. If any Bid Security Bank Guarantee not in proper format / not confirmed by the issuing Bank the same would not be accepted and the bidder would be immediately shorted out from bid process.
8. The bidders are required to **upload the** receipt of depositing all above payments along with their tender at the relevant place on the scheduled date & time otherwise their bids are liable to be rejected.

Note :- 1. All eligible interested bidders are required to get enrolled on e-Tendering portal <http://www.eproc.rajasthan.gov.in/nicgep/app>.

2. If any difficulty arises, in downloading/ uploading of tender you may contact in the RISL, Jaipur Rajasthan at following Contact/address.

Address of RISL: -

Raj COMP Info Services Limited (RISL)
 1st Floor, Yojana Bhawan, Tilak Marg, C-Scheme, Jaipur
 (Rajasthan)
 Phone: 0141- 5103902, 4031900 Fax: 0141-2228701
 Web: <http://risl.rajasthan.gov.in>
 Email: info.risi@rajasthan.gov.in



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TECHNICAL SPECIFICATION

FOR

500 KVA

11/0.433 KV, COPPER WOUND,

DISTRIBUTION TRANSFORMERS WITH ENERGY EFFICIENCY LEVEL-2, Star-1

WITH CRGO (STACK/WOUND)/AMORPHOUS CORE

AGAINST TN-1516

Section - III**TECHNICAL SPECIFICATION FOR SUPPLY OF 11/0.433 KV, 500 KVA RATING OUTDOOR TYPE (COPPER WOUND) DISTRIBUTION TRANSFORMERS WITH ENERGY EFFICIENCY LEVEL-2, STAR-1 AGAINST TN-1516.****1. SCOPE:**

This specification covers the design, engineering, manufacture, assembly, inspection and testing at manufacturer's works before supply and delivery at site of Oil immersed, Oil Natural Air Natural (ONAN) outdoor type 11KV/433 V, three phase, 50 Hz, double wound core type, outdoor Type, Copper Wound Distribution Transformers, complete with fittings and accessories for use in Distribution System.

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

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

1.2 The Tendered / supplier shall bind him 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:

Unless otherwise modified in the specifications, the Distribution Transformers, including various accessories, shall generally comply with the following Indian Standards / REC Specifications. The standard(s) shall be with latest amendment, if any, from time to time.

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

IS: 1180 Part-1 2014: Specification for outdoor type oil immersed DISTRIBUTION TRANSFORMERS up to and including 2500 KVA,33 KV

IS:2026 (PART-I,II,III,IV & V)/1981 – Power Transformers

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

IS:335/1983 : New insulation oils for Transformers
 IS:3347 (Part-I/Sec. 1 & 2) : Dimension of Porcelain parts & Metal parts for Transformer bushing (1.1 KV).
 IS:3347 (PART-III/Sec-1 & 2) : Dimensions of Porcelain parts & Metal parts for Transformer bushing (17.5 KV).
 IS:12444 : Specification for copper wire rod.
 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:5484 : Specifications for Aluminium wire rods.
 IS:9335 : Specifications for insulating kraft paper.
 IS:1576 : Specifications for solid insulating press Boards for electrical purposes.
 IS:6162 : (Part I) : Specification for paper covered Aluminium round conductors
 IS:6162 : (Part II) : Specification for paper covered Aluminium rectangular conductors
 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:5561: Electrical Power Connector
 IS:6262: Method of test for power factor and di-electric constant of electrical insulating liquids.
 IS:6792: Determination of electrical strength of insulating oil.
 IS 6160 : Rectangular conductor for electrical machines.
 IS:10028 : Selection, Installation and maintenance of transformers
 IS: 3401 : Silicagel
 IS: 5/1961: Colour for ready mixed paints
 REC Specification No. 2
 REC Specification No. 39/1993
 CEA Specification, Chapter 4

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.

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.

3. SERVICE CONDITIONS:

The DISTRIBUTION TRANSFORMERS WITH ENERGY EFFICIENCY LEVEL-2 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 a 24 hours period in shade | : 45°C |

iv) Maximum yearly weighted average ambient temperature	: 35°C
v) Maximum temperature attainable by an object exposed to sun	: 60°C
vi) Maximum relative humidity	: 100 %
vii) Average number of thunder storm days per annum	: 40
viii) Average number of rainy days per annum	: 120
ix) Average annual rainfall	: 15-100 cm
x) Number of months of tropical monsoon conditions	: 4 Months
xi) Maximum wind pressure	: 195 Kg/mt ²
xii) Altitudes	: Not exceeding 1000 meters.

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

4. **PRINCIPAL PARAMETERS:**

The Transformers shall be suitable for outdoor installation with three phase 50 Hz 11 KV system in which the neutral is effectively earthed and should be suitable for outdoor service as step down transformers under fluctuations in supply voltage upto plus 10% to minus (-) 15% permissible under Indian Electricity Act and rules there under.

The transformer shall confirm to the following specific parameters:

i) Continuous rated capacity	: 500 KVA
ii) System Voltage (Max.)	: 12 KV
iii) Rated HT voltage	: 11 KV
iv) Rated LT voltage	: 433 V (P-P)/250 V (P-N)
Line current HV	: 26.25 A
Line Current LV	: 666.70 A
v) Frequency	: 50 Hz
vi) No. pf phases	: THREE
vii) Primary connection (HT)	: DELTA
viii) Secondary connection (LT)	: STAR
ix) Vector Group	: Dyn-11
x) Percentage impedance at 75°C	: 5.0%
xi) Taps (off circuits)	: TAPS ARE NOT REQUIRED.
xii) Type of cooling	: ON AN
xiii) Fault level of the system	: 750 MVA

Primary winding shall be DELTA connected and the secondary winding shall be STAR connected (vector symbol Dyn-11), so as to produce a positive displacement of 30° from the primary to the secondary vectors of the same phase. The neutral of the secondary winding shall be brought out to a separate insulated terminal. The transformers shall be **Copper** Wound.

The transformers shall be designed and constructed to withstand without damage the thermal and dynamic stresses of an external short circuit. The manufacturer / supplier shall furnish all relevant design data and calculations in support of having fulfilled this requirement as stipulated in IS:2026 (Part-I)

5. **NO LOAD VOLATGE RATIO:** The No load voltage ratio(s) shall be 11000/ 433 Volts.

6. THE LOSSES:

The total Losses at 50% and 100% loading (at rated voltage and frequency and at 75 deg. C.) shall not exceed the value given below:

RATING (KVA)	MAX. LOSSES AT 50% LOADING (WATTS)	MAX. LOSSES AT 100% LOADING (WATTS)
500	1510	4300

The above specified loss values are maximum guaranteed **as per ENERGY EFFICIENCY LEVEL-2** without any positive tolerance. In case the actual loss values exceed the above guaranteed values, the transformers shall be rejected at the risk, cost and responsibility of the supplier.

7. TEMPERATURE RISE:

Each transformer shall be capable of operating continuously at its normal rating without exceeding following temperature rise with the above service conditions given in clause-3.

- i) 40 Deg. C in oil by thermometer.
- ii) 45 Deg. C in winding by resistance

Temperature rise test shall be conducted on Maximum measured total loss (No load at rated excitation+Load loss at max. current tap at 75oC) at 100% loading shall be supplied during temperature rise test.

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.

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.

8. UNBALANCE CURRENT:

The maximum value of unbalance current in transformers shall not exceed 2% of full load current.

9. IMPEDANCE:

The percentage impedance at rated current at 75°C shall be as under:

S. No.	RATING	percentage impedance at 75°C	Tolerance
1	500 KVA	4.5%	(+/-) 10%

10. TAPPINGS:

No taps are to be provided in these transformers.

11. FREQUENCY:

Transformers shall be designed for normal frequency of 50 Hz, but shall be capable of giving the rated output with the variation of plus/minus (+/-) 5% from the rated frequency.

12. ELECTRICAL CLEARANCES:**(A) EXTERNAL (IN AIR)**

- (I) Minimum external electrical clearances after mounting the bimetallic terminal connectors in position shall be maintained, as under, however positive tolerance shall be acceptable without any ceiling.

Voltage	Medium	Clearance	
		Phase to Phase	Phase to Earth
11000 Volt	AIR	255 mm	140 mm
433 Volt	AIR	75 mm	40 mm

(II) Minimum Clearance between live part of HV bushing to Explosion vent:- 140 mm.

B) INTERNAL (IN OIL):

The following minimum internal clearances shall be maintained as per details given hereunder:

PARTICULARS	500 KVA
a) On width side (non bushing side)	25 mm
b) On length side (bushing side HV & LV both)	40 mm
c) Between HV windings & yokes (end insulation)	20 mm
d) Between LV windings to core (Bare conductor)	5 mm
e) From top of yoke to inside of top cover of tank (with gasket)	100 mm
f) Between LV/HV winding (Radial bare conductor Clearance)	11 mm
g) Phase to Phase Clearance between HV limbs	10 mm

The aforesaid external and internal clearances are minimum clearances and no negative tolerance on these clearances shall be allowed.

13. TEST VOLTAGE:

Transformers shall be capable of withstanding the power frequency and impulse test voltage prescribed below:

Nominal system Voltage (RMS)	Highest system voltage (RMS)	Impulse withstand voltage	Power frequency test voltage in (RMS)
11 KV	12 KV	75 KV (PEAK)	28KV
0.433 KV	----	----	3 KV

The Transformer shall have fully insulated windings designed for the above impulse level.

14. HEAT DISSIPATION (COOLING) / RADIATOR CALCULATIONS & E T R / PSR (ELLIPTICAL TUBE RADIATORS) / (PRESSED STEEL RADIATOR) PLACEMENT:

The transformers shall be capable of giving a continuous output without exceeding the specified temperature rise. **Elliptical tube radiators (ETR) / Pressed Steel Radiator (PSR) of section 57 of gauge 18 or Pressed steel radiator** (with tolerance as per relevant ISS) shall be acceptable on the transformers.

The header pipe connecting radiator bank to the tank shall be rectangular in shape with approximate size of 100x20 mm. **Alternatively round pipe of dia 80 mm can also be used for connecting the radiator bank to the tank**. The placement of top header pipe to the tank body shall be above the top of yoke, to facilitate cooling for hot oil sump over top yoke.

Cooling area of the tank should be sufficient to dissipate the guaranteed losses satisfactorily. Necessary calculations in this regard shall be furnished by the Bidder with their tender. For the purpose of heat dissipation calculations, the following criteria shall be adopted:

- i) Plain surface of tank – **500 W / m²**
(Note: The area of top/bottom tank surface, headers, HV/LV bushing pocket and conservator shall not be considered for purpose of above calculations).
- iii) Elliptical tube of section 57
Pressed Steel Radiator (PSR) -- 55 watts/meter length.

Note:- The provision of radiator is essential in distribution transformers to be supplied against this tender.

15. WINDING AND INSULATION:i) MATERIALS:

Super Enamelled/ Double paper covered copper conductors shall be used for 11 KV class transformers of 500 KVA rating. **The covering shall be conformed to applicable ISS.**

ii) CONSTRUCTION:

The High-tension windings shall be concentric with the Low-tension windings. The Arrangement of the windings shall be robust in electrical and mechanical construction and shall

permit free circulation of oil and avoid hot spots. The LT conductor shall be rectangular in shape. Two layer of electrical grade insulation craft paper of 2 mil thickness or one layer of min. 4 mil thickness shall be used for interlayer insulation both for HV and LV Coils. Insulation cylinder made from electric grade pre-compressed board(s) having minimum total thickness of 1.5 mm shall be used between HV and LV windings. Alternatively 20 mil pressphan paper making thickness of the cylinder 1.5 mm having similar electrical properties may also be used.

For phase barrier, 2 Nos. of 1 mm thick press board shall be used for covering the tie rods. Besides, tie rods shall be covered by SRBP tubes of suitable size.

2 mm press board shall be used for base support insulation and core clamping channel insulation.

For bottom and top yoke insulation, only PC Board of min. 2 mm thickness will be used.

Also, vertical spacers between HV and LV coils and radial spacers (tickleys)/ blocks etc. shall be of PC Board only.

Top layer of all HV coil shall be given one coat of air drying insulation varnish.

A tolerance of up to plus minus 1% shall be permissible on ID and OD and axial length of HV and LV coils. However, the above tolerances are subject to maintaining the min. required clearances. The material and thickness of various insulation provided for phase barrier, foot plate insulation, yoke insulation and core clamp insulation shall be clearly indicated in the drawing and in any case shall not be inferior to those used in type tested transformers.

Min. number of coils on HV side shall be 6 (six) per phase for each rating transformers. Dovetailed shaped radial spacers shall be placed between HV coil sections, suitably - locked with vertical spacers around the circumference of the coils. **The number of such spacers shall be minimum 8(Eight).**

One No. HV Coil is accepted in case of wound core construction.

Current Density

The current density for HV and LV conductor shall not exceed the value given hereunder:

Rating	Current density in Amp/mm .sq.	
	HV winding	LV winding
500 KVA	2.8	2.8

iii) INSULATION MATERIAL:

Electrical grade insulating Kraft paper of only Triveni / Ballarpur / Padamjee shall be used. Press Board used shall be of senapathy whitely / Raman make. Perma wood or haldu wood blocks shall be used for Top and Bottom yoke insulation.

iv) CONNECTIONS AND TERMINATIONS:

A) HV Winding: The following method shall be adopted for taking out HV connections:-

- a) The coil series connections shall be made by soldering / brazing only, after completely removing the insulation from the ends.
- b) Starting and finishing leads of HT coils shall be covered with empire sleeve(s) of proper size. These leads should be clamped with the body of the winding with the help of cotton twine during manufacture of the coils.
- c) All delta leads from the HT coils as well as HT line leads shall be taken out through **multiple paper covered** (MPC) copper wires of sufficient cross section area to impart the desired mechanical strength. The current density in HV lead wire shall not exceed 0.8 A/mm^2 . These lead wires shall be provided with multi layer paper insulation of minimum 1.0 mm thickness i.e. minimum increase in diameter due to paper insulation shall not be less than 2 mm. The layer of glass sleeves/ glass tape shall also be provided on the delta MPC wire and it should be further covered with minimum 12 mm dia. SRBP tube. The MPC should also be varnish dipped. The SRBP tube shall be extended in such a way that it is entered upto 50% of bushing height.
- d) All the above leads shall then be clamped tightly with cotton twine directly on to the special frame/bracket making "Pie" shape connection. This structure could be made up of Bakelite/ Permalli wood/ laminated PC board flats, having minimum size of 25x6.0 mm. Line leads leading to the HV bushing terminals shall be directly clamped to the horizontal support bar of the "Pie" structure so that any tension which may develop in the HT leads due to jerks or at the time of making the connection, is not passed to the HT coils.
- e) Delta joint and lead from delta joint to bushing rod shall be made by brazing only.

B) LV Winding:

- a) The LV connection shall be taken out by cut on the top yoke channel duly reinforced to compensate for the mechanical strength.
- b) The layers in LV Coil may be either even or odd in numbers but minimum layers shall be two.
- c) LV star point shall be formed of copper flat of sufficient strength. Leads from winding shall be connected to the flat by brazing.
- d) Firm connection of LV winding to bushing shall be made of adequate size of " L shape flat". Connection of LV coils to L shape flat shall be by brazing only.
- e) "L" shape Flat shall be clamped to LV Bushing metal part(s) by using nut, lock nut and washer.
- f) Neutral of the Secondary winding (LV) shall be brought out to a separate insulated bushing.
- g) For Copper windings, silver brazing rods with suitable flux will be used.

16. CORE CONSTRUCTION & CORE COIL ASSEMBLY DETAILS:

A. CRGO CORE

- (i) The core shall be **stack/ wound type** of high grade cold rolled grain oriented annealed steel laminations, having low loss and good grain properties, coated with hot oil proof insulation, bolted together to the frames firmly to prevent vibration or noise. All core clamping bolts shall be effectively insulated. The complete design of core must ensure the permanency of the core losses with continuous working of the transformers. The value of the flux density allowed in the designs and grade of laminations used shall be clearly stated in the offer, along with the curves.

The transformer core shall be constructed out of the prime class of materials. CRGO Lamination used shall be of prime grade and not second grade steel laminations.

(ii) It will be mandatory for all the transformer manufacturers to use only **PRIME grade CRGO Laminations of M-4 grade/ 0.27 mm (with tolerance as per relevant ISS) thickness or better** with specific loss of 0.89 watt per kg. at 1.6 Tesla or any other combination of better grades with any thickness subject to maximum specific loss of 0.89 watt per kg. at 1.6 Tesla will also be acceptable. The bidder shall furnish the core loss (watt/Kg.) and power (VA/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) upto 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%.

(iii) Full mitred core construction technique shall be adopted. Top yoke & bottom yoke pieces shall all be in one single piece and no cut pieces shall be acceptable. The cross sectional area of yoke & limb shall be approximately same.

(iv) The transformer core shall not get saturated for any value of V/f ratio to the extent of 115% of the rated value of V/f ratio (i.e. 11000/ 50) due to combined effect of voltage and frequency without injurious heating at full load conditions. The bidder shall furnish necessary design data in support of this situation.

(v) Flux density at rated voltage and frequency of core and yoke shall not be more than **1.6 Tesla**. The Over fluxing shall be limited to 12.5% of rated value and flux density at 112.5% of rated voltage does not exceeds by 1.9 Tesla.

The No Load Current (magnetising current) of each rating of transformers at rated voltage and at 112.5% of rated voltage shall not exceed the values given below:

Maximum permissible magnetising current in percentage of rated full load current	
At 100% rated voltage	At 112.5% rated voltage
2%	5%

The tolerance on magnetizing current shall be +30% on declared value of magnetizing current as per IS:2026.

(vi) For free circulation of oil axial and radial ducts of the following minimum thickness shall be provided:

Width of axial duct in mm in between insulating cylinder and		Radial duct between HV coils in mm
HV winding	LV winding	
5	4	8

Tolerance of ± 1 mm on above axial ducts width shall be allowed provided that total clearance between HV to LV coil (bare conductor) is maintained as minimum 11 mm.

(B). AMORPHOUS METAL CORE

a) The core shall be 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 loss with continuous

working of the transformers. The value of the 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.

b) Core Clamping – Amorphous Metal and CRGO wound core Transformers:-

1. Core clamping shall be with top and bottom U-shaped core clamps made of sheet steel clamped with MS tie rods for efficient clamping.
2. MS core clamps shall be painted with varnish or hot 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.

c) The transformer core shall be suitable for over fluxing due to combined effect of voltage and frequency up to 12.5% without injurious heating at full load conditions and shall not get saturated. The Bidder shall furnish necessary design data in support of this situation.

d) Flux density should not be more than 1.6 Tesla for Amorphous core. The Over fluxing shall be limited to 12.5% of rated value and flux density at 112.5% of rated voltage does not exceed by 1.9 Tesla. No load current shall not exceed 2% of full load current and will be measured by energizing the transformer at 433 volts 50 c/s on the secondary. Increase of voltage of 433 volts by 12.5% shall not increase the no load current disproportionately high and shall not exceed i.e., 5%. Test for magnetic balance by connecting the LV phase by phase to rated phase voltage and measurement of an, bn, cn voltage will be carried out.

NOTE : Equal Weightage shall be given to the transformers with Amorphous metal core and CRGO.

(C) CORE-COIL ASSEMBLY:

The core joints shall be interleaved and with full mitre design, as mentioned above. Ample provision for free circulation of oil in the radial gap between the core & LV coils shall be made. Eyes or lugs of sufficient size shall be provided for lifting core and winding assembly out of the tank. The core shall be effectively earthed through copper earthing foil of 25 mm width & 1 mm thickness bolted on core frame channels, after removing the channel paint.

For top yoke channels, if cut or holes are made for taking LV connections, suitable reinforcement to channels shall be made by providing adequate size of MS Flat of the thickness not less than 6 mm.

On the core-coil assembly, core clamping channels, tie rods, core studs, spacers, assembly base supports, etc. of each rating shall be provided as per details given hereunder:

Sr. No.	Item	Particulars
a)	Tie rods	Minimum 8 Nos. of 16 mm each properly insulated and covered with SRBP tubes. Tie rods shall also be provided with lock nuts.
b)	Core studs	Minimum 8 Nos. of 16 mm each properly insulated and covered with SRBP tubes. The core studs shall also be provided with lock nuts.
c)	Spacers	Minimum 8 Nos. dovetail type with min. peripheral coverage of 30%.
d)	Support of core assembly base	2 Nos. MS channels OF 100x50x6t mm. with minimum peripheral coverage of 40%.
e)	Channels for	4 Nos. MS Channels of 100x50x6t mm. size (applicable for CRGO

clamping core coil assembly	transformers)
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Guides on all the four sides shall be provided to prevent shifting of the active parts and thereby accidental touching the tank. Alternatively boss nut arrangement at the top of core coil assembly to lock the same with the transformer tank be provided.

The assembly fixing boss nut(s) are to be welded, 20-30 mm off the centre line (and diagonally) of the tanks, so that assembly shifting during transport etc. is prevented. M S Channel, Tie Rods etc should be painted with hot oil and corrosion resistant paint before use.

All core-coil assembly shall be indelibly marked / punched on core channel / a identity plate welded on core channel with following details:

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

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

17. TRANSFORMER TANK:

(a) Transformer tank shall be rectangular in shape, robust in construction and with adequate strength to withstand the pressures developed at the time of severe fault conditions. **The tank body shall be suitably stiffened with two stiffeners of size 50x50x6 mm angle. The edge of the angle shall be continuously welded full length with the tank cover body.** The tank sheet shall be electrically continuous welded both from inside and outside to impart proper mechanical strength and to plug leakage of oil. All joints of tank and fittings shall be oil tight and no bulging shall occur during service. The tank design shall be such that the core and windings can be lifted freely. The tank plates shall be of such strength that the complete transformer when filled with oil may be lifted bodily by means of lifting lugs provided. All the welding shall be continuous. The top cover plate shall be sloping down by **more than 15 mm**, opposite LV bushings side. **The top cover edge should be extended by Min. 30 mm** in such a manner to cover gasket each side and it should be bent at **Min. 15° angle** **The top cover edge shall be bent in such a manner which covers the gasket.** Accordingly length of the lifting hooks shall be extended. The top cover shall have no cut at point of lifting lug. **No negative tolerance in the tank dimensions is acceptable in actual supply.** The tank shall be fabricated by welding at corners. **The bottom plate shall be extended at least by 5 mm outside on all sides to facilitate proper welding with the vertical tank walls.** No horizontal or vertical joints in tank side walls and its bottom and top cover will be allowed. **LV Bushing pocket shall be continuously welded on all side from both inside and outside on the tank wall.**

(b) Minimum size of MS Sections to be used in construction of each rating of transformer tanks shall be as under:

S.N	I T E M S	Parameters
1	Tank Cover plate thickness (mm)	5.0 t
2	Tank Sides wall thickness (mm)	4.0 t
3	Tank bottom plate thickness (mm)	5.0 t
4	Conservator body (mm)	3.0 t
5	Detachable Conservator side Cover	N.A
6	No. of stiffeners (To be welded on four side of the tank in the angle forms inverted "L")	
	500 KVA rating	2 Nos.
7	Size of M. S. stiffener (mm)	
	500 KVA rating	50x50x 6 angle
8	Tank Top flange size (mm)	50 x 6 t Flat
9	Cover Bolt Size	As Per IS:1180 Part-1(2014)**
10	Cover Bolt spacing (Maximum)	75 mm
11	Lifting lugs	4 Nos. 10t mm flat
12	Tank Base Channel (ISMC Type) at a C-C distance of 415 mm)	
	shall be continuous welded with tank	
	500 KVA rating	2 (125x65x6t) mm

* **Tank base channels shall be provided parallel to the bushing lines.**

** All screws, nuts, bolts /washers and fasteners exposed to atmosphere are as per IS 1180 Part-1/2014 as follows :-

- a) Size 12 mm and below:- stainless steel
- b) Above 12 mm:- Steel with suitable finish like electrogalvanized with passivation or hot dip galvanized.

NOTE: Each cover bolt shall be complete with two flat washers, one nut and one spring washer.

- i) The 12 Nos. nuts & bolts (4 Nos. each on length sides & 2 Nos. each on widths sides of tank body) to be tag welded on top cover / tank body of the transformer.
- ii) The 04 Nos. Anti Theft Fasteners shall be provided - one each on all four sides in centre of body of transformer. Two holes shall be provided - one on top cover and other on collar of transformer to facilitate providing of 2 Nos. poly-carbonate seals on longitudinal side.

The above mentioned M S sections shall be subject to tolerance as per ISS.

MEASUREMENT OF SHEET THICKNESS OF TRANSFORMER TANK:

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)

For transformer tank sheet thickness verification, the average of top and bottom cover be taken collectively and not individually to decide acceptance/rejection of transformers.

· 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 for DISTRIBUTION TRANSFORMERS as per relevant tender specification are as under for ready reference:

Sr. No	Rating	Top Cover (mm)	Bottom Cover (mm)	Side of Tank (mm)
1	500 KVA Three Phase	5.0	5.0	4.0

The sheet thickness measurements 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.

(c) Lifting Lugs: Four Nos. welded heavy duty lifting lugs of MS plate of 10 mm thickness, suitably reinforced by extended vertical supporting edge of same thickness in one piece having size 125 mm width and 125 mm length, these shall be so extended that cutting of bent plate is not required.

(d) Top cover gasket & Bolt:

- iii) The gasket provided in between top cover plate and tank shall be of min. 6 mm thick neoprene rubberized oil resistant cork sheets conforming to type B or C as per IS 4253 part II
- iv) **Stainless Steel** Nut bolts **(As Per IS:1180 Part-1(2014))** shall be of size M 12 x 40 mm / 4/8x1.5" long with two flat washers, suitably spaced (as specified) to press the cover.
- v) Height of the tank shall be such that minimum clear height is to be achieved between top of yoke and under side of the tank cover (with gasket in place) as under:
 - a) 500 KVA rating - 100 mm
- vi) **All screws, nuts, bolts and fasteners exposed to atmosphere are as per IS 1180 Part-1/2014 as follows :-**
 - a) **Size 12 mm and below:- stainless steel**
 - b) **Above 12 mm:- Steel with suitable finish like electrogalvanized with passivation or hot dip galvanized.**
- vii) All sealing washers / gaskets shall be made of oil and heat resistant neoprene or nitrile rubber. Gaskets made of natural rubber sheet are not permissible. The minimum thickness of gaskets shall not be less than 6 mm for tank cover and 4mm for HT/LT gasket washers.
- viii) Talbros make neoprene/nitrile based rubberized cork sheet – grade RC-70-C shall only be used as gasket material. Alternatively, other makes of gaskets having type designations as under can also be used, if 'Talbros' make gasket is not available:

S. No.	Name of the firm	Commercial name of gasket manufactured by the firm.
1.	M/s. Nu-Cork Products P. Ltd., Gurgaon	Nu-Cork (Neoprene) Nu-Cork 999 RC-70-C
2.	M/s. Bharat Corrub Ind., Vadodara	Chetak (Neoprene) RC-70-C
3.	M/s. Grindbeck, Gujarat	Zebra (Neoprene) RC-70-C
4.	M/s Goodwill Rubber Ind. (P) Ltd., Calcutta.	Mayur (Neoprene) RC-70-C
5.	M/s Pristine Technologies & Industries, Jaipur	VIN CORK-CO1(TYPE-C, RC-70-C)

(e) Tank shall be reinforced by continuously welded angle on all the four sides of the walls, on the edge of tank, as specified above. The permanent deflection shall not be more than 5 mm up to 750 mm length and 6.5 mm up to 1250 mm length when transformer tank without oil is subjected to the vacuum of 250 mm of Mercury.

f). PAINTING & FINISHING:

Steel surface shall be prepared by sand / shot blast or chemical cleaning including phosphating, as per IS 3618. 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 of olive green colour confirming to shade No. 220 of IS: 5-1961 to be applied in order to distinguish of star level transformers. Total Dry film thickness as per IS 1180 Part-1 2014

The requirement for paint and the material to be used as below.

Paint Type	Area to be Painted	No. of coats	Total Dry film thickness (min.)
a) Thermo setting powder paint	Inside	01	30 microns
	Outside	01	60 microns
LIQUID PAINT			
a) Epoxy (Primer)	Outside	01	30 microns
b) Polyurethane (finish coat)	Outside	02	25 microns each
c) Hot Oil resistant Paint/varnish	Inside	01	35/10 microns

18. FITTINGS & ACCESSORIES:

“The following standard fittings shall be provided on each transformer:

- a) **Earthing terminals** of M12x40L/ 4/8x1.5” with tinned lugs and symbol – (2 Nos.)
- b) **Lifting lugs** – (4 Nos. for main tank).
- c) **Rating and terminal marking plate** shall be non-detachable and affixed with Min. 10 rivets (One in centre of top and bottom and 4 Nos. each on both vertical sides at equal distance), details to be included in one plate only. The plate shall be of stainless steel/Aluminium only, with details clearly marked. The base plate of the Rating and terminal marking plate shall be continuously welded with the tank.(1 No.)

- d) Bi-metallic terminal connectors on HV bushings and L-type connectors on LV bushing shall be fitted before dispatch.
- e) Oil level gauge of minimum 150 mm length of prismatic glass, indicating three positions of oil, marked as follows, shall be provided **at centre of the conservator tank:**

1)	-5 °C - Min.
2)	30 °C - Nor.
3)	90 °C - Max.

f) Free Air Type Breather – (1 No.)

g) Thermometer pocket, 12.5 mm dia with cap. shall be provided – **(1 No.)**

h) Oil filling hole (1/4" dia) with cover and gun metal drain valve of 20 mm size on the oil conservator.

i) a) One filter valve of gun metal of 20 mm size at the top side of the tank.

b) One drain cum sampling cum filter valve of **Steel** at the bottom side of the tank but opposite of the top filter valve. The necessary arrangement for locking on this valve by providing MS Sheet box duly welded on tank body shall be made.

c) The valve shall be either of Leder or L&T or AUDCO make and wheel type.

j) **HV Bushings**. These shall be of 17.5 KV/250 A class, porcelain/ polycrate with non adjustable, single gap type arcing horns – (3 Nos.)

k) **LV Bushings** 1.1 KV class: (4 Nos.)

a) 1000 A (M 30 stem) – for 500 KVA rating.

l) Brass rod 12 mm diameter for HT Terminals of each rating – (3 Nos.)

m) Brass rod for LT Terminals of each rating – (4 Nos.)

a) 30 mm diameter for 500 KVA rating transformer

n) 100 mm dial type thermometer for oil temperature indication.

o) Two pulling eyes one each on opposite side of the tank.

p) Explosion vent:

Explosion Vent shall be opening towards LV bushing side with M. S. mesh having Pipe Diameter of minimum 50 mm & it should be inserted in the top cover of tank, welded outside & inside of top cover and its Pipe shall be connected with Conservator. Length of the explosion vent should be minimum 700 mm. Nut bolts of flange of Explosion vent should be tag welded. The position of vent pipe should be on right side of tank (when looked from LV bushing side). There shall be minimum 140 mm clearance between live part of HV bushing to Explosion vent.

q) Air release device on left side (when looked from LV bushing side).

NOTE:

1. **As mentioned above, suitable bi-metallic connectors on HV bushing and L-type connector shall be provided, having capacity of about 1.5 times the rated current of the transformer.**
2. LV/ HV Connector shall not be the integral part of the bushing stems”.

19. CONSERVATOR:

When a conservator is fitted, the oil gauge and the breathing device shall be fixed to the conservator. The conservator shall be of cylindrical shape and it should be provided above the HV bushing with a minimum clearance of 50 mm and suitably inclined to maintain the clearance.

The conservator tank should be connected with transformer tank with the help of two hollow connecting pipes and should be located at the centre of tank cover. The Flat shall not be acceptable.

The total inner volume of conservator shall be minimum of 10% of the volume of oil in each rating of transformer. The inside diameter of the pipe connecting the conservator to a main tank shall be min. of 50 mm and it should be projected into conservator in such a way that its end is approximately 25 mm above the bottom of conservator so as to create a sump for collection of impurities. The min. oil level (corresponding to - 5 deg. C.) should be above the sump level. The connecting pipe from conservator tank to main tank shall have a sloping flap so that oil falling from pipe shall not fall directly on the active job.

The oil filling hole cap of conservator should be welded with tank body with the help of suitable inverted ‘U’ shape clamp.

20.FREE AIR TYPE BREATHER:

The breather shall be only from reputed and approved manufacturer and as per the approved drawing. Inverted ‘U’ shape pipe shall be used for breather. Mounting arrangement of the breather shall be flanged/threaded type as per details given in the illustrative drawing attached

21. H V BUSHING TERMINAL DETAILS:

The transformer shall be provided with outdoor type 3 Nos. **17.50 KV / 250 A** class porcelain bushings, conforming to IS: 3347/1972 & IS: 2099/1973 from the manufacturer of repute. The HV bushings shall be on top of the tank and shall be fitted on a pocket made on top cover. These pockets shall be such that the HV bushing is tilted more towards the HV side. The bushing of R & B may also be tilted sidewise to maintain the required electrical clearance. The bushings rods and nuts shall be made of brass. The inner porcelain portion of the bushing shall be projected about 50% of the length inside the bushing pocket. **HT bushing(s) mounting bolts should be tag welded.**

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

The arcing horn(s) shall be single gap and fixed type. HV bushings shall be of reputed make such as BEPCO, JAYSHREE, WSI, SESHASAYEE, JAIPUR GLASS, BPPL Bikaner, Agarwal salt Co. Bikaner, Baid Sanitary Works, Bikaner/ Krishna Ceramics, Nasirabad, ADPRO/SHINE or any other make - approved by the purchaser. The HV bushings shall generally conform to IS: 3347 and IS: 2099. Embossing showing the manufacturer's name and month & year of manufacture shall be clearly visible on HV bushings, even after fixing on transformer(s).

22. LV BUSHING TERMINAL DETAILS:

"LV Bushing side shall be on side of the tank but opposite to the HV Bushing side. 4 Nos. LV Bushings (1.1 KV/ 1000 A for 500 KVA rating transformers) shall be mounted on on a special pocket on the tank wall. . **LV Bushing pocket shall be continuously welded on all side from both inside and outside on the tank wall** Projection of the LV pocket shall be such that inner portion of the LV stem shall not project more than 20 mm inside the tank, to facilitate unhindered lifting of the core coil assembly. Bushing stem of M 20 & M 30 size shall be of brass respectively. Rest of the components shall conform to the requirement of IS:3347 (Part I/section 2). The LV bushings shall be of reputed make such as BEPCO, JAYSHREE, WSI, SESHASAYEE, JAIPUR GLASS, BPPL Bikaner, Agarwal salt Co. Bikaner, Baid Sanitary Works, Bikaner/ Krishna Ceramics, Nasirabad, ADPRO/SHINE or any other make - approved by the purchaser. The LV bushings shall generally conform to IS: 3347 and IS: 7421".

23. TRANSFORMER 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 Break Down Voltage Value of the fresh oil after filtration and before filling in the transformer should be above 60 KV and after filling in the transformer it should be above 40 KV.

The make of Transformer Oil shall be either APAR/SAVITA/ RAJ LUBRICANTS/ ANAMIKA/SHARAVATI/ MADRAS PETRO/ RAJ PETROL/ LUBRICHEM, MUMBAI/ OPANAMA PETROCHEM, ANKELSHWAR/ TASHKENT OIL, VADODARA/ **COLUMBIA**. The transformer oil sample taken from the transformer shall be subject to testing as per provisions of IS:1866.

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

24. IDENTIFICATION DETAILS:

A. Rating & terminal marking plate: Each Transformer shall be provided with non detachable name, rating and terminal marking plate fitted in a visible position. All details shall be given on one plate. Material of the plate shall be stainless steel/**aluminium** only. Thickness shall be 0.9 mm (with a tolerance of ± 0.1 mm). The plate shall be made absolutely undetectable either through welding or riveting or through any other approved method.

Each HV & LV terminal shall be duly marked with its terminal numbers. (e.g. HV terminal with capital letter 1U, 1V, 1W and LV terminal by corresponding small letters) 2u, 2v, 2w and the neutral terminal by 2n). In the diagram to be given on the name plate, the relative position of various terminals- when viewed from top - shall be clearly shown. 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
- iii) Date of expiry of guarantee period – month & year
- iv) **Maximum Guaranteed Losses Figures at 50% & 100% Loading.**
- v) Name & Full address of the manufacturer.
- vi) Capacity of the transformer.
- vii) Rating of the transformer.
- viii) **Type – Oil filled naturally cooled.**
- ix) **IS 1180 part-1/2014.**
- x) **BIS Level-2 with BIS Licence No.**

ALL DETAILS ON THE NAME RATING AND DIAGRAM PLATE SHALL BE INDELIBLY MARKED i.e. BY ENGRAVING, STAMPING or PUNCHING.

B. Technical cum Identification Plate - M.S. plate of size 125 x 75 x 2.5 mm having following details punched with letters of size 8mm X 6mm shall be continuously welded to the main tank body below the middle HV bushing in clearly visible position:-

- A) Name of the Firm
- B) TN No.
- C) Make
- D) Sr.NO.
- E) JAIPUR DISCOM
- F) Rating
- G) Date of Dispatch
- H) Date of Expiry of G. P.
- I) Core :-
 - 1. Core Dia
 - 2. Core Area
- J) LV Coil :-
 - 1. ID/OD Dimensions
 - 2. Conductor Size
- K) HV Coil :-
 - 1. ID/OD Dimensions
 - 2. Conductor Size
- L) Limb Centre
- M) Window Height

Further following details is to be embossed on the width side of the tank preferably in centre opposite to Name & Rating Plate. The dimensions of letters should be 10x10x1 mm. The punching shall be distinct and visible.

MAKE _____
S. No. _____
T N _____

The details of Make, TN No.& Sr. No. of transformer shall also be punched on the top cover. The punching shall be distinct and visible. (size of letter 10x10x1 mm).

25. 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 **Schedule-V**. Complete details shall be furnished. Tolerances on weight quantity and dimension figures shall be $\pm 5\%$ 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.

26. TYPE TEST CERTIFICATES:

The bidder shall furnish type test certificates of offered design / similar design, not older than 5 years, wherever available, with the bid.

27. DRAWINGS AND OTHER DOCUMENTS:

The tenders shall be accompanied with the following drawings / Calculation sheets, as per the offered designs. The drawings shall be only on A-3 (420 x 297 mm) size paper and calculation sheet shall be on A-4 size paper only.

- a) Name rating / diagram plate drawing.
- b) Outline and general arrangement drawing.
- c) Core-coil assembly drawing.
- d) Core section (for limb and yoke) along with flux density calculation sheet / drawing.
- 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. meter**).

28. QUALITY ASSURANCE PLAN:

The purchaser intends to purchase Transformers only from quality conscious manufacturers.

The tenderer shall furnish the details in respect of following, in the schedules prescribed herein this specification, failing which the offer is liable for rejection.

- a) List of testing equipment and instruments (with class of accuracy) available with tenderer 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 tenderer 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 test (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 tenderer 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 instruments/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.

29. 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 manufacture. 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 progress. 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 bidders must have adequate set of instruments for conducting testing as per ISS/ Specification. The instruments for measurement of losses shall be of accuracy class of 0.5 or better. The instruments shall be duly calibrated and Calibration Certificate 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. A comprehensive list of testing equipment/ instruments indicating make, Sr. No., type, class of accuracy, calibrating agency, calibration date etc. should be furnished along with the bid. The calibrated instruments shall be duly sealed by calibrating agency to avoid any tampering with calibration and the details thereof 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 arrangements can be made for inspection. The supplier shall give minimum fifteen days advance intimation to enable the purchaser to depute his authorised representative for 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.

30 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 despatch shall be subjected to routine tests as per IS: 2026. Minimum 25% of the offered lot size samples subject to minimum 5 Nos will be taken for routine and acceptance tests. The supplier shall invariably furnish manufacturer's routine test certificate along with inspection call of the offered transformers for pre-despatch inspection. **The inspection offers without furnishing of routine test certificates as per ISS**

of all the transformers offered for final inspection shall not be entertained, and any delay on this account shall be to firm's account.

The selected samples shall be subjected to the following routine / acceptance tests at the manufacturer's works in accordance with the relevant ISS:

1. Insulation resistance
2. Separate source voltage withstand test
3. Induced over voltage withstand test
4. Measurement of windings resistance cold (at or near the test bed temperature)
5. Measurement of Voltage ratio and check of voltage vector relationship
6. Measurement of Impedance voltage.
7. Measurement of total losses at rated voltage and normal frequency (at 50% & 100% loading).
8. Measurement of No load current at 100 % and 112.5% of rated voltage and normal frequency.
9. Checking of rating and terminal marking plate.
10. **Pressure Test (As per IS 1180 Part-1:2014)**
11. **Oil leakage Test (As per IS 1180 Part-1:2014)**
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 re-assembly 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 and invoices for major raw materials shall be done and copies thereof duly signed by firm's representatives and inspecting officers shall be enclosed with the inspection report.

Invoices of CRGO 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.

Following tests shall also be carried out at manufacturer's works on one complete unit of 500 KVA Transformers unit

- i) Over Flux Density Test (in the first lot and may be repeated in subsequent lots if desired by purchaser).
- ii) Measurement of unbalance current. (See note below)
- iii) Magnetic Balance Test (See note below)
- iv) Oil Leakage Test (See note below)

Note: It will be mandatory for the manufacturer firms to maintain record of BDV value of the transformer oil and shall furnish to the inspecting officer who in turn shall furnish the same to the Nigam's CTL for verification purpose. The Inspecting Officer during inspection shall verify record of Meggar value of the offered DT's and furnish the same with inspection report to the Nigam's CTL. Simultaneously, record of Air Pressure Test shall also be checked by the inspecting officer and same be furnished with report to the CTL. CTL will conduct testing of DT's only after receipt of record of BDV value, Meggar value and air pressure test results.

Fifteen days clear notice shall be arranged for pre-despatch inspection by purchaser's representative as per General Conditions of Contract.

After successful inspection, the inspecting officer shall seal **each and every transformer by sealing the transformer with 2 Nos. poly-carbonate seals on longitudinal side as per the manner mentioned in Clause No. 17 above.** Before sealing, the inspecting officer will ensure that all the offered transformers are completed and duly fitted with name, rating and diagram plate, identification plate (on tank body & Top cover) as specified in this specification.

i) INSULATION RESISTANCE MEASUREMENT:

Insulation resistance of selected samples shall be measured with a 2500 V Megger, of standard make such as M/s AVO, M/s Sakova, M/s Wako, M/s Evershed, Vignole or Metrawatt. The minimum insulation resistance, in Mega Ohms, shall be as indicated in the table below:

	20 Deg. C.	30 Deg. C.	40 Deg. C	50 Deg. C.	60 Deg. C.
11000 Volts (HV)	800	400	200	100	50
433 Volts(LV)	400	200	100	50	25

(ii) MAGNETIC BALANCE TEST:

This test shall be conducted as an additional test on one sample transformer from each lot offered for inspection.

The application of low voltage to the middle limb will induce approximately equal voltages on the two end limbs. The application of voltage to the end limbs will induce greater voltage in the middle limb and less voltage in the other end limb. Uniformity of induced voltages shall confirm the healthiness of the transformer windings.

The procedure for the test shall be as under:

- a) Apply 250 Volts between LV terminals-2u-2n and measure voltages between 2v-2n & 2w-2n.
- b) Apply 250 Volts between 2v-2n and measure voltages between 2u-2n & 2w-2n.
- c) Apply 250 Volts between 2w-2n and measure voltages between 2u-2n & 2v-2n.

The measured voltages shall satisfy the conditions detailed as above.

iii) PRESSURE TEST (Routine Test):-

The transformer with bolted cover shall be tested at an air pressure of 35 KPa above atmosphere pressure maintained inside the tank for 10 min. There should be no leakage at any point.

iv) OIL LEAKAGE TEST: (As per IS 1180 Part-1/2014):

The oil leakage test shall be conducted on one unit selected from the offered lot. The assembled transformer for non-sealed and sealed Type with all fittings including bushing in position shall be tested at a pressure equivalent to twice the normal head measured at the base of tank for 8 hrs. There should be no leakage at any point.

31. TYPE 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 I to III).

- i) Short circuit test for dynamic and thermal ability: The short circuit test for dynamic and thermal ability shall be arranged 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) on one unit of each rating. The transformer(s) for the test shall be selected/ sealed by our inspecting officer from the first lot which shall be of minimum 02 Nos. or 5 % of ordered qty. whichever is more. The short - circuit test shall be conducted only after successful routine tests including measurement of no-load and load losses. The supply shall be accepted only after arranging successful type test on the selected transformer(s).
- ii) Impulse voltage withstand test: The impulse voltage withstand test shall be arranged at any testing house accredited to NABL or 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) for purpose of impulse test. The test shall be conducted on one unit of each rating to be selected by our inspecting officer from the first lot which shall be of minimum 02 Nos. or 5 % of ordered qty. whichever is more. The test procedure shall conform to the requirement of Clause 13 of IS: 2026 (Part-III). Impulse voltage withstand test shall be

of **Min. 75 KVp** The supply shall be accepted only after arranging successful impulse test on the selected transformer(s).

iii) TEMPERATURE RISE TEST : [As per IS 2026 (Part 2)]

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

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

(iv) 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 and vacuum 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 80 KPa for 30 minutes and vaccume of 500 mm of mercuy for 30 minutes. The Permanent deflection of flat plate, after pressure has been released, shall not exceed the values given below

Length of plate up to	Deflection
750 mm	5.0 mm
751 to 1250 mm	6.5 mm
1251 mm to 1750 mm	8.0 mm
Above 1751 mm	9.0 mm

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.

32. RANDOM SELECTION AND TESTING (RST):

32.1 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 Loss & Load Loss shall form part of tests conducted before and the after the short circuit test and recorded in the report.
- ii) **Impulse test at 75 KVp**
- iii) **Temperature rise Test.**
- iv) **Air Pressure Test at 80 KPa for 30 minutes and vacuum of 250 mm of mercury for 30 minutes for transformer upto 200 KVA rating and 80 KPa for 30 minutes and vacuum of 500 mm of mercury for 30 minutes for transformer above 200 KVA rating and upto including 2500 KVA rating as per IS:1180 Part-I: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 Dynamic & Thermal Ability to withstand 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 & Impulse withstand test, **Temperature rise Test & Pressure 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)

32.2 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):

- a) One transformer will be selected out of every lot of 10 Nos. or part thereof for measurement of No load Losses at rated voltage; No Load current (at 100% and 112.5% of rated voltage); Impedance voltage, thickness of tank body sheet and total Losses at 50% and 100% loading at rated current. The testing shall be arranged either at purchaser's own testing lab and / or at independent test lab. The testing charges for such tests shall be borne by the purchaser. The test results will be applicable to the respective lot of 10 Nos. from which sample was drawn.
- b) In case if dispatch instructions are less than 10 Nos. than one sample shall be selected from each store (s) and the test result so obtained shall be for the quantity consigned / received by the store (s).

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

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

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

Metal Parts of Bushing assembly shall be checked in CTL as per specification/IS on the transformer which is physically opened in CTL (from the lot of 100 Nos. or part thereof). The tolerance may be allowed in accordance with coarse class of IS 2102-1969. **If sample does not confirm the requirement of specification/IS, then lot of 100 nos. or part thereof shall be rejected.**

The No Load Voltage Ratio (Transformer Turn Ratio) shall be checked in CTL with the tolerance as per specification/ IS 2026 on the transformer from the lot of 10 Nos. or part thereof and the concerned sub lot shall be rejected if not meet out the requirement of IS.

Further, Internal clearances shall be checked without opening of core coil assembly in each of the transformers which have been selected for physical verification at CTL (i.e. one sample from a lot of 100 nos. or part thereof) in presence of firm's representative. No negative tolerance shall be admissible. If clearances are not found as per specification then the lot of 100 Nos. or part thereof shall be rejected.

The sample of Oil be taken at CTL from the Transformer opened for physical verification in presence of firm's representative and same shall be tested at Nigam's CTL/NABL accredited Lab. If sample does not confirm the requirement of specification, then lot of 100 nos. or part thereof shall be rejected.

Besides above points following shall also be checked in CTL opened for physical verification and if the sample(s) does not meet the above requirements then the entire lot shall be rejected:

- 1. Marking on HV terminals on transformer tank by stamping (i.e. 1u, 1v, 1w).**
- 2. Marking on LV terminals on transformer tank by stamping (i.e. 2u, 2v, 2w & 2n).**
- 3. Marking on Outgoing LV terminals of M&P Box by stamping (i.e. 2u, 2v, 2w & 2n).**

The earthing of the core through tinned copper earthing Foil of 25 mm width & 1 mm thickness bolted on core frame channels, after removing the channel paint.

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.

If the window height and limb centre are 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. However, a tolerance of ± 2 mm shall be allowed in window height and limb centre.

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).

32.3 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.

33 **GUARANTEE PERIOD:**

I. 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 of material. 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 replaced free of cost expeditiously. The Manufacturer may use Core and Transformer Tank of the GP failed Distribution Transformer. All other materials shall be replaced by new materials such as Transformer Oil, HV & LV Windings, Metal Parts and Fittings & Accessories, etc. The Testing Procedure of such replaced Distribution Transformer including Physical Verification shall be same as per Testing of New Distribution Transformer at Firm's Works as well as at CTL without any tolerance in the losses at 50% and 100% loading.

i) The firm will **replace** all type of GP failed Distribution Transformers without asking any segregation on account of manufacturing defect. However, the Discom will compensate the cost of missing parts as per practice in vogue.

ii) The guarantee period failed transformers will directly be lifted by the suppliers from the respective circle store **within a period of 60 days from the date of intimation by the respective consignee and will replace Distribution Transformers against G.P. failed within 30 days from the date of lifting** in the ACOS store/central store along with the joint inspection sheet of missing parts issued by the respective consignee. After receiving the material at ACOS, 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 on Nigam's account. The invoices of missing parts shall be verified by the ACOS store as per the joint inspection sheet issued by the circle store as per practice in vogue and accordingly, the Sr. A.O. (CPC) will make the payment of missing parts, if any.

iii) The loading of G.P. failed Distribution Transformers at circle store and un-loading of **replaced Transformer** at ACOS will be on suppliers' account.

iv) The firm will **replace** 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 **replaced transformer**.

Firms shall lift the G.P. failed Transformer(s) within a period of 60 days from the date of intimation by the respective consignee and will replace Distribution Transformers against G.P. failed within 30 days from the date of lifting positively. In case firm fails to deliver replaced Transformer(s) within 90 days from date of intimation, the cost of the transformer(s) shall be withheld from firm's financial hold and in case firm fails to deliver replaced transformer within 90 days from date of intimation, a penalty at the rate of ½% per week subject to maximum 10%, shall be levied for the late delivery of replaced 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.

- i) 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
- ii) In case if order is more than 1000 Nos. but upto 3000 Nos. then the safe custody BG for Rs.10.00 Lacs and
- iii) In case for orders more than 3000 Nos. DT's the value of safe custody BG shall be Rs.20.00 Lacs.

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

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

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

A. A replacement identification steel plate on replaced transformer against G.P. failed transformer of size 75 x 75 x 2.5 mm duly engraved with following details shall be welded on the transformer body.

Particulars	Original Supply	1 st Replacement	2 nd Replacement	3 rd Replacement
Firm's Name/Logo				
TN				
Rating (KVA)				
Sr. No.				

Date of Dispatch				
Date of failure				
Guarantee period Upto				

B. Such metallic plate fixed on first **replacement** should not be removed at the time of second **replacement** or any subsequent **replacement**. However, necessary details of failure and **replacements** shall be graved on **the identification plate**, each time it is **replaced** in guarantee.

Note:-All other plates such as rating and terminal marking plate and Technical cum Identification Plate have to be affixed on the replaced transformers. In case it is felt that these are loose, then it should be repaired suitably by welding or riveting.

C. The **replaced** transformer shall be provided with 40 mm wide red color band all around transformers including radiator each time it is **replaced** in G.P. Thus if a transformer is **replaced** three time in G.P. then there should be three colored bands each of size 40 mm.

IV. 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.

V. The Testing Procedure of such replaced Distribution Transformer including Physical Verification shall be same as per Testing of New Distribution Transformer at Firm's Works as well as at CTL without any tolerance in the losses at 50% and 100% loading.

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

34. PRICE:

The prices shall be quoted on F.O.R. destination basis in the manner detailed in **BOQ** indicating details of Ex-works price, Freight & Insurance charges, CGST and SGST or IGST 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 transformer will be 01.02.2019** irrespective of date of tender opening. 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: (i) 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 along with receipted "challans" to the Sr. Accounts Officer (Cash & CPC), JdVVNL, Jodhpur.

35. 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 issue 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.

36. PERFORMANCE BANK GUARANTEE:

Performance security shall be solicited from all successful bidders except the departments of the State Government and undertakings, corporations, autonomous bodies, registered societies, co-operative societies which are owned or controlled or managed by the State Government and undertakings of the Central Government. However, a performance security declaration shall be taken from them. The State Government may relax the provision of performance security in particular procurement or any class of procurement.

The amount of performance security shall be 5% (**five percent**) of the amount of supply order in case of procurement of goods and services and 10% (**ten percent**) of the amount of work order in case of procurement of works. **In case of Micro, Small and Medium Scale Industries of Rajasthan** it shall be 1% (**one percent**) of the amount of quantity ordered for supply of goods and in case of sick industries, other than Small Scale Industries, whose cases are pending before the Board of Industrial and Financial Reconstruction (BIFR), it shall be 2% (**two percent**) of the amount of supply order.

The bank guarantee shall be initially valid for **36 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 firms not furnishing the bank guarantee on non-judicial stamp paper of Rajasthan Govt. then they shall have to furnish difference amount of stamp duty on Non-Judicial stamp paper of Rajasthan Govt. You shall also furnish manufacturer's warranty on Rajasthan Govt. Non-Judicial stamp paper amounting Rs.500/- as per clause No.1.41.2(a) of GCC in the prescribed proforma.

37. QUANTITY:

S. N.	Item/ Rating	Quantity in Nos.
1.	11/0.433 KV, 500 KVA, Copper Wound, Conventional Type Distribution Transformers Energy Efficient Level-2 . The prices shall be variable as per IEEMA Price Variation Formula without any ceiling.	33 Nos.

NOTE- BESIDED ABOVE SPECIFICATIONS, THE TECHNICAL PERAMETERS WHERE-EVER ARE DEVIATING FROM IS:1180 (PART-I/2014) , THE SAME SHALL BE IN ACCORDANCE WITH THE IS:1180 (PART-I/2014) AND ITS LATEST AMMENDMENTS, 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.

38. ADDITIONAL ORDER:

Repeat orders for additional quantities, up to 50% of original ordered quantities, may be placed by the Nigam, on the same rates, terms and conditions given in the contract.

39. MAKE OF BROUGHT OUT ITEMS:

The Make of brought out items like Bushings, Transformer Oil, MCCB etc. other than Make specified in the specification/work order may be accepted if confirms to relevant IS with due approval of JdVVNL.

40. Every Micro, Small & Medium enterprises of Rajasthan shall be required to submit an affidavit in schedule-XI, along with duly filled bid document

Schedule - I

SCHEDULE OF REQUIREMENT

**500 KVA, 11/0.433 KV, 3 PHASE, COPPER WOUND, DISTRIBUTION TRANSFORMER
ENERGY EFFICIENT LEVEL-2 (BEE STAR-1) UNDER SPECIFICATION
NO.JdVVNL/SE/MM&C/EIAI/TN-1516.**

S. No	ITEM	QUANTITY
1	500 KVA, 11/0.433 KV, 3 PHASE, COPPER WOUND, DISTRIBUTION TRANSFORMER ENERGY EFFICIENT LEVEL-2 (BEE STAR-1)	33 Nos.

NOTE:

1. The quantities as mentioned in the schedule of requirements are tentative and may increase/decrease as per the requirement of the Nigam.
2. Price bids shall be opened only of the firms who are having "BIS Certificate" as on opening of technical bid.
3. 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.
4. The Star Rated will be as per notification letter dated 16.12.2016, Ministry of Power, Govt. Of India, New Delhi.

SCHEDULE- II

PRICE VARIATION CLAUSE FOR COPPER WOUND DISTRIBUTION TRANSFORMERS COMPLETE WITH ALL ACCESSORIES AND COMPONENTS
(FOR SINGLE AND THREE PHASE OF RATINGS UPTO 2500 KVA AND VOLTAGE UPTO 33 KV)
(BEE / ENERGY EFFICIENCY LEVEL AS PER IS:1180(PART-I): 2014) Supplied against domestic contracts UNDER **TN-1516**

This price variation clause is applicable for 'Single Phase & Three Phase Copper Wound Distribution Transformers' for BEE / Energy Efficiency Level as per IS:1180 (Part-I):2014 of rating upto 2500 KVA and voltages upto 33 KV. The clause is to be used for domestic contracts.

The price quoted/ confirmed is based on the input cost of raw material / components and labour cost as on the date of quotation and the same is deemed to be related to prices of raw materials and all India average consumer price Index number for industrial workers as specified in the price variation clause given below. In case of any variation in these prices and index numbers, the price payable shall be subject to adjustment, up or down in accordance with following formula.

$$P = \frac{P_o}{100} \left\{ 10 + 33 \frac{C}{CO} + 24 \frac{ES}{ESo} + 9 \frac{IS}{ISo} + 4 \frac{IM}{IMo} + 5 \frac{TO}{TOo} + 15 \frac{W}{Wo} \right\}$$

Wherein

- P** = Price payable as adjusted in accordance with the above formula.
Po = Price quoted/ confirmed.
CO = Average LME settlement price of copper wire bars (refer notes)
This price is as applicable on the 1st working day of the month, one month prior to the date of tendering.
ES0 = Price of CRGO Electrical Steel Sheets (refer notes)
This price is as applicable on the 1st working day of the month, one month prior to the date of tendering.
IS0 = **Price of HR coil of 3.15 mm thickness** (refer notes).
This price is as applicable on the 1st working day of the month, one month prior to the date of tendering.
IM0 = Price of insulating Materials (refer notes)
This price is as applicable on the 1st working day of the month, one month prior to the date of tendering.
TO0 = Price of Transformer Oil (Refer notes).
This price is as applicable on the 1st working day of the month, one month prior to the date of tendering.
W0 = All India average consumer price index number for industrial workers as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base 2001=100)
This index number is as applicable on the first working day of the month, three months prior to the date of tendering.

For example, if date of tendering falls in December, 2015, applicable price of Copper (Co) and Transformer Oil (TO0) CRGO Steel Sheets (ES0), HR Coil (IS0) and insulating material (IM0)

should be as on 1st November, 2015 and all India average consumer price Index number (W0) should be for the month of September, 2015.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA (PVC) / DIST_PWR_TRF/-/- one month prior to the date of tendering.

- C** = Average LME settlement price of copper wire bars (refer notes)
This price is as applicable on the 1st working day of the month, one month prior to the date of delivery.
- ES** = C&F price of CRGO Electrical Steel Sheets (refer note)
This price is as applicable on the 1st working day for the month, one month prior to the date of delivery.
- IS** = **Price of HR coil of 3.15 mm thickness** (refer notes)
This price is as applicable on the 1st working day of the month, one month prior to the date of tendering.
- IM** = Price of insulating Materials (refer notes)
This price is as applicable on the 1st working day of the month, one month prior to the date of delivery.
- TO** = Price of Transformer Oil (refer notes)
This price is as applicable on the 1st working day of the month, one month prior to the date of delivery.
- W** = All India average consumer price index number for Industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base 2001=100)
This index number is as applicable on the first working day of the month, three months prior to the date of delivery.

For example, if date of delivery in terms of clause given below falls in Dec. 2015, the applicable price of Copper (C) and Transformer Oil (TO), CRGO steel sheets (ES), HR coil (IS) and insulating material (IM) should be as on 1st Nov. 2015 and all India average consumer price index number (W) should be for the month of Sept. 2015.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA (PVC) / DIST_PWR_TRF/-/- one month prior to the date of delivery.

The claim of price variation shall be governed as per the Clause No. 1.10.2 of Instructions to Bidders.

NOTE- The Base date will be 01.02.2019, irrespective of date of tender opening.

The date of delivery is the date on which the transformer is notified as being ready for inspection/ dispatch (in the absence of such notification, the date of manufacturer's dispatch note is to be considered as the date of delivery) or the contracted delivery date (including any agreed extension thereto), whichever is earlier.

SCHEDULE II A**PRICES & PRICE VARIATION**

- a) The prices quoted shall be variable as per Price Variation Formula given in the Specification (Schedule-III-A) without any ceiling.
- b) If the price variation formula/**Indices** is changed, the same shall be applicable for the price variation. During the transit period when both old and new indices are being circulated, then the admissible Price Variation shall be applicable, which is advantageous to Nigam, and the period from which the old indices are discontinued then the P.V. shall be admissible with the new indices.
- c) The date of delivery applicable for claiming price variation shall be the date prevailing on the first day of Calendar month which shall be determined in the manner prescribed hereunder:-
 - (i) When the material is offered within stipulated delivery schedule : For allowing P.V. the date of delivery shall be considered the date on which material is notified as being ready for inspection or date of receipt of inspection call in the office.
 - (ii) When the material is offered after expiry of stipulated delivery schedule : For allowing P.V. in the cases supplies are made after the expiry of scheduled delivery, the price prevailing in the last month of the stipulated scheduled delivery or the date on which material is notified as being ready for inspection or date of receipt of inspection call in the office, whichever is beneficial to Nigam shall be allowed.
 - (iii) When the material if offered ahead of delivery schedule on the request of Jaipur Vidyut Vitran Nigam Limited : Normally supplies ahead of delivery schedule shall not be accepted. However in case of urgency of material, if supplies are accepted ahead of delivery schedule, PV shall be allowed on the basis of the material is notified as being ready for inspection or date of receipt of inspection call in the office.
 - (iv) When the material is offered ahead of delivery schedule by firm at their own and accepted by Nigam on the request of firm: Normally the request of the firm to accept the material ahead of delivery schedule will not be accepted. In case firm offers supplies ahead of delivery schedule at their own and such request is accepted by Nigam, the price prevailing in the last month of stipulated delivery schedule or the date on which material is notified as being ready for inspection or date of receipt of inspection call in the office, whichever is beneficial to Nigam shall be allowed.

Schedule - III

JODHPUR VIDYUT VITRAN NIGAM LIMITED
A Govt. of Rajasthan Undertaking
Prescribed technical specification for supply of
(Name of Material/Equipment/Machinery/T&P etc.)

S. No.	Technical specification to which material/equipment/Machinery/T&P shall confirm	Name of IS/other standard specification to which material should confirm	Other particulars if any.
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As per clause no. 2 of attached specification

Certified that we agree to all the aforesaid technical specification except at S. No..... for which our technical specification shall be as under: -

S. No.	Technical specification to which material/equipment/Machinery/T&P shall confirm	Name of IS/other standard specification to which material should confirm	Other particulars if any.
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(Signature)

Name & Designation
with seal of the bidder.

SCHEDULE-III-A**QUALIFICATION REQUIREMENT FOR 500 KVA THREE PHASE COPPER WOUND DISTRIBUTION TRANSFORMERS WITH ENERGY EFFICIENCY LEVEL-2, STAR-1 (TN- 1516)**

The bidder should fulfill following qualifying requirements for successful participation in the tender along with relevant documentary evidence supporting each qualifying requirement without which the offer shall be considered non-responsive & rejected.

- I) The bidder should be a manufacturer of offered items. **The offers from sole selling agent/ authorized dealers shall not be entertained**
- II) The bidder is required to quote for minimum 10 % of tendered quantity, failing which the offer may be considered Non-Responsive.

III) The bidder should have designed, manufactured/fabricated, tested and supplied to Licensed Power Utility/Discoms/Govt. Departments Distribution Transformers at least 2XQQ (QQ being the quoted quantity) of similar or higher rating (Block of 160 KVA, 250 KVA, 315 KVA, 500 KVA & 630 KVA and higher rating Three phase transformers is to be considered for qualifying criteria) in last three financial years from the date of opening of techno commercial bid (For quantity verification C.A. Certificate should be furnished in prescribed proforma as per schedule-VII(A) only). However, this will not be applicable for transformers having different number of phases i.e. quantity supplied in three phase transformers will not be considered for single phase and vice-versa. The material supplied and accepted for same/higher rating for turnkey projects to a licensed power utility/Govt. shall be considered for the purpose of evaluating criteria. The certificate given by C.A. shall indicate above separately.

Note:-The CA Certificate should be furnished on the letter head of CA and must be signed by the bidder and C.A. firm. The details i.e. address of C.A. & membership No. shall clearly be mentioned on C.A. certificate. In case C.A. certificate is not signed by the bidder/furnished without membership No. & address of C.A. then same may not be considered for which responsibility rests with the bidder.

In support of fulfillment of the past supply criteria, the bidder shall furnish documentary evidence in the form of certificate from Chartered Accountant in the enclosed prescribed proforma only. This prescribed proforma should be furnished either in original or copy duly attested by Notary. The bidder shall also sign and affix seal on the C.A. Certificate. The certificate should have membership number with the name & address of the chartered accountant. Certificate should clearly indicate the quantity supplied, period of supply, voltage Class, Rating of the Transformer etc. in the format prescribed, any deviation to format or information diverted format, will not be considered and rejected.

IV) The BIS is must for participation in the bid along with the type test reports of offered type and design which should not be older than five years as on date of opening of technical bid. The type test should be conducted on one unit i.e. Short Circuit Withstand Test, Lightning Impulse Voltage Withstand Test, Temperature Rise Test and Pressure Test as per IS:1180 (Part-I)/2014 .The firm will furnish Type Test SBG of Rs.5.0 lac in lieu of non furnishing of Type Tests Reports of offered type & design . The firm will also furnish the valid BEE Certificate and inclusion of offered rating in the BIS Certificate before commencement of supply.

Note: The price bid of only those bidders shall be opened whose BIS Certificate is valid as on the date of opening of Technical Bid. However, if the BIS License validity is expired as on date of opening of technical bid then the bid may be considered if BIS License is operative as on date of opening of technical bid and firm furnish the proof of deposition of renewal fee to BIS on or before expiry date of validity of BIS license.

V) The bidder shall furnish valid type test certificates of same rating of offered item from a Govt. approved/Govt. recognized/NABL Accredited laboratory/ILAC i.e. International Laboratory Accredited Laboratory (in case of foreign laboratory). Such type test certificates should not be older than 5 years as on the date of opening of tender. For this purpose date of conducting type test will be considered. The date of conducting type test shall be before the date of opening of technical bid. Type test conducted at supplier's own NABL accredited lab shall not be considered. The following Type Test shall be conducted on one unit at NABL/Govt. Approved Lab as per IS:1180 part-1/2014 (Details of Test given in the specification)

a) Lightening Imp. Voltage Test at Min 75 KV

b) Short Circuit Test

c) Temperature Rise Test

d) Pressure Test.

VI) In case the bidder is not in a position to furnish type test certificate of same rating of offered item and furnish type test certificate of higher rating from CPRI / independent NABL Accredited laboratory/ Govt. approved lab (which does not belong to tenderer) at the time of submission of bid, the bid of the bidders may be considered as responsive, if bidder gives an undertaking along with BG / DD / Pay Order that type test of rating offered shall be arranged from first lot (without asking for any delivery extension) from CPRI / independent NABL accredited lab or shall furnish the valid type test reports before commencement of supply from ERDA/CPRI/independent NABL Accredited laboratory/Govt. approved lab.

The bank guarantee from a Scheduled Bank/DD/Pay Order should be for an amount of Rs.5.0 Lacs towards furnishing of satisfactory type test reports from first lot (without asking for any delivery extension) or shall furnish the valid type test reports before commencement of supply. However In case the bidder fails to furnish successful type test certificates from the offered lot(s) or shall not furnish the valid type test reports before commencement of supply, their bank guarantee/DD/Pay Order will be invoked/forfeited (Proforma for submitting undertaking a bank guarantee is enclosed at Schedule-III C. The initial validity of B.G. shall be nine months with a grace period of 3 months.

The firms may furnish the Type Test Reports of offered type & design or of higher rating with a Bank Guarantee of Rs.5.0 lacs along with the Technical Bid. However, the date of issuing of Type Test Bank Guarantee in lieu of non-furnishing of Type Test reports shall be before the date of opening of technical bid & the Type test BG issued on or after opening of technical bid shall not be accepted.

Note:-New state units & also those units located in Raj. which do not meet Qualifying Criteria may be considered for trial order subject to technical competency and furnishing of BG of Rs. 5.00 Lacs in lieu of non furnishing of Type test report of offered items and design but BIS Certificate must be valid as on date of opening of Technical Bid failing which the bid shall be considered Non-Responsive. However, the date of issuing of Type Test

Bank Guarantee in lieu of non-furnishing of Type Test reports shall be before the date of opening of technical bid & the Type test BG issued on or after opening of technical bid shall not be accepted.

VII) The bidder should possess adequate testing facilities for carrying out routine & acceptance test of items as per relevant standard at their works. The bidder shall furnish documentary evidence in support for conducting routine & acceptance test.

VIII) The bidder shall clearly indicate the deviations such as Technical Deviation & Commercial Deviations in the prescribed proforma only. The deviations indicated elsewhere in the bid shall not be accepted.

IX a) The bidder must clearly fill up each and every particular of Guaranteed Technical Particulars annexed with Technical Specification otherwise he will be responsible for Technical Non-Responsiveness.

IX b) The type test certificates shall be furnished either in original or copy duly attested by notary.

IX) PERFORMANCE CRITERIA:-

i) If a bidder has supplied up to 50% of ordered quantity in previous tender up to date of opening of subsequent tender and scheduled delivery period expired, the bid of such bidder will not be opened in the Discom for that item.

ii) However, if the supplies have been completed for a quantity more than 50% but not completed up to date of opening of subsequent tender and scheduled delivery period expired, the quantity equal to the quantity pending in previous tender for that item shall be reduced from the subsequent tender quantity to be allocated to the bidder.

X) POOR RECORD OF PERFORMANCE AND DELIVERY :

The bidder who have been black listed or with whom business relations have been severed in any of the state Discom shall not be considered. Severment of business relations will be done in case of following circumstances for the period and with the recovery mentioned against each :

i) When vendor does not accept order awarded on its accepted price and terms and conditions and does not comply with contractual formalities.	Forfeiture of EMD/cancellation of vendor registration to recover amount of EMD along with severment of business relations for three years from the date of issue of order.
ii) When vendor complies with contractual formalities but does not commence supplies.	Levy of maximum recovery on account of delay in delivery along with severment of relations for a period of 2 years from the date of issue of order or in next two bids whichever is later along with forfeiture of EMD / cancellation of vendor registration.

XI) Black Listing:

(A) Black listing of a firm:-

After having given Show Cause Notice of 30 days, and having established & cogent reasons for blacklisting of the firm as given below, the firm should immediately be blacklisted for a

period of 5 years indicating reasons of doing so, in the letter itself, and a copy of such blacklisting should be given to the firm, with the approval of CLPC:-

- (i) There are sufficient and strong reasons to believe that the supplier or his employee has been guilty of malpractices such as manhandling/misbehavior with Government official by supplier or his partner/employee, bribery, corruption or abatement of such a offence in a position where he could corrupt Nigam's official, fraud, vitiating fair tender process including substitution of or interpolation in tender, mis-representation, pilfer-aging or unauthorized use or disposal of Nigam's material issued for specific work etc.
- (ii) Where a supplier or his partner or his representative has been convicted by a court of Law for offences involving moral turpitude in relation to the business dealing or where security considerations including suspected disloyalty to the Nigam/state so warrant the blacklisting.
- (iii) If the State Bureau of Investigation or any other authorized investigating agency recommends for blacklisting after completing the investigation.

Note: - 1. If a supplier after having tendered for a supply or after negotiations gives application voluntarily vitiating the fair tendering process, it shall also tantamount to malpractice.

Note :-2 (A) Black listed supplier -

- (i) shall not be entitled for registration in any of the Discom
- (ii) shall not be awarded any supply order in future in any Discom during the notified period
- (iii) his registration if any shall stand cancelled immediately and his registration security /EMD/S.D. shall stand forfeited. (iv) In case of blacklisting of the firm by any one of Discom for the cogent prescribed reason(s) as stipulated above, the same shall be applicable to all the three Discoms and as a consequence of blacklisting, all the pending orders to that firm, will be cancelled in all three (3) Discoms with immediate effect. However in respect of completed/ executed contract G.P. obligations as well as other liabilities shall be fulfilled by the supplier.

(B) Severment of Business relation:

- (a) After having given Show Cause Notice of 30 days, and having established & cogent reasons for Severment of business relation as given below, the firm should immediately be severed the business relations for a period of 2 to 3 years indicating reasons of doing so, in the letter itself, and a copy of such severment should be given to the firm, with the approval of CLPC:-
 - (i) The supplier continuously refuses to pay Nigam dues without showing adequate reasons and where the purchasing authority is satisfied that no reasonable dispute attracting reference to Settlement Committee or Court of Law exists for the supplier's action of non-supply.
 - (ii) When vendor does not accept LOI/detailed purchase order awarded on its accepted prices and terms & conditions or does not comply with the contractual formalities.
 - (iii) When vendor/supplier who otherwise completed contractual formalities but does not commence supplies on the date of opening of technical bid of the fresh tender/completion of schedule delivery period whichever is later.

- Note- 1. In case supplier does not deposit outstanding dues towards Nigam, even after completion of severment period, the period of severment will continue.
2. Severment done purely/ mainly on account of non-deposition of dues against the supplier/vendor/contractor could be lifted by CLPC, if the dues are deposited prior to the expiry of such severment period.
 3. Severment done by one Discom for non-supply of material and /or corresponding nonrecovery of dues will not be effective in other Discoms **except in respect of common purchase cases of three Discom.**
 4. On severment of business, the EMD/SD/vendor registration security will be forfeited.
 5. The orders in execution satisfactorily will not be cancelled other than the order on which severment have been done.

(C) DEBARMENT:-

Reasons on which Debarment can be made:-

- (i) The competent authority may debar the supplier on account of his performance or other disabilities, if it is no longer considered fit to remain under vendor registration as per his obligation under vendor registration.
- (ii) If at any subsequent stage of inspection of firms after award of contract, it is found that firm does not have sufficient tech. staff or required/necessary technical equipments, the purchasing authority can debar the firm for one year or next tenders whichever is later. The debarment will be lifted only on re-inspection of firm's works; the defects noticed earlier are fully rectified to the satisfaction of Nigam.
- (iii) When contract agreement executed and supplies commenced but could supply only up to 50% of ordered quantity and scheduled delivery period expired, then the firm can be debarred for one year or next tender whichever is later in that Discom only for that particular item/rating/capacity/size etc.
- (iv) The suppliers who have been awarded contract for supply of material is not adhering to the periodic delivery schedule, the contract awarding authority reserve the right to terminate the contract and may debar the firm in participating in tender for a period of 2 to 3 years.

Note:-1. On debarment, the EMD/ SD/Vendor Registration security shall be forfeited.

Note:-. 2. If the firm is debarred in one Discom for any reasons then the same should not be applicable in other Discom **subject to exception that in case of common Discoms purchases such debarment of a firm would be applicable to all three Discoms for that particular item and rating/capacity/size etc.**

XII) APPEALS AND APPLICATIONS :

Appeal against the order of blacklisting, severment and debarment can be filed before BOD With in a period of 3 months from the date of intimation. The letter of appeal will be addressed to the order placing authority. Who will process the case for placing the matter in B.O.D. with in a period 60 days. The BOD may reduce or waive the penalty, if sufficient reasons/supporting documents are furnished by the supplier.

Schedule – III -B**BANK GUARANTEE IN LIEU OF FURNISHING OF TYPE TEST CERTIFICATE**

(On Rajasthan Non-Judicial Stamp Paper worth Rs. 0.25% of BG Value)

To

**The Superintending Engineer (MM&C)
Jodhpur Vidyut Vitran Nigam Limited,
Jodhpur.**

Dear Sir,

Whereas Jodhpur Vidyut Vitran Nigam Limited, Jodhpur (hereinafter called the purchaser) has issued a tender enquiry under TN for procurement of (name of material).

Whereas M/s (herein called the bidder) has furnished a bid for supply of to the Superintending Engineer (MM &C), Jodhpur Vidyut Vitran Nigam Limited, Jodhpur or his nominated officer(s).

Whereas in accordance with the provisions of the specification of the aforesaid TN, the bidder can deposit a bank guarantee in lieu of the requirement of furnishing the type test certificate.

Whereas M/s (the bidder) have requested us(Name of bank) to furnish the bank guarantee in lieu of the type test certificate, for amount equivalent to Rs. (in words also) only.

Under this bank guarantee, we (name of bank) hereby undertake unconditionally and irrevocably to guarantee as primary obligatory and not as surety merely, the payment to the purchaser on his first demand without whatsoever right of objection on our part and without his first claim to the bidder, in the amount not exceeding (amount of guarantee in figures and words).....

Payment pursuant in this undertaking will be demanded by the purchaser from the Bank and will be met by the Bank without question in the case in which the bidder, on receipt of the order and /or after the acceptance of this tender makes default in furnishing the required type test certificates. As to whether the occasion or ground has arisen for such demand the decision of the Superintending Engineer (MM &C), Jodhpur Vidyut Vitran Nigam Limited, Jodhpur or any other officer exercising the powers of Superintending Engineer (MM&C), Jodhpur Vidyut Vitran Nigam Limited, Jodhpur shall be final.

The liability of the Bank shall not at any time exceed Rs.....
(Rs.....)

The undertaking will be determined on..... but will not with standing such determination, continue to be in force till the expiry of three months from that date.

No indulgence or grant of time by the purchaser to the bidder without the acknowledgement of the Bank will discharge the liabilities of the bank under this guarantee.

The guarantee herein contained shall not be affected by any change in the constitution of the bidder.

All disputes arising under the said guarantee between the bank and the purchaser or between the bidder and the purchaser pertaining to the guarantee shall be subject to the jurisdiction of courts only at Jodhpur in Rajasthan.

The bank further undertakes not to revoke this guarantee during its currency except with the previous of the Superintending Engineer (MM &C), Jodhpur Vidyut Vitran Nigam Limited, Jodhpur.

Notwithstanding anything contained herein before, the Bank's liability under this guarantee is restricted to Rs.....(Rs.....) and the guarantee shall remain in force up toUnless demand or claim in writing is presented on the Bank within three months from that date, the bank shall be released and discharged from all liabilities there-under. However the validity of the Bank guarantee shall be extended as and when required by the purchaser.

IN WITNESS WHEREOF the Bank has executed these presents the day.....month.....and year.....

Yours faithfully,

**(Bankers)
EXECUTANT**

Witness:-

- 1.
- 2.

SCHEDULE-IV "A"

JODHPUR VIDYUT VITRAN NIGAM LIMITED
A Govt. of Rajasthan Undertaking
Must be filled-in by the tenderer and attach with technical bid (Part-I)

To,
The Superintending Engineer (MM&C),
Jodhpur Vidyut Vitran Nigam Limited,
Jodhpur.

Dear Sir,

With reference to your invitation to tender against specification No. **JdVVNL/SE/MM&C/TN-1516**, we agree to supply the following quantity:-

S. No.	Particulars of item	Tendered Quantity	Qty. Offered	Justification of quantity offered as per Qualifying Requirement.	Status of Type Test Certificates Or BG details
1	2	3	4	5	6

- The offer is valid for a period of 120 days from the date of opening of this tender.
- The base date of prices will be 01.02.2019, irrespective of date of tender opening**
- It is noted that the quantities as mentioned in the specification are approximate and we agree to supply any quantity as per your requirement.
- The delivery shall strictly be in accordance with our delivery clause as given in Schedule-VIII of this specification. In case we fail to deliver the material as indicated in the clause No. 1.23, we are liable to pay recovery for delay in delivery as per clause No. 1.24 of this Schedule-II of this specification.
The material shall conform to your specification No. **JdVVNL/SE/MM&C/TN-1516** and as per relevant ISS in all respect.
- We confirm that we agree to all the terms & conditions as well as the technical stipulations of your specification No. **JdVVNL/SE/MM&C/TN-1516** and there are no deviations other than as specified in the Schedule VI (A&B).

Yours faithfully,

Signature of tenderer
Dated with stamp

Schedule - V

JODHPUR VIDYUT VITRAN NIGAM LIMITED
A Govt. of Rajasthan Undertaking

Statement of guaranteed technical particulars and other performance data for supply of
 (Name of material) against specification No.

S. No. Particulars of technical & other performance data guaranteed.

Certified that we agree to all the aforesaid technical particulars and other performance data
 except following:-

S.No.	Particulars of technical & other Performance data	Reasons for deviations/departure.
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(Signature)
 Name & Designation
 with seal of the bidder.

SCHEDULE-V A

**GUARANTEED TECHNICAL PARTICULARS FOR 11/0.433 KV, 500 KVA, COPPER WOUND,
ENERGY EFFICIENT LEVEL-2, STAR-1 DISTRIBUTION TRANSFORMER**

S. No.	PARTICULARS	AS OFFERED (500 KVA)
1.	Manufacturer's Name and Address	
2.	Service (Outdoor, continuously rated)	
3.	Type (CRGO / Conventional)	
4.	Continuous max. Rating under peak ambient temp. of 50 ° C	
5.	Rated voltage : (a) H V (b) L V	
6.	Rated current (a) H V (b) L V	
7.	Rated Frequency	
8.	No. of phases	
9.	Method of connection : (a) H V (b) L V	
10.	Vector group reference	
11.	Method of cooling	
12.	Max. temperature rise obtained by the transformer when run at the maximum ambient temp. of 50 ° C (a) Of top oil by thermometer (b) Of winding by resistance	
13.	Hottest spot temperature, at rated current and voltage, calculated corresponding to the yearly weighted average ambient temp. of 35 ° C	
14.	Total losses At rated current and at 75° C i) At 50% loading ii) At 100% loading	
15.	Percentage impedance at full load and at 75 ° C	
16.	Percentage resistance at full load and at 75 ° C	
17.	Percentage reactance at full load	
18.	Efficiency at 75 ° C :- a) At unity power factor :- i) At 125% of full load ii) At 100% of full load iii) At 75% of full load iv) At 50% of full load v) At 25% of full load b) At 0.8 power factor :- i) At 125% of full load ii) At 100% of full load iii) At 75% of full load iv) At 50% of full load v) At 25% of full load	
19.	Maximum efficiency	
20.	Load at which maximum efficiency occurs	

S. No.	PARTICULARS	AS OFFERED (500 KVA)
21.	% regulation at full load & at 75 ° C: a)At unity power factor b)At 0.8 power factor	
22.	Max. flux density at rated voltage and rated frequency	
23.	Percentage no load current at rated frequency (without any positive tolerance) a) At rated voltage b)At 112.5% rated voltage	
24.	Insulation level of transformer :- a) Impulse strength of HV b)Power frequency withstand voltage HV LV	
25.	H V Bushing details:- (a) Rating of the bushing (b) Impulse strength (c) Power frequency withstand voltage, dry and wet (d) IS reference	
26.	LV Bushing details :- (a) Rating of the bushing (b) Power frequency withstand Voltage, dry and wet (c) IS reference	
27.	H V coil constructional details:- (a) type of winding (b)No. of coils per phase (c)Conductor cross Section(min.) (d)Bare conductor dia (e)Covered conductor dia (f) Phase current (H V) (g)Current density (h)Coil. D (i)Coil O.D (j)Coil axial length (k) Total no. of turns per phase (l) Resistance per ph. at 75 ° C (m) Weight of covered conductor per transformer (n) Inter layer insulation (o) No. of vertical spacers per circle (in the annular gap between LV & HV)	
28.	LV coil constructional details:- (a) type of winding (b)No. of coils per phase (c) Conductor cross section(min.) (d)Bare conductor size (e)No. of conductors in parallel (f)Covered conductor size (g)Phase current (L V)	

S. No.	PARTICULARS	AS OFFERED (500 KVA)
	(h) Current density (i) Coil I.D. (j) Coil O.D. (k) Coil axial length (l) Total no. of turns per phase (m) Resistance per phase at 75 ° C (n) Weight of covered conductor per transformer (o) Inter layer insulation (p) No. of vertical spacers per circle	
29.	Minimum external clearances in air (with B M C s mounted) (a) HV phase to phase (b) HV phase to earth (c) LV phase to phase (d) LV phase to earth	
30.	Minimum internal clearances (in oil) (a) Between HT outside surface and tank inside (non bushing side) (b) Between HT outside surface & tank inside (HV & LV bushing side) (c) Between HV windings and yokes (end insulation) (d) LV windings & yokes (e) From top of yoke to inside of top cover of tank (with gasket) (f) LT / HT coil annular gap. (bare Conductor) (g) Radial clearance between core & LV coil (Bare conductor) (h) Phase to phase Clearance between Limbs (HV Conductors), with a minimum of 2 Nos. x 1mm Press board covering the tie rods (i) Minimum thickness of locking Spacers between HV coil sections (including 1 mm ring of press board) (j) Maximum clearance of core channels from tank walls at each end	
31.	Tank details :- (a) Clear inside tank dimensions: (i) Length (ii) Breadth (iii) Height (b) Tank sheet thickness (i) Sides (ii) Top (iii) Bottom (c) Tank stiffener details (i) No. of stiffeners around the tank (ii) Size	
32.	Cooling radiator details : (a) Cooling tube size (b) Total length of tubes used	

S. No.	PARTICULARS	AS OFFERED (500 KVA)
	(c) Whether cooling calculations attached? (d) No. of tubes on each side	
33.	Core Details	
(i)	Size of core frame channels	
(ii)	Core diameter (mm)	
(iii)	Core stud details	
(iv)	Core coil assembly base supports (2 Nos)	
(v)	Window Height (mm)	
(vi)	LimbCenter (mm)	
(vii)	Tai Rod Details	
34.	Transformer weight details: (a) Core coil assembly (b) Tank with fittings (c) Oil weight (d) Total weight of transformer (e) Volume of oil (minimum quantity for first filling)	
35.	Overall dimensions (a) Length (b) Breadth (C)Height	
36.	Whether the bidder is an ISO : 9001 / 9002 certified company?	
37.	All the standard fittings & accessories shall be provided as per IS:1180 (part-1)-2014/spec.	Yes
38.	Whether the metal parts of HV/LV Bushing are as per relevant IS and not under size (YES/NO). If Metal parts are under size, then the lot may be rejected at firm's works.	YES/NO
39.	Whether the BEE Label sticker has been affixed on transformer. If No, then the lot may be rejected at firm's works.	YES/NO
40.	Whether the HV terminals on transformer tank are duly indelibly marked by stamping (i.e. 1u, 1v, 1w) with Min. letter size of 40x40 mm. If No, then the lot may be rejected at firm's works.	YES/NO
41.	Whether the LV terminals on transformer tank are duly indelibly marked by stamping (i.e. 2u, 2v, 2w & 2n) with Min. letter size of 40x40 mm. If No, then the lot may be rejected at firm's works.	YES/NO
42.	Whether the Four Nos. welded heavy duty lifting lugs of MS plate of 10 mm thickness, suitably reinforced by extended vertical supporting edge of same thickness in one piece having size 125 mm width and 125 mm length has been provided, these shall be so extended that cutting of bent plate is not required. If No, then the lot may be rejected at firm's works.	YES/NO
43.	Whether the LV Bushing Pocket has been continuously welded from both inside and outside on tank wall. If No, then the lot may be rejected at firm's works.	YES/NO
44.	Whether the HV leads from delta joint to HV bushing stem are	YES/NO

S. No.	PARTICULARS	AS OFFERED (500 KVA)
	terminated by brazing. If No, then the lot may be rejected at firm's works.	
45.	Whether the Core has been earthed through copper earthing foil of 25 mm width & 1 mm thickness bolted on core frame channels after removing channel paint. If No, then the lot may be rejected at firm's works.	YES/NO
46.	Whether the Sloping flap are provided on conservative pipe to main tank inside top cover. If No, then the lot may be rejected at firm's works.	YES/NO
47	Whether the Rating & Terminal Marking Plate is non-detachable & has been affixed with Min. 10 rivets and the base of the Rating & Terminal Marking Plate is continuously welded with the tank. If No, then the lot may be rejected at firm's works.	YES/NO
48	Whether the Internal electrical clearances in oil are found as per specification. If No, then the lot may be rejected at firm's works.	YES/NO
49	Whether all the External Electrical clearances are found as per specification. If No, then the lot may be rejected at firm's works.	YES/NO
50	Whether two flat washer, one nut and one spring washer have been provided with top cover nut bolts. If No, then the lot may be rejected at firm's works.	YES/NO
51	Whether Conservator is provided above the HV bushing with min. clearance of 50 mm. If No, then the lot may be rejected at firm's works.	YES/NO
52	Whether any core stamping found rusted & damaged (hole observed in stamping). If Yes, then the lot may be rejected at firm's works.	YES/NO
53	Whether the top cover and tank top flange is deformed and sunked at center of non bushing side or hammer marks are also observed, as such top cover is not sloping down opposite LV bushing side as per requirement. If Yes, then the lot may be rejected at firm's works.	YES/NO
54	Explosion vent (opened towards LV bushing side) with M.S. mesh having Pipe Diameter of minimum 50 mm & it should be inserted in the top cover of tank, welded outside & inside of top cover and its Pipe connected with Conservator. Length of the explosion vent should be minimum 700 mm. Nut bolts of flange of Explosion vent should be tag welded. The position of vent pipe should be on right side of tank and oil leakage plug on left side (when looked from LV bushing side). If not found as mentioned above, then the lot may be rejected at firm's works.	Required as per spec.
55	Whether the Details of Make, Rating, Sr. No. and TN/Order No. are punched or an identity plate with said details is welded on core coil assembly. If No, then the lot may be rejected at firm's works.	YES/NO
56	Whether Bi-metallic connectors on Bushings are provided as per specification. If No, then the lot may be rejected at firm's	YES/NO

S. No.	PARTICULARS	AS OFFERED (500 KVA)
	works.	
57	Whether the 12 Nos. nuts & bolts (4 Nos each on length sides & 2 nos each on widths sides of tank body) have been tag welded on top cover. If No, then the lot may be rejected at firm's works.	YES/NO
58.	Whether the tank base channel and stiffeners are continuously welded. If No, then the lot may be rejected at firm's works.	YES/NO
59	Whether the header pipe connecting radiator bank to the tank is rectangular in shape with approximate size of 100x20 mm. Alternatively round pipe (of dia 80 mm in case of 160 KVA to 500 KVA Three Phase Distribution Transformers) can also be used for connecting the radiator bank to the tank. Whether the placement of top header pipe to the tank body is above the top of yoke, to facilitate cooling for hot oil sump over top yoke. If No, then the lot may be rejected at firm's works.	YES/NO
60	Whether 2 Nos. of 1 mm thick press board has been used for covering the tie rods for phase barrier. Besides, tie rods have to be covered by SRBP tubes of suitable size. If No, then the lot may be rejected at firm's works.	YES/NO
61	Whether 2 mm press board has been used for base support insulation and core clamping channel insulation. For bottom and top yoke insulation, only PC Board of min. 2 mm thickness has to be used. Also, vertical spacers between HV and LV coils and radial spacers (tickleys)/blocks etc. shall be of PC Board only. If No, then the lot may be rejected at firm's works.	YES/NO
62	Whether top layers of all HV coils have been given one coat of air drying insulation varnish. If No, then the lot may be rejected at firm's works.	YES/NO
63	Whether Press Board used has been of senapathy whitely / Raman make and Perma wood or haldu wood blocks has been used for Top and Bottom yoke insulation. If No, then the lot may be rejected at firm's works.	YES/NO
64	Whether the size of core clamping MS Channel used on top and bottom (for stacked core transformers) is as per specification. If No, then the lot may be rejected at firm's works.	YES/NO
65	Whether core clamping Channel on LV side has been reinforced at equidistance, if holes/cutting is done for LT lead in order to avoid bending of channel. If No, then the lot may be rejected at firm's works.	YES/NO
66	Whether core clamping MS channel has been painted with varnish or oil-resistant paint. If No, then the lot may be rejected at firm's works.	YES/NO
67	Whether Tie-rods used in core clamping arrangement has been effectively insulated as per specification. If No, then the lot may be rejected at firm's works.	YES/NO
68	Whether all top and bottom yoke nuts & bolts and tie rods has been painted with oil and corrosion-resistant paint and phosphate coated paint for tie rods before use. If No, then the lot may be rejected at firm's works.	YES/NO

S. No.	PARTICULARS	AS OFFERED (500 KVA)
69	Whether the sizes of following items are as per specification: i. Tank top flange ii. Cover Bolt (As per IS 1180, PART-1) iii. Cover Bolt Spacings iv. Tank Base Channel (continuous welded) If No, then the lot may be rejected at firm's works.	YES/NO
70	Whether top cover edge has been extended by Min. 30 mm in such a manner to cover gasket each side and it has been bent at Min. 15° angle. If No, then the lot may be rejected at firm's works.	YES/NO
71	Whether 04 Nos. Anti Theft Fasteners has been provided - one each on all four sides in centre of body of transformer. If No, then the lot may be rejected at firm's works.	YES/NO
72	Whether two holes has been provided – one on top cover and other on collar of transformer to facilitate providing of 2 Nos. poly-carbonate seals on longitudinal side. If No, then the lot may be rejected at firm's works.	YES/NO
73	Whether dry type film thickness (DFT) of paint is as per specification. If No, then the lot may be rejected at firm's works.	YES/NO
74	Whether Oil level gauge of minimum 150mm length of prismatic glass has been located at center of conservator tank. If No, then the lot may be rejected at firm's works.	YES/NO
75	Whether make of HV/LV Bushings is as per specification/PO. If No, then the lot may be rejected at firm's works.	YES/NO
76	Whether HV Bushing pockets are such that the HV bushing is tilted more towards the HV side. The bushing of R & B phases may also be tilted sidewise to maintain the required electrical clearances. If No, then the lot may be rejected at firm's works.	YES/NO
77	Whether Technical cum Identification Plate of size 125 x 75 x 2.5 mm having details as per specification punched with letters of size 8mm X 6mm has been continuously welded to the main tank body below the middle HV bushing in clearly visible position. If No, then the lot may be rejected at firm's works.	YES/NO

(Signature)

Name & Designation
of the bidder with seal

Schedule - VI (A)

JODHPUR VIDYUT VITRAN NIGAM LIMITED
A Govt. of Rajasthan Undertaking
DEPARTURE/DEVIATION FROM TECHNICAL SPECIFICATION

The bidder shall state under this schedule the departure from the Purchaser's specification in respect of technical is as under:-

S. No.	Main Deviations from Technical Specification.
--------	-----------------------------------------------

Certified that we agree to all the technical specification of the NIT except for the deviation to the extent indicated above.

(Signature)
Name & Designation
with seal of the bidder

Schedule - VI (B)

JODHPUR VIDYUT VITRAN NIGAM LIMITED
A Govt. of Rajasthan Undertaking
DEPARTURE FROM COMMERCIAL TERMS & CONDITIONS OF THE SPECIFICATION

The bidder shall state under this schedule the departure from the Purchaser's specification in respect of Commercial terms & conditions:-

S. No.	Main Deviations from Specification.
--------	-------------------------------------

Certified that we agree to all the commercial terms & conditions as laid down in General Conditions of Contract to the specification except for the deviation to the extent indicated above.

(Signature)
Name & Designation
with seal of the bidder.

Schedule – VII

JODHPUR VIDYUT VITRAN NIGAM LIMITED
A Govt. of Rajasthan Undertaking
LIST OF PAST SUPPLIES

The bidder shall state under this schedule whether material and equipments, similar to those offered in the tender have been previously supplied by him. A list shall be given of such orders executed by him together with information regarding the names of purchasing organizations, quantities supplied and when the supplies were effected. This list should be in form given below:-

S. No.	Detailed particulars of items supplied	Qty in Nos.	Order No. & Date	Name & details of purchasing authority	Date of Completion
1	2	3	4	5	6

If executed partially to be mentioned (Qty. in Nos.)	Whether still to be executed	Delivery stipulated in order	Remarks
7	8	9	10

Note: Separate schedules are to be furnished by the bidder for past supply to the JVVNL/AVVNL/JdVVNL, other State Electricity Boards and other Departments /Organisations.

(Signature)

Name & Designation with seal of the bidder

SCHEDULE-VIIIA
TN-1516

TO WHOMSOEVER IT MAY CONCERN

This is to certify that M/s _____ (Complete with address) have manufactured and supplied the goods / equipments / material during the following financial year(s) to the Licensed Power Utilities / Government Departments / Discoms/ SEBs as detailed out below:

FOR THE LAST THREE FINANCIAL YEARS FROM THE DATE OF OPENING OF TECHNO-COMMERCIAL BID.

S. No.	Financial year in which material supplied	Detailed Particulars of item(s) supplied	Name and particulars of purchasing authority	Order No. & date against which item(s) supplied	Unit	Ordered		Actual Supplied up to		Remarks
						Quantity	Value (Rs.)	Quantity	Value (Rs.)	
1	2	3	4	5	6	7	8	9	10	11

Signature,
Name & Designation
With Seal of the Bidder
Date _____
Place _____

Signature of C.A
Name:
Address:

Membership No

The above particulars are true and correct based on explanations, records and books of accounts produced before us. Further the above certificate issued on the request of the company

CA Firm (_____)

Note:- The C.A. certificate must be signed by the bidder and C.A. firm. The details i.e. address of C.A. & membership No. shall clearly be mentioned on C.A. certificate. In case C.A. certificate is not signed by the bidder/furnished without membership No. & address of C.A. then same may not be considered for which responsibility rests with the bidder.

Schedule - VIII

JODHPUR VIDYUT VITRAN NIGAM LIMITED
A Govt. of Rajasthan Undertaking
DELIVERY SCHEDULE

PART-A

The delivery schedule of the material by the Purchase Officer is as mentioned hereunder:-

S N	Particulars of Material	Commencement period	Rate of supply per month	Period for completion of delivery of entire material
1	500 KVA, 11/0.433 KV, 3 PHASE, COPPER WOUND, ENERGY EFFICIENT LEVEL-2, STAR-1, DISTRIBUTION TRANSFORMER	45 days from the date of receipt of P.O	_____ Nos. per month (to be quoted by tenderer)	Eight and half months excluding commencement period (Max.)

PART-B

In case bidder deviates from the delivery schedule mentioned by the purchaser in Part-A then the delivery schedule shall be indicated/mentioned by the bidder as under:-

S N	Particulars of Material	Commencement period	Rate of supply per month	Period for completion of delivery of entire material
	500 KVA, 11/0.433 KV, 3 PHASE, COPPER WOUND, ENERGY EFFICIENT LEVEL-2, STAR-1, DISTRIBUTION TRANSFORMER			

NOTE:

- (i) **The offers deviating in deliveries mentioned above at part 'A' shall be considered as non responsive** in accordance to Clause No. 35 of the technical specification Section - III. In case if ordered quantity is different than quoted quantity then monthly deliveries shall be adjusted proportionately.
- (ii) During the commencement period the contractual formalities shall be got completed.

(Signature)
Name & Designation
with seal of the bidder

SCHEDULE - IX**JODHPUR VIDYUT VITRAN NIGAM LIMITED****A Govt. of Rajasthan Undertaking**

List of Equipments and Technical Hands Available with the Firm
(To be filled in by the bidders & enclosed with the bid)

Manufacturers who are quoting against this bid are requested to furnish the following information along-with the bid. The Purchaser will have the discretion to ignore the bid without the under noted particulars and/or ignore the bid particulars.

1. Name and Address of Manufacturer.
2. Place where works exist.
3. Details of machinery particularly with B.H.P. of each item installed.
4. Details of staff employed in the works.
5. Date when started the manufacturing of item under reference.
6. List of items manufactured.
7. Literature and drawings of items manufactured showing their description, size, design and other important technical particulars.
8. Details of order so far, executed along with the names of organization to whom supplied.
9. Manufacturing capacity.
10. Is the workshop open for inspection by the representative of the board, if required?
11. Statement of financial resources and Banking Reference along with Balance-Sheet for previous two years.
12. Testing facilities available for the manufactured articles in the testing laboratory of works.
13. Whether the Firm is a small/medium/large scale industry.
14. Registration No. with:-
 - i. Small Scale, National/State.
 - ii. DGTD
 - iii. State Industries Department.

(Signature)

Name & Designation
with seal of the bidder.

Schedule – X**GENERAL PARTICULARS ABOUT THE TENDER IN BRIEF****SPECIFICATION FOR SUPPLY 500 KVA, 11/0.433 KV, 3 PHASE, EEL-II, STAR-1, COPPER WOUND, DISTRIBUTION TRANSFORMER UNDER SPECIFICATION NO.JdVVNL/SE (MM&C)/ EIAl/ TN-1516.**

A	NIT No.	TN-1516
B	Cost of tender specifications	Rs.2500.00 (Two Thousand Five Hundred Only)
C	Processing fee of RISL	Rs.1000.00 (One Thousand Only)
D	Earnest money	Rs.2.00 Lacs /Exemption Certificate / Vendor Registration of Class “A” & “B”
E	Validity	120 days from the next date of opening of techno-commercial bid.
F	Base date for price variation	01.02.2019, irrespective of date of tender opening

IMPORTANT DATES

S.N.	Events	Date & Time	Location
1	Date of downloading of tender specifications	Up to 28.03.2019 (06:00 PM)	www.jdvvnl.com & http://eproc.rajasthan.gov.in
2	Deposit of cost of Tender Specifications, Processing fee & Earnest Money	Up to 28.03.2019 (3:00 PM)	Office of Sr. A.O (Cash & CPC), JdVVNL, New Power House, Industrial Area, Jodhpur
3	Last Date & time of submission of electronic bid	Up to 29.03.2019 (12:00 PM)	http://eproc.rajasthan.gov.in
4	Opening of Technical Bid	29.03.2019 (03:00 PM)	http://eproc.rajasthan.gov.in
5	Opening of Price Bid	To be intimated separately to the qualified bidders	http://eproc.rajasthan.gov.in

1. The bids not accompanied with qualification requirement, technical requirement indicated in the specification and other requirement given here under will be considered as incomplete offer and sufficient grounds for offer to be passed over:

- i) Capacity, capability and competency proofing documents.
 - a) Capacity/orders of similar and higher rating of tendered equipment booked as on date of bidding with type and rating and construction details of equipment for which order received be indicated.
 - b) Copy of purchase orders of Erstwhile RSEB /SEB`S / Electric Utilities / Govt. Departments / Discom for similar or higher rating equipment latest executed.
- ii) Year wise past experience for last 5 years of similar or higher rating of tendered equipment.
- iii) The details of testing facilities available at the works and copies of latest type test certificates, carried out on similar ITEM.

- iv) Quality assurance plan.
 - vi) Complete guaranteed technical particulars, out lines and general arrangement drawings along with Bill of Material.
2. Bids without Section-I, II, III & Schedules (I to X) shall be rejected.
 3. Bids shall be furnished in single copy.
 4. JDVVNL has the right to reject any offer on the basis of track record of poor performance in execution of previous order / equipment supplied /after sales service while evaluating the Techno-Commercial bid.
 5. JDVVNL reserves the right to accept minor deviations in standard terms and conditions and also in technical and constructional features as specified in the technical specification **(Section-III)**.
 6. Deviation of any kind shall not be quoted in price bid, if found quoted, the same shall be ignored.
 7. The following facilities are to be provided by the supplier at his own cost to the inspecting officer of Nigam (JdVVNL).
 - i) Suitable accommodation.
 - ii) Local conveyance between arrival point, place of stay, works and departure point.
 - iii) The supplier shall assist in arranging return ticket and reservation on the request of the inspecting officer for which the payment shall be made by the inspecting officer. In case of joint inspection, single or shared double room accommodation shall be provided

Schedule - XI**Format of Affidavit****(TO BE FURNISHED ON NON-JUDICIAL STAMP WORTH Rs.100/- & DULY NOTARIZED)**

I, _____ S/o _____ Aged ___ Years residing at
 _____ Proprietor/ Partner/ Director of M/s
 _____ do hereby solemnly affirm and declare that:-

(a) My/ our above noted enterprise M/s _____ has been issued acknowledgement of Entrepreneurial Memorandum Part-II by the District Industries Center, _____. The acknowledgement No. is _____ dated _____ and has been issued for manufacture of following items:-

(i)

(ii)

(iii)

(iv)

(b) My/ our above noted acknowledgement of Entrepreneurial Memorandum Part-II has not been cancelled or withdrawn by the Industries Department and that the enterprise is regularly manufacturing the above items.

(c) My/our enterprise is having all the requisite plant and machinery and is fully equipped to manufacture the above noted items.

(d) The present status of the firm is as per acknowledgment of Entrepreneurial Memorandum Part-II issued on the date of District Industries Center, _____.

Place

Signature of Proprietor/ Director/
Authorized Signatory with Stamp and Date**VERIFICATION**

I, _____ S/o _____ Aged ___ Years residing at
 _____ Proprietor/ Partner/ Director of M/s
 _____ verify and confirm that the contents at (a), (b), (c) & (d)
 above are true and correct to the best of my knowledge and nothing has been concealed therein.
 So, help me God.

DEPONENT

APPENDIX-A

Bank Guarantee No. ____.
Security Amount : ____.
Issued on dated : ____.
Valid upto : ____.
Claim upto / Grace period: ____.

PERFORMA OF BANK GUARANTEE FOR BID SECURITY

(Bank Guarantee in lieu of bid Security on non-judicial Stamp Paper of Rajasthan State of 0.25% of the B.G. value or Rs.25,000/-, whichever is less)

To,

The Superintending Engineer (MM&C),
 Jodhpur Vidyut Vitaran Nigam Limited,
 Jodhpur.

1. Whereas _____ (name of the Bidder) (hereinafter called "the Bidder") has submitted its bid dated ____ (date of submission of bid) for _____ (name of contract/ name of the material with Bid no. / TN No. ____) (hereinafter called 'the Bid').
2. KNOW ALL PEOPLE by these presents that WE _____ (name and address of branch of Bank) of _____ (name of country), having our registered office at _____ (addresses of bank) (hereinafter called 'the Bank'), are bound unto _____ (name of Purchaser) (hereinafter called "the Purchaser") in the sum of Rs. *_____ for which payment well and truly to be made to the said Purchaser, the Bank binds itself, its successors, and assigns by these presents sealed with the Common Seal of the said Bank this ____ day of ____ 20__.
3. THE CONDITIONS of this obligation are :
 - i. If the bidder withdraws its Bid during the period of bid validity specified by the Bidder in the Bid Form; or
 - ii. If the bidder refuses to accept the correction of error in his Bid; or
 - iii. If the bidder, having been notified of the acceptance of its Bid by the purchaser during the period of bid validity:
 - a. Fails or refuses to execute the Contract Agreement within the time specified in purchase / work order, if required, or
 - b. Fails or refuses to furnish the performance security within the time specified in purchase / work order in accordance with the GCC, or
 - c. Fails to commence supply of goods or services or execute work as per purchase / work order within time specified.
 - iv. If the bidder breaches any provision of the Code of integrity specified in the RTPPP Act and Chapter VI of the RTPPP Rules.
4. We undertake unconditionally and irrevocably to guarantee as primary obligator and not as surety merely to pay to the purchaser a sum of Rs. _____ (in words Rs. _____) upon receipt of its first written demand, without the purchaser having to substantiate its demand, provided that in its demand the Purchaser will note that the amount claimed by it is due to it owing to the occurrence of one or all of the three conditions specifying the occurred condition or conditions.

5. The decision of the Superintending Engineer (MM&C), Jodhpur Vidyut Vitaran Nigam Limited, Jodhpur shall be final whether breach has been committed on the right to demand the amount of guarantee from us which has accrued to the purchaser.
6. This guarantee shall not cease or determine, if the purchaser grants time or indulgence or vary the terms of the contract with the Contractor or without our consent or knowledge.
7. The guarantee herein contained shall not be affected by any change in the constitution of the Contractor.
8. We _____ (Bank Name) further undertake not to revoke this guarantee during its currency except with the previous consent of the Superintending Engineer (MM&C), Jodhpur Vidyut Vitaran Nigam Limited, Jodhpur.
9. All disputes arising under the said guarantee between the Bank and the Nigam or between the Contractor and the Nigam pertaining to the guarantee, shall be subject to the jurisdiction of the Courts in Jodhpur, Rajasthan alone.
10. This guarantee will remain in force up to and including one hundred eighty (180) days after the date of the opening of bids, i.e. upto _____, with a further grace period of Ninety (90) days and any demand in respect thereof should reach the Bank not later than the above date.

Yours faithfully,
Bankers (EXECUTANT)
Signed by the above named Bank in presence of :
(signature with full Name and Address)

Witness :

1. _____.
2. _____.

Attested by Notary Public, First Class Magistrate or directly confirmed by the executing Bank.

* The Bidder should insert the amount of the guarantee in words and figures denominated in the currency of bid.

Note : In case the bid is submitted by a Joint Venture, the Bid Bank guarantee shall be in the name of Lead partner or in the name of joint venture partners submitting the Bid covering all the partners of the joint vent

Annexure-I**UNDERTAKING FOR CA CERTIFICATE****(TO BE FURNISHED ON NON-JUDICIAL STAMP WORTH Rs.100/- & DULY NOTARIZED)**

I/WE UNDERTAKE THAT THE CA CERTIFICATE SUBMITTED AS PER THE REQUIREMENT OF PRE-QUALIFICATION REQUIREMENTS, FOR ADJUDGING THE PAST SUPPLIES ,UNDER THE SUBJECT TENDER, TN-**1516**, IS CORRECT AND I , UNDERSIGNED WILL BE SOLELY RESPONSIBLE FOR ANY DEVAITION/DISCREPANCY/IN-CORRECT INFORMATION , IF EVER NOTICED IN THE CA CERTIFICATE.

FURHER, IN CASE, IF ANY DEVAITION/DISCREPANCY/IN-CORRECT INFORMATION IS NOTICED IN THE CA CERTIFICATE FURNISHED WITH THE BID, AT ANY STAGE DURING PROCESSING/ CURRENCY OF TENDER, DISCOM CAN TAKE THE ACTION AGAINST THE FIRM M/s _____AS PER THE RULES & REGULATIONS.

(SIGNATURE)
NAME & DESIGNATION
WITH SEAL OF THE BIDDER.

AMENDMENT IN ITB AND GCC

- 1) Wherever EMD and Security Bank Guarantee (SBG), are appearing in the ITB, GCC & other Bidding Documents, same is hereby replaced by BID SECURITY as under:-**

BID SECURITY

Bid security shall be 2% **of the estimated value of subject matter of procurement put to bid.** In case of Small Scale Industries of Rajasthan it shall be 0.5% of the **quantity offered** for supply and in case of sick industries, other than Small Scale Industries, whose cases are pending with Board of Industrial and Financial Reconstruction, it shall be 1% of the value of bid. Every bidder, if not exempted, participating in the procurement process shall be required to furnish the bid security as specified in the notice inviting bids.

In case SSI unit of Rajasthan quotes the less than the tendered quantity, then they are required to furnish Bid Security @ 0.5% of the estimated value of the quantity offered by them, failing which bid shall be considered non-responsive.

The Bid Security amount (as applicable) to be paid by Demand Draft/Banker's Cheque in favour of SR. AO (CASH & CPC), JDVVNL, Jodhpur (payable at Jodhpur) **upto 3.00 p.m. upto one WORKING day prior to schedule date of opening** of respective bid or Bank Guarantee, in specified format, of a scheduled bank in favour of The Superintending Engineer (MM&C), JDVVNL, Jodhpur, be deposited to the Sr. Accounts Officer (MM&C), JDVVNL, New Power House, Industrial Area, Jodhpur-342003 **upto 3.00 p.m. upto one WORKING day prior to schedule date of opening** of respective bid and obtain a receipt / acknowledgement thereof. **No other mode of deposit shall be accepted. At time of depositing the Bid Security amount or Bank Guarantee, the bidder shall also furnish self attested and duly attested by Notary the documentary evidence of SSI unit of Rajasthan or of sick unit (as applicable) and also submit a letter for the offered quantity by them alongwith an Affidavit for MSME unit of Rajasthan in the enclosed format as per Schedule XI is to be furnished on non-judicial stamp paper of Rs.100/- duly attested by Notary public, to the office of Sr. Accounts Officer (MM&C), JDVVNL, Jodhpur. The Bid Security bank guarantee of requisite amount shall be furnished on non-judicial stamp paper of Rajasthan State. Also furnish the undertaking for the CA certificate in the enclosed format as per **Annexure-I** on non-judicial stamp paper of Rs.100/- duly attested by Notary public alongwith the original / notarised CA certificate as per requirement of tender specifications.**

The Bank Guarantee against Bid Security be issued by Nationalized / Scheduled Bank. The same may be accepted after confirmation by issuing Bank. If any Bid Security Bank Guarantee not in proper format / not confirmed by the issuing Bank the same would not be accepted and the bidder would be immediately shorted out from bid process.

The Micro, Small & Medium Scale Industries of Rajasthan and sick industries, other than Small Scale Industries, whose cases are pending before the Board of Industrial and Financial Reconstruction (BIFR) shall furnish self-attested documentary evidence duly attested by Notary to claim the above.

- 2) Wherever Performance Bank Guarantee (PBG) and Composite Bank Guarantee (CBG) are appearing in the ITB, GCC & other Bidding Documents, same are hereby replaced by PERFORMANCE SECURITY as under:-**

PERFORMANCE SECURITY:

- (i) Performance security shall be solicited from all successful bidders except the department's of the State Government and undertakings, corporations, autonomous bodies, registered societies, co-operative societies which are owned or controlled or managed by the State Government and undertakings of the Central Government. However, a performance security declaration shall be taken from them. The State Government may relax the provision of performance security in particular procurement or any class of procurement.
- (ii) The amount of performance security shall be **five percent** of the amount of supply order in case of procurement of goods and services and **ten percent** of the amount of work order in case of procurement of works **In case of Micro, Small and Medium Scale Industries of Rajasthan** it shall be **one percent** of the amount of quantity ordered for supply of goods and in case of sick industries, other than Small Scale Industries, whose cases are pending before the Board of Industrial and Financial Reconstruction (BIFR), it shall be **two percent** of the amount of supply order.

3) VENDOR REGISTRATION

The **relaxation/exemption given to the registered vendors of the Nigam in respect of EMD/SBG, wherever appearing in the ITB, GCC & other Bidding documents, are hereby WITHDRAWN.**

- 4) **The indirect taxes i.e. Excise Duty, Service Tax, VAT/CST, Entry Tax etc. mentioned in G.C.C., may now be read as G.S.T.**
- 5) **G.S.T. will be charged extra at the prevailing rate on all the Settlement Fees as applicable and amended time to time.**
- 6) **The Clause No. 1.43 of GCC has been amended to the extent as under:**

1.43 DUE DATE OF PAYMENT:

Payment shall be due and payable by the purchaser in accordance with the provision of the contract within a reasonable period from the date of receipt of each invoice by the contractor / supplier duly supported by a certificate of the Engineer. The purchaser will take all possible effort to make payment to the contractor / supplier generally on **45th day** after receipt of duly verified challans / receipts / bill in the office of paying authority (Sr. Accounts Officer (Cash & CPC) Jodhpur Discom, Jodhpur / Concerned Circle Accounts Officer) and completion of contractual formalities. But in case of delay in payment the purchaser shall not be liable to pay any interest on the outstanding amount to the contractor / supplier.

Appendix-B**Instructions**

- 1. All the intending bidders are requested to submit hard copy of all the document(s), uploaded on the e-procurement web-portal, in a sealed envelop in the office of the SE (MM & C), JdVVNL, Jodhpur. This sealed envelop shall be opened on the same date of bid opening i.e. on website of eproc.rajasthan.**
- 2. Bidders are requested to read the bid documents very carefully and upload their bid well in time.**
- 3. At the time of accepting counter offer given or at the time of negotiation, bidders change the quantity of original offer & give the conditional acceptance of counter offer which is not in accordance with RTPP rules and Act therefore Negotiation with the bidders or counter offer given to bidder shall be accepted in terms of price only. Restriction on quantity to be supplied or any other conditional offer shall not be accepted. If any conditional offer is given then that bidder shall be treated for violation of the code of integrity in terms of sec 11 of RTPP Act and Rule 80 of RTPP Rules and action shall be taken against defaulter bidder in accordance with RTPP Rules and Act.**
- 4. In case of bid security deposited, the firm deposits lesser security than the required amount, bid shall be rejected.**
- 5. As per notification SO 165 issued by Fin. Dept. dt. 19.11.2015 on reference to RTPP rules, " clause 8(A)" bidding document shall be provided to MSME at 50% of prescribed cost.**
- 6. RTPP Act 2012 & RTPP rules 2013 shall be applicable for the procurement process.**
- 7. A declaration regarding debarment/blacklisting/code of integrity shall be given by bidder in Annexure-'A'.**

Annexure 'A'**(SELF ATTESTED UNDERTAKING TO BE GIVEN ON FIRM'S LETTER HEAD)**

We, the undersigned declare that:

- 1. Our firm, its affiliates of subsidiaries including any subcontractor or suppliers for any part of the contract have not debarred by the state government or the procuring entity or a regulatory authority under any applicable law.**
- 2. We declare that we have complied with and shall continue to comply with the provision of the code of integrity including conflict of interest as specified for bidders in the RTPP Act 2012, RTPP Rules 2013 and the bidding document during the procurement process and execution of contract till completion of all our obligation under contract.**

**Firm's Name
Seal & Signature**