



**By Regd. Post with Ack. Due:**

**In duplicate:**

**NORTHERN POWER DISTRIBUTION COMPANY OF TELANGANA LTD  
CORPORATE OFFICE, VIDYUTH BHAVAN, WARANGAL – 506 001.**

**(REPEAT PURCHASE ORDER)**

**Phones: 0870-2461507.  
Fax : 0870-2461519.**

**Ph: 08564-258987.  
Fax: 08564-255087.**

From  
The Chief General Manager / P&MM,  
# 2-5-31/2, 1st Floor, Vidyuth Bhavan,  
T.S N.P.D.C.L, Corporate Office,  
Nakkalagutta, Hanamkonda,  
Warangal – 506 001.

To  
M/s. Sree Lakshmi Venkateswara Electricals,  
C-9, Industrial Estate,  
Besides Joy Ice Cream Factory,  
Mydukur Road, Proddatur – 516 362.

<b>SAP No:</b>	<b>5</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>8</b>	<b>3</b>	<b>4</b>
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**P.O.No.CGM/P&MM/NPDCL/Wgl./GM/DE-2/A3/RPM- 4228, Dt. 18-07-2014.**

**Sub :-** NPDCL/Wgl. – Repeat Order for supply of 3 Star 3-Ph 25 KVA Conventional type, stacked core Aluminium wound Distribution Transformers – Issued – Reg.

- Ref:-**
1. Tender Specification No. CGM/ NPDCL/ OT-02/12-13.
  2. P.O.No.CGM/P&MM/NPDCL/Wgl./GM/DE-2/A3/PM- 3956, Dt.15-04-2013
  3. Lr.No.CGM/P&MM/NPDCL/WGL/GM/DE-2/A3/D.No.881, Dt. 1.7.2014
  4. Your acceptance Letter. Dt. 2.7.2014.

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1. **ACCEPTANCE:** I, acting for and on behalf of and by the order and direction of the TSNPDCL accept the rate for supply of 833 No's 3 Star 3-Ph 25 KVA Conventional type, stacked core Aluminium wound Distribution Transformers with guaranteed losses as mentioned in "Schedule of Materials" as per the above cited correspondence subject to the following terms and conditions.
2. **PRICES:** The prices noted below are in rupees free at destination stores (FADS) inclusive of Freight & Insurance, Excise Duty @ 10 %, Educational Cess @ 3% on ED and CST @ 2%.

The prices are variable as per the IEEMA Price Variation Formula (Annexure-II) and as per specification with base date 01-07-2012 (i.e., 1st working day of one month prior to date of tendering) with 30% ceiling on positive side and no ceiling on negative side as below :

**For Aluminum Winding:**

$$P = \frac{P_0}{100} \left\{ 12+18 \frac{AL}{AL_0} + 26 \frac{ES}{ES_0} + 17 \frac{IS}{IS_0} + 4 \frac{IM}{IM_0} + 12 \frac{TO}{TO_0} + 11 \frac{W}{W_0} \right\}$$

- I. The price variation bills shall be claimed separately which will be paid after approval of the same by this office, and after payment of recoveries, if any, intimated by field officers. You shall claim only the prices as indicated in the Purchase Order in your regular bills.
- II. Any variation up or down in Excise duty or VAT or other statutory levies, or new levies introduced after placing of the order, under this specification, shall be to the TSNPDCL account, provided that in cases where the delivery schedule is not adhered to by the supplier and that, if there are increases in excise duty or VAT/CST or other statutory levies or new imports after

the agreed delivery dates, the supplier shall bear the impact of these levies and if there is downward variation/ revision, the TSNPDCL shall be given credit to that extent.

**3. SCHEDULE OF MATERIALS:**

Sl. No.	Description	Qty. in Nos.	Rate/ Each (inclusive of all)	Amount Rs. Ps.
1	11KV/433 – 250V, 3 Star 25 KVA oil immersed naturally cooled three phase, 50 Hz double wound, CRGO Core/ Stacked Aluminum Winding, outdoor type, Conventional Distribution Transformers top cover fixed with nut and bolt and neoprene gasket continuous arrangement generally conforming to IS-1180/Part-I&II and IS-2026/1977 latest versions except where specified otherwise with first filling of oil generally as per IS-335/1983 (latest version) and as per specification.  <b>Guaranteed Max. Losses:</b>  Maximum Losses at 50% Load : <b>210 Watts</b> Maximum Losses at 100% Load : <b>695 Watts</b>	<b>833</b>	<b>Rs. 49,578.76</b>	<b>4,12,99,107.08</b>
<b>Total:</b>				<b>4,12,99,107.08</b>
<b>(Rupees Four Crores Twelve Lakhs Ninety Nine Thousand One Hundred and Seven only)</b>				

**NOTE:** The Breakup price of 3 Star 3-Ph 25 KVA Conventional type, stacked core Aluminium wound Distribution Transformers as indicated below:

<b>Breakup Price</b>		
Ex-works Price	Rs. :	43,445.48
Excise Duty @10.3 %	Rs. :	4,474.88
Freight & Insurance	Rs. :	700.00
CST @ 2 %	Rs. :	958.40
<b>Total</b>	<b>Rs. :</b>	<b>49578.76</b>

The unloading charges at destination stores shall be to TSNPDCL's account.

**4 DESIGN & CONSTRUCTION :**

**4.1 CORE :CRGO Material:**

- a) The core shall be stacked type, generally of M4 or high grade cold rolled grain oriented annealed steel lamination having low loss and good grain properties, coated with hot oil proof insulation, bolted together and to the frames firmly to prevent vibration or noise. All core clamping bolts shall be effectively insulated. The complete design of core must ensure permanency of the core losses with continuous working of the transformers.
- b) The transformer core shall be suitable for over fluxing due to combined effect of voltage and frequency upto 12.5% without injurious heating at full load conditions and shall not get saturated. The bidder shall furnish necessary design data in support of this situation.
- c) Flux density should not be more than 1.55 Tesla for CRGO core .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., 6%. 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. .

- d) **Core clamping :**
- i. MS Channel of 75 x 40 mm min. size shall be used on top and bottom.
  - ii. 2 x 12 mm high tensile bolts to be used in parallel at each end.
  - iii. Channel on LV side to be reinforced at equidistance, if holes/cutting is done for LT lead in order to avoid bending of channel.
  - iv. MS channel shall be painted with varnish or oil-resistant paint.
- e) Tie-rods : 4 Nos. of M12 HT steel rods shall be effectively insulated.
- f) i) All top and bottom yoke nuts & bolts and tie rods shall be painted with oil and corrosion-resistant paint before use.
- ii) Core base and bottom yoke shall be supported with 75 x 40 mm MS channel with proper bolting/welding. Flat or cut channels will not be accepted.
- g) Only prime quality CRGO sheets should be used in the transformers and no Second/Defective/Scrap CRGO finds way into transformers. Therefore regarding quality control following documents are to be furnished along with bid documents.

The supplier should offer the core for inspection and approval by the purchaser during manufacturing stage. Supplier shall give note for inspection with the following documents as applicable as a proof of towards use of prime core material.

1. Invoices of supplier
2. Mill's test certificate
3. Packing list.
4. Bill of landing
5. Bill of entry certificate by custom
6. Description of material, electrical analysis, Physical inspection, certificate for surface defects, thickness and width of the material.

Subjecting to at least 10% of the transformers to routine tests and no load and load loss measurement

It is note that, using seconds /defective CRGO sheets or Load losses found to be more than stipulated limit, heavy penalty will be imposed or the suppliers will be black listed.

**4.2 Windings:** winding material shall be as per specification.

**4.3 INSULATION MATERIAL & CLEARANCES :**

- a) Materials: Electrical grade insulation epoxy dotted Kraft paper of standard make or better material subject to approval of the purchaser. Press Board of standard make or better material and subject to approval of purchaser. Inter layer insulation shall be Epoxy dotted paper
- b) All spacers, axial wedges/runners used in windings shall be made of pre-compressed Pressboard- solid, conforming to type B 3.1 of IEC 641-3-2. All spacers shall be properly sheared and dovetail punched to ensure proper locking. All axial wedges/ runners shall be properly milled to dovetail shape so that they pass through the designed spacers freely. Insulation shearing, cutting milling and punching operations shall be carried out in such a way, that there should not be any burr and dimensional variations

**4.4 CLEARANCES** : The clearances for the CRGO stacked core shall be maintained as specified in the tender specification .

**4.5. TANK** : Circular cross section cooling tubes of not less than 38 mm dia and 1.25 mm thick bent & directly Welded to tank shall be provided. OR The radiators can be Press fin type of 1.2mm thickness to achieve the desired cooling to limit the specified temperature rise. They should be fixed at right angles to the sides and not diagonally. The transformer shall be capable of giving continuous rated output without exceeding the specified temperature rise. The size of the radiator shall be such that it covers at least 50% of the bottom yoke, full core and complete top yoke. Supplier shall submit the calculation sheet.

4.5.1. The transformer tank shall be of robust construction rectangular in shape and shall be built up of tested MS sheets of the following thickness and no negative tolerance is allowed.

i)	Side walls (min)	:	3.15 mm thickness.
ii)	Top and bottom plates (min)	:	5.0 mm thickness.
iii)	Bottom plates (Min.)	:	5 mm thickness.

4.5.2. The internal clearance of tank shall be such that, it shall facilitate easy lifting of core with coils from the tank without dismantling LV bushings. The four walls of the tank shall be made of TWO "L" shaped sheets (without joints) fully welded at the corners from inside and outside of the tank. Two sides corner shall be welded for withstanding a pressure of 1Kg/Sq.cm for 10 minutes.

All the tank plates shall be of such strength that the complete transformer with oil and fittings can be lifted bodily by means of lifting lugs provided. The top cover of the tank shall be bent 'L' shape four sides to avoid entry of water through cracks of gasket.

4.5.3. All joints of tank and fittings shall be oil tight and no bulging should occur during service. The tank design shall be such that the core and windings can be lifted freely. The tank plate shall be of such strength that the complete transformer when filled with oil may be lifted bodily by means of lifting lugs provided. Inside of tank shall be painted with *hot oil proof paint*.

4.5.4. Manufacturer should carry out all welding operations as per the relevant ASME standards and submit a copy of the welding procedure qualifications and welder performance qualification certificate to the customer.

4.5.5. The tank shall be reinforced by welded angle (40x40x5 mm) on all the outside wall on the edge of the tank to form two equal compartments. Permanent deflection when the tank without oil is subject to a vacuum of 760 mm of mercury shall not be more than 5 mm up to 750 mm length and 6 mm up to 11000 mm length. The tank shall further be capable of withstanding a pressure of 0.8 kg/sq.cm (g) and a vacuum of 0.3 kg/sq.cm (g) without any deformation.

4.5.6 Pressure test will be conducted by the inspecting officer on a transformer vent pipe against each lot offered for inspection. The diaphragm should burst at a pressure between 0.76Kg./Sq.mm to 0.95Kg./Sq.mm. For any operational failure of vent pipe and consequent damaged to the tank in addition to insisting for free replacement of the tank, the TSNPDCL may at its option, recover an estimated loss sustained by it from the manufacturer.

4.5.7 The transformer tank top cover shall be fixed with M12 bolts (hot dip galvanized) spaced not more than 100mm between each bolt. Four M12 anti theft SS bolts (fasteners) shall be fixed with provision to put seals (2 mm hole on tail side) and four corner bolt-nuts shall be welded to prevent opening of the cover at site by miscreants and suitable continuous neoprene cork/ rubberized / nitril gasket(Rectangular) with 6mm without any joint conforming to IS: 4352 Part-II will be placed between tank and cover, to avoid leakage of Nitrogen/dry air and all the fittings including bushings in position shall be tested for leakage at a pressure of 0.7Kg./Sq.cm inside the tank for 10 minutes. The above test shall be

carried out before final sealing of the transformers. The bolts outside tank shall have 2 flat washers & one spring washer.

4.5.8. The cooling tubes shall not be provided underneath the LV bushing to avoid puncturing of the tubes due to falling down of LV lead on them. Heat Dissipation calculation shall be furnished with respect to the maximum 100% load losses specified.

**4.5.9. Lifting Lugs :** 2 Nos. welded heavy duty lifting lugs for main tank and 2 nos for top cover of MS plate 8 mm thick suitably reinforced by vertical supporting flat welded edgewise below the lug on the side wall.

**4.5.10 The sealing :** The supplier shall provide seals to four corners of the distribution transformers. The space on the top of the oil shall be filled with dry air. The dry air plus oil volume inside the tank shall be such that even under extreme operating conditions, the pressure generated inside the tank does not exceed 0.406 Kg/Sq.cm positive or negative. The volume of space above oil level shall normally be not less in volume than 55% of the volume of oil. The nitrogen/dry air shall conform to commercial grade of the relevant standard.

'U' shaped pressure relief vent of 2" diameter pipe with 0.025mm copper shim sheet/0.4 mm Bakelite thick sheet as diaphragm shall be provided on the top of the cover of the tank such that the pressure released should be directed to the ground. The other end of the vent pipe shall be guarded with wire mesh for preventing the entry of worms and nesting. The diaphragm shall burst at a pressure of 0.76 to 0.95 kg/ sq.cm. Conservator shall not be provided for these transformers.

4.5.11 Manufacturer has to emboss his company monogram and The word "**NPDC of TS Ltd.,**" shall be embossed on the side sheet of the Tank above rating & diagram plate. The size of the embossing of the word "**NPDC of TS Ltd.,**" is of 2" Inches. The following information shall also be embossed on a separate MS sheet of thickness 2mm and firmly welded (No Tack welding) on one side of the transformer. **The size of the word is of 1" inch. a) P.O. No. & Date, b) Year of manufacture c) Make and Serial No., d) Guarantee period .**

**4.6. SURFACE, PREPARATION AND PAINTING :** Shall be maintained as specified in the tender specification .

4.6.1 Tests for painting.

4.6.2 The painted surface shall be tested for paint thickness.

4.6.3 The painted surface shall pass the Cross Hatch Adhesion test, Salt spray test and hardness test as per the relevant ASTM standards.

**4.7. FINISHING:**

The exterior of the transformer and other ferrous fittings shall be thoroughly cleaned, scraped and given a primary coat and the two finishing coats of durable oil and weather resisting paint of polyurethane. The colour of the finishing coats shall be dark admiral gray conforming to No. 632 of IS 5 of 1961 colour for Ready Mixed Paints.

**4.8. BUSHINGS:** Shall be maintained as specified in the tender specification. The bushings shall conform to the relevant standards specified and shall be outdoor. The bushing rods and nuts shall be made of brass material 12 mm diameter for both HT & LT. The bushings shall be fixed to the transformers on sides with straight pockets and in the same plane. The tests as per IS:2099/1962 shall be conducted on the transformer bushings as detailed below.

- i) Dry flashover voltage.
- ii) Wet flashover voltage.
- iii) Dry 1 min. withstand voltage.
- iv) Wet 1 min. withstand voltage.
- v) Impulse withstand voltage (1.2/50 micro sec. Positive wave).

#### 4.9 Terminal connectors:

The L V bushing and HV busing stems shall be provided with suitable terminal connectors so as to connect the jumper without disturbing the bushing stem. Connectors shall be with eye bolts so as to receive 55 sq.mm. conductor for HV Terminal connectors must have type tested as per IS:5561

#### 4.10 Rating Plates and Star Labeling :

The rating plates on the transformer containing the information specified in clause 15.2 of IS : 2026-1977 (Part-i). 50% & 100% load losses of the transformer should also be mentioned on the rating plate.

**Star Labeling:** 3-Star rating label in accordance with colour design, logo etc., shall be provided on each transformer as per the design/recommendations of Bureau of Efficiency (BEE). Expenses incurred to get star rating labeling is in the account of suppliers only. The certificate of registration issued by BEE shall be submitted.

**4.11. LIGHTNING ARRESTORS :** 9kV, 5kA Metal Oxide Lightning Arrestors with disconnecter as per relevant standard, one number per phase shall be fitted under the HV bushings with GI earth strip 25x3 mm connected to the body of the transformer with necessary clamping arrangement shall be provided. The metal oxide lightning arresters shall of reputed make.

**4.12. FITTINGS :** The following standard fittings shall be provided.

- a. Rating and terminal marking plates non detachable -1No.
- b. Earthing terminals with bolt, nuts & washers for connecting earth wire - 2Nos.
- c. Lifting lugs – 2 Nos. for main tank and 2Nos. for top cover
- d. Bimetallic terminal connectors on the HV/LV bushings – 7 Nos.
- e. Thermometer pocket with cap – 1 No.
- f. U shaped Pressure relief vent pipe of 2' dia with 0.0025 mm diaphragm on the tope of the top cover for breaking at a pressure of 0.76 to 0.95 Kg/cm<sup>2</sup> such that the pressure released should be directed to the ground and other end of the vent pipe shall be guarded with suitable mesh against entering of worm and resting.
- g. HV bushings – 3 Nos.
- h. LV bushings – 4 Nos.
- i. Stiffener angle 40x40x5 mm (and vertical strip of 50x5 mm flat if required).
- j. Cooling tubes – No. & lengths may be mentioned (as per heat dissipation calculations).
- k. Metal oxide lightning arrestors with disconnecter and GI earth strip of *minimum 25 X 3 mm size*
- l. Base channels 75 x 40 mm.
- m. LV epoxy bushings – 4 Nos.
- n. 5 year guarantee embossed plate with details welded below name plate.
- o. Internally oil flow screwing fixing arrangement of die cast oil gauge indicating three positions of oil marked as minimum
- p. Tank and over all dimensions.

- q. Weight content of a) core b) windings c) tank & fittings d) weight/qty. of oil e) over all weight.

**4.13. FASTENERS:**

All bolts, studs, screw threads, pipe threads, bolt heads and nuts shall comply with the appropriate Indian Standards for metric threads, or the technical equivalent. Bolts or studs shall not be less than 6 mm in diameter except when used for small wiring terminals. All nuts and pins shall be adequately locked. Wherever possible bolts shall be fitted in such a manner that in the event of failure of locking resulting in the nuts working loose and falling off, the bolt will remain in position. All ferrous bolts, nuts and washers placed in outdoor positions shall be treated to prevent corrosion, by hot dip galvanizing, except high tensile steel bolts and spring washers which shall be electro-galvanized/plated. Appropriate precautions shall be taken to prevent electrolytic action between dissimilar metals. Each bolt or stud shall project at least one thread but not more than three threads through the nut, except when otherwise approved for terminal board studs or relay stems. If bolts nuts are placed so that they are inaccessible by means of ordinary spanners, special spanners shall be provided. The length of the screwed portion of the bolts shall be such that no screw thread may form part of a shear plane between members. Taper washers shall be provided where necessary.

**4.14. MOUNTING ARRANGEMENT :** The under base of all transformers shall be provided with two 75x40mm channels 460 mm along with holes to make them suitable for fixing on a platform or plinth MS channel shall be painted with vanish/oil-resistant paint.

**4.15 OVER LOAD CAPACITY:** The transformers shall be suitable for loading as per relevant standard (IS-6600/1972). The tendered should state clearly the percentage overload the transformers can take for a continuous period of 1 hours.

**5. DELIVERY:** You shall commence the supply within two months from the date of Purchase Order and complete the supplies as follows.

Due Date	Qty in Nos.	Due Date	Qty in Nos.
31.08.2014	100	30.11.2014	200
30.09.2014	200	31.12.2014	133
31.10.2014	200	<b>TOTAL</b>	<b>833</b>

- a). However you may advance the supplies to meet the urgent requirements of TSNPDCL's works if any.
- b). Delay in delivery of materials free at destination stores due to non availability of transport facility and such any reasons will not be considered. It is the responsibility of the supplier to make alternate arrangements for transporting the materials, so as to see the Material reaches the destination within the stipulated period.
- c). The Company shall have the right to vary the delivery schedule mentioned in the Purchase Order due to any operational exigencies at any time during the execution of the order by the supplier after due notice.
- d). Unloading of the materials at destination stores shall be TSNPDCL's responsibility and any expenditure incurred for unloading is to TSNPDCL's account only.
- e). The Company shall have the right to vary the ordered quantity by + or - 25% at any time during the execution of the order after due notice.

**6. PERFORMANCE SECURITY:** Individual Performance Security to the extent of 10% of the total Ex-works value shall be furnished for the proper fulfillment of the Contract within 15 days of receipt of Purchase Order, which will include the Warranty Period and completion of Performance and

Warranty obligations. The Performance Security will cover a period of six months over and above the period of Performance Guarantee against defective supplies etc.

The Performance Security will be,

- 1) A Bank Guarantee in the prescribed proforma issued by a Scheduled /Nationalized Bank acceptable to the Purchaser. **(OR)**
- 2) A Demand Draft payable at the Head Quarter of the Purchaser.

7. **PAYMENT:** 100% Payment would be made through cheque on or after 30 days from the date of delivery of materials at the destination stores in good condition duly certified by the consignee (i.e., from the date of issue of Form-13) or after approval of Test Certificates or after submission of bills in full shape whichever is later, subject to furnishing of Performance Security to the extent of 10% of the Contract Value.

**NOTE:** i). The date of delivery would be the date on which the stores officer signs the Form-13 acknowledging receipt of materials at stores and certified the receipt of goods in good condition.

The following documents of title to goods shall be sent by the supplier to the paying officers concerned.

- a. Detailed packing list.
- b. Detailed Invoice.
- c. Test Certificate approval letter.

With regard to segmenting the equipment i.e., equipment which requires several accessories before it is fully operational and which have been ordered as such the date of receipt will be the date on which the last such accessory is received at the Stores.

- a. The TSNPDCL may at its option get the material inspected by the third party if it feels necessary and all inspection charges in this connection shall be borne by supplier.
  - b. The bills of exchange along with the certified receipt of goods and the following documents of title to goods shall be sent by the supplier or his Bankers to the Paying Officer concerned who will accept to release the same.
- ii). You shall furnish the 100% routine Test Certificates for the equipment being offered for inspection along with your offer and got approved by this office before the bills become due for payment, failing which the payment against the bills would be stopped.
  - iii). One additional copy of the each delivery challan, Form-13, Invoice, packing list and Test Certificates shall be sent to CGM/P&MM/NPDCL, Warangal , immediately after delivery at destination stores.
  - iv). The performance guarantee to be executed in accordance with this Purchase Order shall be furnished on stamp paper of value of Rs.100/-. The bank guarantee shall be extended suitably in case the equipment/ materials found defective within guarantee period. The defective portion/ whole of the equipment/ materials so replaced or renewed should get satisfactory performance till the expiry of 12 months from the date of such replacement/ renewal or until the end of guarantee period whichever is later.
  - v). If you have received any over payments by mistake or if any amounts are due to the TSNPDCL due to any other reason when it is not possible to recover such amounts under the contract resulting out of this specification, the TSNPDCL reserves the right to collect same from any other amounts and or bank guarantees given by you due to or with the TSNPDCL.
  - vi). When you do not at any time, fulfill your obligation in replacing/ rectifying etc., of the damaged/ defective materials/ equipment in part or whole promptly to the satisfaction of the TSNPDCL officers, the TSNPDCL reserves the right not to accept the materials/ equipment against subsequent dispatches made by the supplier and only the supplier will be



responsible for any demurrages, wharfages or damage occurring to the consignment dispatched.

8. **DESPATCH:** Please arrange to supply the materials specified herein and dispatch them by goods train/ lorry freight prepaid to the persons and destination Stores which will be issued/intimated to you separately.
9. **ACKNOWLEDGEMENT:** The Transport receipt should be sent to the persons noted against each item and should be accompanied by two copies of the invoice/ challan, one of which will be returned to you direct in token of acknowledgement of receipt of the goods. A copy of the invoice shall be sent to this office as soon as dispatch is made.
10. **LOSS OR DAMAGES:**
  - a). You are responsible for the safe delivery of the goods in good condition at destination stores. You should acquaint yourself of the conditions obtaining for handling and transport of the goods to destination and shall include and provide for security and protective packing of the goods so as to avoid damage in transit.
  - b). External damages or shortages that are prima facie the results of rough handling in transit or due to defective packing will be intimated within a fortnight of the receipt of the materials. Internal defects, damages or shortages of any internal parts which cannot ordinarily be detected on superficial visual examination though due to bad handling in transit or defective packing would be intimated within 2 months from the date of receipt of these articles. In either case, the damaged or defective materials should be replaced by you free of cost to the TSNPDCL.
  - c). If no steps are taken within 15 days of receipt of intimation of defects or such other reasonable time as the TSNPDCL may deem proper to afford, the TSNPDCL may without prejudice to its other rights and remedies cause to be repaired or rectified the defective materials or replace the same and recover the expenditure incurred there for from the deposits such as Earnest Money, Security Deposit and Performance or other monies available with the TSNPDCL or by resorting to legal action and also decline to accept further delivery of materials/ equipment.
  - d). Where the Plant / Machinery or other materials supplied by you is found defective in whole or in part WITHIN THE GUARANTEE PERIOD, you will be intimated of the same. You should take immediate steps to rectify the defect or to replace the defective materials free of cost within 60 days from the date of receipt of the intimation.
  - e). The defective portions or whole of the equipment so replaced or renewed should give satisfactory performance till the expiration of 6 months (six) from the date of such replacement or until the end of guarantee period whichever is later.
  - f). For the purpose of any legal construction, the materials shall be deemed to pass into TSNPDCL's ownership only, at the destination Stores where they are delivered and accepted.
  - g). The TSNPDCL reserves the right, apart from the above said provisions, not to accept further despatches of materials and the connected bills etc. under conditions of your continued negligence to rectify repair or replace any equipment or materials supplied earlier and received in damaged condition or failed during the guarantee period or not conforming to the Purchase Order/ specification conditions.
11. **GUARANTEE:**
  - i). The Conventional Transformers have been guaranteed by you for satisfactory operation for a period of 5 Years from the date of supply. The 5 Years guarantee shall be embossed on a separate metal sheet, painted prominently and welded to the Transformer tank below the name plate.
  - ii). For strict implementation of this Clause you may note :
    - a). On failure of a Transformer, a telegraphic intimation will be given to you and the Transformer will be shifted to SPM Center. You should either

rectify the Transformer or replace it with a good Transformer within 60 days of intimation.

- b). Please note that you shall rectify or replace the defective materials within 60 days of receipt of intimation of defects failing which payment to the extent of failed units will be deducted from the subsequent bills/ bank guarantees.
- c). If the Transformer is repaired or replaced beyond (3) months of date of telegraphic intimation to you, you should note that the 2 Year guarantee period will be extended by the number of days by which 90 days are exceeded from the date of telegraphic intimation of failure to you.
- d). In case the Transformer is repaired or replaced by you after 180 days of date of telegraphic intimation you should note that 5 Year Guarantee will be counted from the date from which the transformer is replaced and commissioned successfully by us.
- e). The TSNPDCL shall get the Transformer repaired at your cost, in case if you fail to repair in 60 days from the date of intimation.

**12. CHALLENGE TESTING :** “The other manufacture can also request challenge testing for any test based on specification and losses. The challenger would request for testing with testing fee. The challenge test fees are proposed at least three times the cost of testing. This is likely to deter unnecessary challenges. The challenger would have the opportunity to select the sample from the store and any such challenge should be made within the guarantee period. The party challenged, and the utility could witness the challenged testing.

The challenged testing would cover the

1. Measurement of magnetizing current
2. No Load losses test.
3. Load Losses test (At 50% loading or as per acceptance test)
4. Temperature rise test.
5. Total losses at 50% and 100% loading

The challenge test could be conducted at NABL accredited laboratory, like ERDA and CPRI. If the values are within limit the product gets confirmed else not confirmed. No positive tolerance in losses is permitted. If the product is not confirmed the manufacture would pay the challenge fee and challenger would get the fee refunded. However as redressal system the challenger would allowed to ask for fresh testing of two more samples from the store and the same be tested in NABL laboratory in presence of party challenged, challenger and the utility.

If any one or both sample does not confirm the test then the product said to have failed the test. In such cases the manufacture will be declared as unsuccessful manufacturer for the said product with wide publicity and would not be allowed to compete in tenders of the Boards for the period of three years and heavy penalty would be imposed”.

**13. DEFECTIVE SUPPLIES:** If, during the guarantee period, any of the materials/goods are found to be defective in materials or workmanship, they shall be replaced by you free of cost.

**14. PENALTY FOR LATE DELIVERY:** i). **General :** The delivery of materials/ Equipment as per the agreed schedule of delivery is the essence of the contract. In case of not adhering to the delivery schedule, TSNPDCL reserves the right to cancel the purchase order.

- ii). In case of delay in delivery of materials/ Equipment at destination for whatever be the reason, the TSNPDCL may at its option demand and recover from you an amount equivalent to half percent (½%) of the value of the materials not delivered within the prescribed time limit for every week of delay or part thereof, subject to a max. of 5% of the total value of the Ex-works price . This right of the TSNPDCL, shall be without prejudice to its right under the law including the right to cancel the contract, forfeit the deposit and or recover damages for breach of contract.

The date of receipt of materials/ Equipment at the destination stores in good condition will be taken as the date of delivery.

- iii). Materials/ Equipment which are not of acceptable quality or not conforming to specification would be deemed to be not delivered.
  - iv). In case of supplier who has not adhered to the delivery schedule, TSNPDCL reserves the right to Purchase the balance quantity from the open market and recover the extra expenditure thus incurred from the supplier. This is in addition to the rights of the TSNPDCL mentioned in the first para of this clause.
- 15. FORCE MAJEURE:** You shall not be liable for any liquidated damages for delay or for failure to perform the contract for reasons of Force Majeure such as acts of God, acts of Public enemy, acts of Govt., fires, floods, epidemics, Quarantine restrictions, strikes, lockouts, riots freight embargoes and provided that you shall within ten (10) days from the beginning of such delay notify the TSNPDCL in writing of the cause of delay, the TSNPDCL shall verify the facts and grant such extension as facts justify. No price variation shall be allowed during the period of Force Majeure and penalty would not be levied for this period.
- 16. EXTENSION OF TIME:** If the completion of supplies is delayed due to reason beyond the control of the supplier, the supplier shall without delay give notice to the Purchaser in writing of his claim for an extension of time. The Purchaser on receipt of such notice may agree to extend the contracted delivery to such date as may be reasonable but without prejudice to other terms and conditions of contract.-+
- 17. DRAWINGS AND MANUALS:** The following drawings in (3) sets shall be got approved by this office before taking up the manufacture of the equipment.
- 1. Completely dimensioned drawings indicating general outline arrangements showing plan, elevation and end view, list of fittings, clearances and Winding details.
  - 2. Drawings of internal constructional details such as Core Coil assembly and Coils, Tank dimensions, weights of main component parts, positions of internal fittings, clearances between the leads within the transformer, core area, grade of laminations, distance of core centers, area of conductor bare and with insulation, No. of coils, No. of turns per coils, material of bushing metals etc.
  - 3. Name plate details and schematic drawing.
  - 4. Heat dissipation calculations shall be furnished along with the drawings.
- A detailed operational and maintenance manual with each unit shall be supplied @ 2 copies by you for each consignee.
- 18. QUALITY ASSURANCE PLAN:** The following information is to be furnished to this office within 15 days from the date of receipt of this order.
- (i). List of raw materials as well as bought out accessories and the names of Sub –Suppliers.
  - (ii). Type test certificates of raw materials and bought out accessories.
  - (iii). Quality assurance plant (QAP) withheld points for Purchaser’s inspection.
- The quality assurance arrangements shall conform to the relevant requirements of ISO-9001 or ISO-9002 as appropriate and shall give a description of the quality system and quality plans as per the Specification.
- 19. INSPECTION :** a). The accredited representative of TSNPDCL shall have access to your manufacture works or your Sub ordinate’s works, at any time during working hours for the purpose of inspecting the materials during manufacturing of the plant and equipment and for the testing and may select test samples from the material going into plant and equipment.

- (b). You shall provide facilities for testing such samples at any time. As soon as the materials are ready you shall duly advise the TSNPDCL 15 days well in advance, enabling us to arrange for deputation of our representative and carryout the tests for any characteristics as specified in the Guaranteed Technical Particulars, before the representative of the TSNPDCL. The dispatches should be effected only if the test results comply with the specification stipulated in the order. The dispatches shall be made only after the inspection by the TSNPDCL's Officers is completed to the TSNPDCL's satisfaction or such inspection is waived by this office.

You shall offer the inspector representing the purchaser all reasonable facilities, without charges, to satisfy him that the material is being supplied, in accordance with the ISS/Specification.

- c). The NPDCL reserves the right to insist for witnessing the acceptance/ routine testing of the bought out items.
- d). 10% of the offered quantity for inspection will be inspected at the premises of the supplier by the accredited representative of TSNPDCL for conducting routine and acceptance tests and no-load/ load loss measurements.

The Supplier shall furnish the following documents as proof of purchase of Core, Transformer Oil, Copper/ Aluminum winding and other important materials along with each inspection offer for ensuring quality control:

- a) Invoice of the supplier.
- b) Mill's Test Certificate.
- c) Packing List.
- d) Bill of landing.
- e) Bill of entry certificate by Custom.
- f) Description of material, electrical analysis, physical inspection, certificate of surface defects, thickness and width of material wherever applicable.

Only prime quality CRGO Core should be used in the Transformers and no second/ Defective/ Scrap CRGO Core finds way into the Transformers.

It is to note that, using seconds/ defective/ scrap CRGO Sheets or No-Load/ Load losses found to be more than the stipulated limit, heavy penalty will be imposed or Suppliers will Blacklisted or both at the discretion of NPDCL.

- e). The TSNPDCL may at its option get the materials inspected by the third party for conducting routine & acceptance tests along with an TSNPDCL's representative if it feels necessary and all inspection charges in this connection shall be borne by the supplier.

## **20. TEST CERTIFICATES:**

**20.1 TYPE TEST CERTIFICATES :** a). The following type test reports as prescribed in the specification conducted on the similar design transformers as specified in IS-2026/part-I of 1977 & IS-2026/1977 latest versions where specified otherwise with first filling of oil generally as per IS-335/1993 (latest version) with same No-load and Load losses have to be furnished from NABL before offering the material for inspection without actually affecting the delivery schedule.

1. Measurement of winding resistance (IS 2026 (part-I) :1977)
2. Measurement of voltage ratio and check of voltage vector relation ship (IS 2026 (part-I) :1977)
3. Measurement of Impedance voltage/short circuit impedance and load loss (IS 2026 (part-I) :1977)
4. Measurement of No Load loss and current (IS 2026 (part-I) :1977)
5. Measurement of Insulation resistance (IS 2026 (part-I) :1977)
6. Induced of over voltage with stand test(IS 2026 (part-3) :1981)
7. Separate source voltage withstand test(IS 2026 (part-3) :1981)

8. Impulse voltage test: with chopped wave of IS 2026 part-III. BIL for 11 kV shall be 95 kV peak instead of 75 kV)
9. Temperature rise tests (IS 2026 (part-II) :1977)
10. Short Circuit test (IS 2026 (part-I) :1977)
11. Air pressure test (IS-1180/Part-I/1989.)
12. Permissible flux density and over fluxing (IS-1180/Part-I/1989.)

**NOTE:-**You are requested to submit the Heat Dissipation calculation with respect to the maximum 100% load losses i.e., 555 Watts. (Including No load & Load losses). The heat dissipation by tank walls up to oil level should be limited to 500 W/sq.m (excluding top and bottom) cooling tube limited to (300) W/Sq.m.

- b) The latest certificates containing the results of the tests as per IS-2026/1977 (or Latest version) must be submitted to the Chief General Manager, (P&MM), TSNPDCL, Warangal and got approved by him before sending bills for payment which will not be paid unless these are approved (vide Clause-8).
- c) TSNPDCL shall have all rights to conduct type tests at its own cost by an independent agency on a transformer either in service or from stores at its discretion. In the event of failure of transformer in such tests, the expenses incurred in testing shall be to the suppliers account. The failed unit will not be accepted for supply to TSNPDCL even after repairs.

**20.2 ACCEPTANCE & ROUTINE TESTS:** All transformers shall be subjected to routine tests at the manufacturer's works. The following routine tests shall be carried out in accordance with the details specified in REC Specification No: 23/1983, IS: 1180 (Part-II) and IS:2026 or as agreed upon between the NPDCL and the manufacturer.

1. Checking of weights, dimensions fitting and accessories, tank thickness, oil qty., material, finish and workmanship as per purchaser order and contract drawings.
2. Physical verification of core coil assembly and measurement of flux density of one unit of each rating, in every inspection with reference to short circuit test report.
3. Measurement of winding resistance.
4. Measurement of voltage ratio, polarity and check of voltage vector relationship.
5. Measurement of Impedance voltage,  $Z_{sc}$  short circuit impedance and load loss at rated current and normal frequency.
6. Measurement of No Load loss and current at service voltage and normal frequency.
7. Measurement of No load current and losses at 112.5% of rated voltage.
8. Measurement of Insulation resistance .
9. Induced of over voltage with stand test .
10. Separate source voltage withstand test.
11. Checking of name plate and marking on the tank.
12. Checking of di-electric strength of transformer oil
13. **Air pressure test: (Routine Test):** The transformer tank with all the fittings including bushing in position shall be tested for leakage at a pressure of 0.8 Kg./cm<sup>2</sup> above atmosphere pressure maintained inside the tank for 10 minutes. There should be no leakage at any joint. (This may be carried out periodically, say after every 50 transformers).

All above acceptance and routine tests shall be carried out by the supplier in presence of purchaser's representative on 10% of quantity offered every time.

In addition to the above measurement of losses at 50% load and 100% load losses calculations at 75 Degrees for 100% transformers is to be conducted and report submitted.

Following tests shall be carried out at manufacturer's works on one unit of each rating by the supplier in presence of purchase representative.

- I. Measurement of unbalance current.
- II. Air pressure test on empty tank of transformer opened for physical verification test (Once only)
- III. Breakdown voltage test of transformer oil.
- IV. Heat run test shall have to be conducted at suppliers cost on one transformer of each rating, generally from first offered lot, during the course of supplies.

To facilitate conduction of heat run test on any unit in any lot at any point of time during the supply, the manufacturer will provide a thermometer pocket which gets immersed in oil on the side of the transformer in all the transformers. The depth of the projecting stem of this pocket inside the transformer will be below oil level. It shall not fringe with electrical clearance nor obstruct the unloading of the active part.

VII. The test certificates for all routine and type tests for the transformers and also for the bushings and transformer oil shall be submitted.

VIII. Tests at site: The purchaser reserves the right to conduct all tests on Transformer after arrival at site and the contractor shall guarantee test certificate figures under actual service conditions.

**21. GUARANTEE AND PENALTY FOR EXCEEDING THE LOSSES:**

- a). The no-load losses in Watts at the rated voltage and rated frequency and the total losses in Watts at rated full load current and rated frequency at 75 Deg. C shall be guaranteed under penalty for each transformer. For the purpose of penalty computations, all the transformers offered for inspection shall be tested for evolution of no load and full load losses and the test figures of the no load and the load losses will be compared with the corresponding guaranteed figures mentioned in Guaranteed Technical particulars as per Annexure -I enclosed.
- b). The penalties shall be separately evaluated at the rates indicated below in sub para (c) From:
  - i). The excess of test figures of the no-load loss in Watts over the corresponding guaranteed value and
  - ii). The excess of the test figures of the load losses in Watts over the corresponding guaranteed value.
  - iii). The penalty amount will be recovered from any one of the bill amount against the lot offered for inspection. For the purpose of price variation, the penalty amount will be deducted from the cost of transformers, whose losses have exceeded the guaranteed value, price variation will be admitted on an average basis for all these Transformers which exceed the guaranteed losses.
- c). The penalties shall be calculated at double the rate of Rs.2,17,515/- per Kilo Watt for the excess of no-load loss and at double the rate of Rs.28,772/- per Kilo Watt for the excess of load losses, if the test figures of the losses are less than guaranteed values no bonus is allowed.
- d). The TSNPDCL reserves the right to test any one transformer from any one lot offered for inspection / supplied in any recognized laboratory of

national repute for the purpose of testing the no-load and load losses. These tests shall be conducted in presence of TSNPDCL's representative. The entire expenses for conducting these tests including transportation shall be borne by you and the results obtained shall be considered and applicable in the lot offered inspection/ supplied, from which the transformer was selected for testing.

- e). In case during testing as explained in (d) above, the test figures obtained are found to be more than the guaranteed figures, TSNPDCL besides levying penalty as explained in (c) above, to the above lot of transformers, reserves the right for repetitions of these tests on any other Transformer selected from subsequent lots offered/ supplied at your cost.
- f). Should any inspected or tested transformer fail to confirm to the specifications, the TSNPDCL may reject them and in that eventuality you shall either replace the rejected transformers (or) make all necessary alterations to meet the specification requirements free of cost to NPDCL. In such case, the Item (c) related to penalties shall not be operated.
- g). The NPDCL reserves the right to reject any transformer, if during tests at supplier/s works, the tested no load losses and total losses exceeds the corresponding maximum guaranteed losses by more than the following values.

**22. GUARANTEED TECHNICAL PARTICULARS:** The technical particulars as per Annexure-I have been guaranteed by you for the supplies against this order.

**23. DESPATCH INSTRUCTIONS:** All the materials detailed in Clause-4 must be consigned and despatched as per despatch instructions to be issued after inspection and the bills sent to as follows:

Sl. No	To be sent to the TSNPDCL's Stores at	Materials to be consigned and despatched to ADE/Dist. Stores/ NPDCL	Paying Officer to whom bills & RR to be sent to Accounts Officer/ Expr., O/o.SE/OP.
1	Warangal	Warangal	Warangal
2	Karimnagar	Karimnagar	Karimnagar
3	Khammam	Khammam	Khammam
4	Nizamabad	Nizamabad	Nizamabad
5	Nirmal	Nirmal	Adilabad

**24. PACKING:** i). The packing may be in accordance with the manufacturer's standard practice unless otherwise specified. You should however ensure that the packing is such that the equipment reach the departmental stores without damages after transport by Road. The packing should withstand unloading and inter stores transfer with reasonable care.

- ii). Whenever you despatch materials to consignee, you should prepare the following information in the form of packing slip in quadruplicate and send the same to the consignee and obtain his acknowledgement on the same. The consignee will return to you one copy of the packing slip with his remarks. The proforma of the packing slip shall be as follows:

**PACKING SLIP**

1. Purchase Order No. and Date.
2. Qty. allotted to the stores and rate applicable.
3. Qty. so far supplied to the stores and rate applied.
4. Qty. now supplied and rate applied.
5. Total qty. supplied under the Purchase Order with rates applied.
6. Program for supplying the balance quantity to the stores.

- iii). You shall invariably send to the Purchasing Officer a copy of the delivery challan whenever materials are dispatched.

- 25. NOTE:** It may be noted that
- a). The Prices cited are Free at Destination Stores and as noted in Clause-2 & prices cited are Variable as noted in Clause-3.
  - b). The ownership of the materials would rest with you till they are all received at destination in good condition.
  - c). Freight charges shall be prepaid.
  - d). The materials may be duly insured at your cost as per specification.
  - e). **Interchangeability :** All similar materials and removable parts of similar equipment shall be interchangeable with each other.
- 26. GENERAL:**
- i). Your bills in duplicate along with a duplicate copy of invoice and sub standing vouchers for all extra claims to be made separately should be forwarded to the paying officers mentioned in the despatch instructions.
  - ii). All general and technical correspondence should be addressed to the Chief General Manager/P&MM/NPDCL/Warangal.
  - iii). All correspondence regarding bills, payments etc., should be addressed to the Paying Officers, cited in despatch instructions with a copy to the Pay Officer, TSNPDCL, Warangal.
  - iv). All and any disputes or differences arising out of or touching this order shall be decided by courts or tribunals situated in Warangal/Hanamkonda cities. No suit or other legal proceedings shall be instituted elsewhere.
  - v). Unless otherwise, specified, you shall abide by all the terms and conditions specified in the specification No. OT-02/ 12-13.
  - vi). This is in regularization of preliminary acceptance by you, vide reference 4<sup>th</sup> cited.
  - vii). Please return within a period of 15 days one copy of the Purchase Order duly signed in token of acceptance of all terms and conditions of this order.

**Yours faithfully,**

**Encl:** GTP

**Chief General Manager,  
P&MM/NPDCL/Warangal.**

We accept all the terms & conditions of this order and specification.

**Signature of the Contractor.**

Copy communicated to the Chief General Manager/ Expr./NPDCL/Warangal.  
Copy to the Superintending Engineer/Opn./ WGL, KNR, KMM, NZB, ADB.  
Copy to the Accounts Officer/ Expr./,O/o. SE/OP./ WGL, KNR, KMM, NZB, ADB  
Copy to the Divisional Engineer/Transformers/ WGL, KNR, KMM & NZB.  
Copy to the Divisional Engineer/MRT/ Mancherial & Nirmal.  
Copy to the Asst. Divisional Engineer/Dist. Stores/ WGL, KNR, KMM, NZB,  
Nirmal.