Aryabhatta Research Institute of Observational Sciences (ARIES)
(An autonomous institute under Department of Science and Technology, Govt. of India)

Manora Peak, Nainital, Uttarakhand 263 129 INDIA
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FAX : +91-(5942) - 233439, **Gram:** astronomy
Website: http://www.aries.res.in

TENDER DOCUMENT

For

Supply, installation, testing and commissioning of one outdoor 750KVA(11KV/433-250V, 3-Phase, 50Hz) energy efficient, eco-friendly, Electric Transformer with OLTC

TENDER ENQUIRY NO: AO/2243 /3-2(6)/11-12/750KVA Transformer

ISSUE OF TENDER DOCUMENT: 30 November 2011 from 9.00 Hrs

LAST DATE OF SUBMISSION OF BID: 27 December 2011 up to 14.00 Hrs

I. TENDER NOTICE

Aryabhatta Research Institute of observational sciencES (ARIES), an autonomous Scientific Institute under the *Department of Science and Technology*, *Govt. of India***,** invites sealed offer in **Two-Bid Form** from reputed, eligible and resourceful Contractors towards **Supply, installation, testing and commissioning of one outdoor 750KVA(11KV/433-250V, 3-Phase, 50Hz) energy efficient, eco-friendly, Electric Transformer with OLTC** for its Manora Peak, Nainital ST Radar site.

Section – I

INVITATION FOR BIDS

A.1 Scope of Work: Supply, installation, testing and commissioning of one outdoor 750KVA(11KV/433-250V, 3-Phase, 50Hz) energy efficient, eco-friendly, Electric Transformer with OLTC at ARIES, Manora Peak, Nainital site.

A.2 IMPORTANT DATES :-

(a)	Issue of Tender Document *(from the website http://www. aries.res.in)*	30 November 2011 at 9.00 Hrs
(b)	Last date of Bid submission	27 December 2011 Up to 14.00 Hrs
(c)	Opening of Technical Bid	27 December 2011 at 15:30 Hrs
(d)	Opening of Financial Bid	03 January 2012 at 15:30 Hrs

A.3

Tender Document can be obtained from the *ARIES, Manora Peak, Nainital-263129, Uttarakhand, India* on payment of requisite **Tender Fee(including VAT &Non-Refundable) Rs. 1000/- (Rs. One thousand only)** by way of Demand Draft (issued from any Nationalized Bank) drawn in favour of "*Director, ARIES*" payable at *Nainital*. Sale of Tender documents shall be closed one day prior to the last date of submission of Tender as mentioned in A.2. Tender documents shall be supplied free of cost, on demand, to all Government Departments. Tender document can also be downloaded from website "http://www.aries.res.in"without need of purchasing the same from office. However**,** bidders submitting their Tender against downloaded Tender document must enclose either the requisite Tender Fee in DD or Certified Copy of Proof of Exemption from payment of Tender Fee in the way mentioned in A.7 of the Section I. The facility of downloading the Tender Document from website will also be closed one day prior to the last date of submission of tender.

A.4 Tender depositions and Tender enquiries, if any regarding clarifications/ interpretation in connection with this tender should be addressed to:

Director(Kind attention Er. Chandra Prakash),
Aryabhatta Research Institute of observational sciencES (ARIES),
Manora Peak, Nainital – 263 129, Uttaranchal INDIA
Tel : +91-(5942) - 232655/ 233727/ 233734/ 233735/ 235583
FAX : +91-(5942) - 233439**, Gram:** astronomy
Email: chandra@aries.res.in

A.5 Tenders should be submitted on or before the last date & time as indicated in A.1. No tender shall be accepted / opened in case of receipt after due date and time of

tender, irrespective of delay due to postal services or any other reasons and ARIES shall not assume any responsibility for late receipt of tender.

A.6 **Bid Submission**: Tender shall be submitted in lac-sealed covers in the form of **Two-bid system (Technical & Commercial bids)** in separate covers in the following manner:

(i) Bid containing Technical specifications and Earnest Money Deposit (EMD).
(ii) Bid containing Financial offer.

The envelopes should be marked as **Part I: Technical Bid** and **Part II: Financial Bid** with Tender Enquiry number and due date & time subscribed on them and submitted in one cover bearing the following inscription:

Sub: Supply, installation, testing and commissioning of one outdoor 750KVA(11KV/433-250V, 3-Phase, 50Hz) energy efficient, eco-friendly, Electric Transformer with OLTC at ARIES, Manora Peak, Nainital site.

Tender Enquiry No. **:** ……

Due Date & Time **:** ……

Vendor Name & Address : .....

The bids will be opened in two stages on different dates as indicated in A.2 of Section I. The bid containing Technical specifications and EMD will be opened at 1st stage and if the same is found according to required specifications, the bid containing financial offer shall be opened in 2nd stage.

A.7 **Part – I (Technical Bid)** shall contain:

a) **Non-Refundable Tender fee(Including VAT)** of **Rs. 1000/**- **(Rs. One Thousand Only)** in case when the Tender form is downloaded from the website in the form of crossed DD / Bank Guarantee drawn on any Nationalized bank in favour of "*Director, ARIES*" payable at *Nainital*.

b) **Refundable Earnest Money Deposit (EMD)** of **Rs. 46950/- (Rs. Forty Six Thousand Nine Hundred & Fifty only)** in the form of crossed DD / Bank Guarantee drawn on any Nationalized bank in favour of "*Director, ARIES*" payable at *Nainital.* Tenders **without EMD shall be rejected without any notice.**

c) Technical proposal with full details including description & make / model of material / components, all the supporting documents as desired such as ***Product brochures, leaflets, manuals, bill of materials so*** as to enable technical

assessment of the proposal on technical grounds. This shall also include a compliance statement as per **Section V**

d) **An Undertaking,** as mentioned in Clause No A.8 (a) of Section I.

e) **Prequalification Criteria** (as per enclosed **Proforma I & II**) along with all the supporting documents.

f) The detailed compliance statement with make and model of components in the enclosed format (**as per Section-V)** along with product brochure, leaflets, manuals, bill of materials etc. **Without proper Compliance Statement the bid is liable to be rejected.**

g) Complete contact details of technical staff with name, telephone nos., mobile nos., e-mail etc. for after – sales service support at ARIES, Manora peak, Nainital. **In absence of such details, the bid is liable to be rejected.**

h) Acceptance to the terms and conditions laid down in the tender document. In case any deviation from the general terms and condition the bid is liable to be rejected.

If the technical offer contains any price information the offer is liable to be rejected.

A.7 Part – II (Financial Bid) shall contain:

Only Price Schedule completed in all respects with proper seal and signature of authorized person. **Prices should be given in INR in both figures and words.**

A.8 Eligibility Criteria:

a) Should be reputed, eligible and resourceful contractors and give an **"UNDERTAKING"** that they would facilitate their regular support during the warranty period. **In absence of such undertaking, the Bid is liable to be rejected.**

b) Should have authorized service centre / branch office in Haldwani, Rudrapur, Bareilly or in Delhi, ensuring satisfactory after sales service support. Complete contact details are to be submitted by the bidder.

c) Should have successfully completed three similar types of works. **Enclose copies of three major work orders as otherwise the Bid is liable to be rejected.**

d) Should be having all the necessary registrations (as per Pre-Qualification details asked in enclosed Performa I & II) like Service Tax, TIN, PF, PAN etc. **Enclose**

proof thereof. In absence of supporting documents, the Bid is liable to be rejected.

e) The Bidder should submit a self-attested certificate that it has not been blacklisted, debarred, declared non-performer or expelled by Union Govt/State Govt/ PSU's during the last 5 years. **In the absence of certificate, the Bid is liable to be rejected.**

A.9 Rejection & Return of Tender:

a) Any Tender can be rejected by the order of the Director, ARIES without assigning any reason whatsoever or incurring any liability to the bidders.

b) The bidders are cautioned that not giving complete information called for in the Tender Document, not giving it in clear terms or making any change in prescribed formats or deliberately suppressing the information may result in summarily disqualified.

c) Any information furnished by the applicant found to be incorrect either immediately or at a later date, would result in rejection of the application at any stage or to cancel the contract if awarded, and shall render him liable to be debarred from tendering in future.

d) Any effort on the part of the applicant or his agent to exercise influence or to pressurize for his/her bid shall result in rejection of his/her bid. Canvassing in any form in connection with the tenders is strictly prohibited. Bidder who resorts to canvassing will invite rejection of his tender.

A.10 Opening of Technical & Financial Bid

Only the technical bid will be opened on the date specified in A.2 of Section I**.** Interested bidders may attend the technical bid opening as per the schedule. Financial Bid of only technically qualified bidders will be opened on the date specified in A.2 of Section I.

Section – II

INSTRUCTIONS TO BIDDERS

1. Delivery Schedule

The delivery, to be done at ARIES, Manora Peak Nainital, must be completed within **Forty Five (45) Days** from the date of Purchase Order.

2. Offer Validity

Bid must be valid for minimum **Ninety Days** from the date of opening of **Financial Bid**. ARIES, Nainital may ask bidders to extend the period of validity.

3. Product Specifications & Compliance Statement

The bidder should quote for all the specified brands which are in compliance to our technical specifications. Wherever brand / make are not mentioned please ensure to quote only for REPUTED and WELL KNOWN BRAND / MAKE meeting national / international standards. Any deviations must be specifically and clearly mentioned in form of COMPLIANCE STATEMENT, as per enclosed **Section-V**. In the absence of this, the bid is liable to be rejected. Complete technical details along with Make, Model and product literature should be enclosed. *Each page of the bid and cuttings / corrections shall be duly signed and stamped by the bidder. Failure to comply with this requirement may result in the bid being rejected.*

4. In case of any discrepancy between rates mentioned in figures and words, the latter shall prevail. If there is any discrepancy between the unit price and the total price, the unit price shall prevail and the total price shall be corrected.

5. Material must be properly packed against any damage and insured up to the destination. The material should be directly dispatched to the installation site at **ARIES, Manora Peak, Nainital.**

6. All the expenses involved in delivering, unloading etc. the equipment at our site, shall be borne by the Bidder. All aspects of safe delivery shall be the exclusive responsibility of the Bidder. ARIES will have the right to reject the component / equipments supplied, if it does not comply with the specifications at any point of installation, inspection and testing.

7. ARIES, Nainital reserves the right to divide / split the order between more than one technically qualified bidder to meet the technical requirements and the Work Completion Schedule.

8. EMD is liable to be forfeited and bid is liable to be rejected, if the bidder withdraws or amends impairs or derogates from the tender in any respect within the validity period of the tender.

9. The **EMD** of all the unsuccessful bidders will be returned as early as possible within the Bid Validity period but not before 30 days of the issue of the Purchase Order. No interest will be payable by ARIES on the EMD. The Earnest Money of successful bidder shall be returned after acceptance of the order and submission of Performance Bank Guarantee (PBG).

10. ARIES Nainital reserves the right to increase or decrease the Bill of Material as per the requirement without any change in the quoted rates.

11. If any equipment or part thereof is lost or rendered defective during transit, the supplier shall immediately arrange for the replacement of damaged equipment or part thereof, as the case may be, at no extra cost.

12. Rates should be quoted towards Manufacture, Supply at site, Unloading, Erection, Commissioning, Testing and Maintenance of Supplies / Materials given under Scope of Work of Section I accordingly by giving the basic price, VAT, Service Tax, etc. wherever applicable. The rates should be quoted in **Indian Rupees** for the entire completion of job to be done at site BOTH IN FIGURES & WORDS.

13. Govt. Levies like VAT, Service Tax etc. shall be paid on actual rates as applicable from time to time. Percentage Rate of taxes to be charged must be mentioned in the price bid. Terms like "at Actual" will not be acceptable for any commodity quoted by the vender and tender will be rejected.

14. ARIES will provide road permit and excise exemption certificate under Govt notification 10/97 dated 01.03.1997.

15. ARIES, Nainital reserves the right to accept / reject the offers or cancel the whole tender proceedings without assigning any reason whatsoever. Offers through Email / Fax, etc and open offers shall not be accepted. **Late / Delayed offers shall not be accepted under any circumstances. Incomplete offers are liable to be rejected.** In case the specified date for the submission of offers being declared as a holiday for ARIES, the bid-closing deadline shall stand extended to the next working day up to the same time.

16. Any attempt of negotiation on the part of the bidder, directly or indirectly, after submission of tender, with the authority to whom he has submitted the tender or authority who is competent to finally accept it. or any endeavor to secure any interest for an actual or prospective bidder or to influence by any means the acceptance of a particular tender will render the Bidder's tender liable to be rejected.

17. The bidders seeking any clarification may notify to ARIES in writing at ARIES, Manora Peak, and Nainital-263129. Clarifications received till 96 hours before the closing date / time of receipt of bids will be responded.

18. The equipment must be supported by a Service Centre manned by the bidder's technical support engineers. The support through this Centre must be available 24 hours in a day, seven days a week and 365 days a year. Also provide toll free number / web / email so that it should be possible to contact the Principal Bidder's (OEM's) support Centre.

19. Unsatisfactory Performance

ARIES shall have the sole right to assess the performance of the tendered equipment(s) /components, primary / intermediate and or final, and reject the same without assigning any reason / explanation to the bidder if the performance is found to be unsatisfactory as per norms of ARIES. The decision of ARIES will be final and binding on the supplier.

20. Disclaimer

This Tender / Request for Proposal (RFP) is not an offer by ARIES Nainital, but an invitation for bidder response. No contractual obligation whatsoever shall arise from the RFP process.

21. Declaration: The bidder would be required to give certificate as below in his commercial bid:

"I/WE UNDERSTAND THAT THE DETAILS OF THE SALES & SERVICES AS PROVIDED ABOVE ARE SUBJECT TO CHANGE. I/WE AGREE THAT IN CASE OF ANY CHANGE IN THE QUANTITIES REQUIRED FOR ANY OF SERVICES, I/ WE WOULD BE SUPPLYING THE SAME AT THE RATES AS SPECIFIED IN COMMERCIAL BID. I /WE AGREE TO ADHERE TO THE PRICES GIVEN ABOVE EVEN IF THE QUANTITIES UNDERGO A CHANGE".

SIGNATURE OF THE BIDDER WITH STAMP.

Section – III

SPECIAL CONDITIONS OF CONTRACT

1. Price Basis

Price basis should be **F.O.R. ARIES, Manora Peak, Nainital in INR only.** The quoted price will be considered firm and no price escalation will be permitted during the bid validity period.

2. Order Placement and Release of Payment

The purchase order and payment shall be processed from: ARIES, Manora Peak Nainital-263129

3. Billing is to be done in the name of **Director ARIES, Manora Peak, Nainital.** The payment would be released on the basis of the successful test and commissioning of the item and actual bill of material used, duly certified by our authorized representative at site.

4. Performance Bank Guarantee (PBG)

The successful bidder will be required to furnish the Performance Bank Guarantee from a scheduled Indian Bank towards **10%** amount of the total Order value. This Bank Guarantee shall remain valid for the warranty period, commencing after the successful completion of entire job.

5. Payment

100 % of the payment will be released after receipt and approval of the items at ARIES normally within 30 days and submission of Performance Bank Guaranty of 10% of the total amount including taxes valid for two months beyond warranty period or/else 10% amount will be released after two months beyond warranty period. However the payment shall be made on actual measurement basis.

6. Penalty for Delayed Services

Penalty / Liquidated Damages shall be charged @0.5% of the contract value per day subject to maximum of 10% of total order value, in case of delay beyond the stipulated time period as given in Clause 1 under Section II.

7. Warranty

All the items covered in the schedule of the requirements, shall carry minimum **Two Years Onsite Comprehensive Warranty,** commencing from the date of completion of entire job. **The after – sales service support / warranty services has to be provided at ARIES, Manora Peak, Nainital . The repairing / rectification, if any of the items under warranty must be done at site only within 24 hours.** The bidder should submit along with the technical bid, the detailed plan for providing installation and warranty services at site. Prompt and efficient after sales service must be free within the warranty period.

Section – IV

GENERAL RULES & DIRECTION

1. The bidders name, dated signature & seal should appear on each page of the Tender Document.

2. All Reference, information and certificates from the respective clients especially for all completed works certifying suitability, technical know-how or capability of the applicant should be signed by senior officer of the Company submitting the bid.

3. **The cemented plateform** for placing the transformer will be provided to the vender by ARIES.

4. The bidders are advised to see the actual site & local condition where transformer is to be installed before tendering.

5. The bidder shall be responsible for the delivery of the equipments to site and shall include in his bid all the necessary arrangements for transport, loading and off-loading(including cranes, lifting tackles, wire rope, winches, slings, etc.) . **Access to site during the Tender period will be provided to enable any access or other difficulties to be established. ARIES will not accept any claims for additional costs in this regard after the contract has been awarded**.

6. If the contractor or his workmen or employees shall break, deface, injure, or destroy any part of a building, road kerb, fence, enclosure, water pipes cables, drains, electric or telephone posts, wires ,etc. The contractor shall make the same good at his own expenses. Aries may cause the same to be made good by other workmen and deduct the expenses of which ARIES decision is final.

7. Firm should be preferably registered in CPWD / PWD / PHED / MES in appropriate class. Valid registration certificate should be attached.

8. In the event of tender being submitted by a firm, it must be signed separately by each partner thereof or in the event of the absence of any partner, it must be signed on his behalf by a person holding a power of attorney authorizing him to do so, such power of attorney to be produced with the tender, and it must disclose that the firm is duly registered under the Indian Partnership Act' 1952.

9. In the case of any tender where unit rate of any item / items appear unrealistic, such tender will be considered as unbalanced and in case the tenderer is unable

to provide satisfactory explanation such a tender is liable to be disqualified and rejected.

10. Plant & Machinery: The contractor shall arrange at his own expense all tools, plant, machinery and equipment.

11. The contractor shall make his own arrangement for obtaining electric connection required for execution of work and make necessary payments directly to the concerned departments and nothing extra shall be payable on this account.

12. On account of security consideration, some restrictions may be imposed by the security staff on the working and/ movement of men and materials etc. The contractor shall be bound to follow all such restrictions/ instructions and he shall organize his work accordingly. No claim on this account, whatsoever, shall be payable.

13. The contractor shall take all preventive measures against any damage caused by rain, snowfall, floods or any other natural calamity, whatsoever during the execution of the work. The contractor shall be fully responsible for any damage to the Owners property and to the work for which the payment has been advanced to him under the contract.

14. The contractor shall be responsible for completing the work and for satisfying all terms and conditions of the Contract without any extra payment over his quoted rates unless otherwise specified. The contractor shall quote his rates for various items of work accordingly and no claim whatsoever shall be entertained for any incidental or extra work involved in the execution of the work as per nomenclature of the item and the specifications indicated in the tender documents.

15. The contractor shall prepare and produce instruction, operation and maintenance manuals in English for the use, operation and the maintenance of the supplied equipment and installations, and submit to the Engineer-in-Charge in **TWO** copies at the time of handing over. The manual shall generally consist of the following:

a) Description of the project
b) Operating instructions
c) Maintenance instructions including procedures for preventive maintenance
d) Manufacturers catalogues
e) Spare parts list
f) Trouble shooting charts
g) Drawings
h) Type and routine test certificates, if any.

Section –V

TECHNICAL SPECIFICATIONS

The Transformer shall be suitable for outdoor service and shall be with the following ratings and specifications:

Sr. No	Particulars	Specifications	Tenderer' Offer
1.	Make/ Model		
2.	System voltage (max.)	12 kV	
3.	Rated voltage HV	11 kV	
4.	Rated voltage LV	433 - 250 V	
5.	Frequency	50 Hz +/- 4%	
6.	No. of Phases	Three	
7.	Connection HV	Delta	
8.	Connection LV	Star (Neutral brought out)	
9.	Audible sound levels (decibels)	56	
10.	KVA Rating	11KV/433V, 3 Phase, 50Hz, 750KVA	
11.	Reference Standard	IS 2026 (latest edition)	
12.	Vector Group	DYn11	
13.	No load Voltage HV / LV	11kV / 0.433 kV	
14.	Core Type	Double wound with Copper conductor	
15.	Type of Insulation	Class A	
16.	Cooling	ONAN cooled with corrugated tank arrangement	
17.	Tap Range / Steps	+10% to -10%@ ±1.25% per step provided on HV winding	
18.	Tap Changer	OLTC	
19.	Type of Taping	ON Load type	
20.	Mechanical Tap position Indicator	Yes	
21.	Insulation level a) Full wave lighting impulse withstands voltage HV winding. b) Rated short duration	 750 KV peak 35 KV rms	

	power frequency withstand voltage		
22.	Efficiency @ 75°C At unity power factor ▪ at full load ▪ ½ full load	 > 99% > 99.2%	
23.	Temperature Rise	50^{o}C for Oil, 55^{o}C for Winding	
24.	Protection of Transformer	Provision of double float Buchholz relay with alarm and trip contacts. Buchholz relay shut of valve. Explosions vent and pressure relief device with trip contact. Dial type oil temp. Indicator with max. reading pointer and having potential free contacts for alarm and trip. Winding Temperature Indicator with alarm and Trip.	
25.	Terminal Arrangement: ▪ HV winding ▪ LV winding	 Cable Box Type Cable Box Type	
26.	Approximate Mass (in Kg) of Core & Windings Tank fittings & accessories Oil quantity in ltrs. Total mass in Kg.	To be furnished by the Tenderer	
27.	Approximate overall Dimensions including all fittings	To be furnished by the Tenderer	
28.	To be sustained in Ambient condition	▪ Max and Min Temperature: 50^{0} C & -5^{0}C ▪ Maximum Humidity: 100 %	

		▪ Heavy rain fall ▪ Altitude: 2000 mtr.	
29.	Losses (max)	6300W@100%loading	
30.	INSULATION LEVELS:	Impulse Voltage (kV Peak) 95 , Power Frequency Voltage (kV) 28	
31.	Hermetically Sealding	To be furnished by the Tenderer	
32.	Future Provision of remote monitoring of a. Currents & voltages in all three phases using SCADA b. Taping of OLTC using SCADA	Using PLC & RS485 port	

Earthing & Cables:

Sr. No	Specifications	Qty	Tenderer' Offer
1.	Earthing with copper earth plate 600 mm x 600mm x 3mm thick including accessories, providing masonry enclosure with cover plate having locking arrangement and watering pipe etc. (but without charcoal or coke and salt) complete as required. Chemical gel earthing will be preferred. **Earth resistance should not exceed 1 OHM.**	8 Nos	
2.	HT Cable: 240sq mm 3 core XLPE Al conductor cable with lugs	120 m	

Note : <u>Any columns left blank may be liable for rejection of Tender</u>.

Standards:

Unless otherwise modified in this specification the transformers/ materials shall confirm in all respects to the relevant Indian /International standards specifications with latest amendment thereof, some of them are listed below.

S.No.	Indian Standards	Title	International Standards
1.	IS : 2026 : 1977- 81	Specification for Power transformer	IEC – 76
2.	IS : 335 / 1993	Insulating Oil for transformer	BS –148
3.	IS : 3639 : 1968	Fittings and accessories for power transformer	ASTM D-1275
4.	IS : -2099 : 1986	High voltage porcelain bushings	IEC 296-1969
5.	IS : 7421-1988	Low voltage porcelain bushings	-
6.	IS 5082	Terminal connectors	
7.	IS - 4257	Dimensions for clamping arrangements for bushings	
8.	IS : 3347	Dimensions for outdoor bushings	DIN 42531 to 33
9.	IS : 12444	Specification for copper wire rods	ASTM B - 49
10.	IS : 5 / 1964	Specifications for colours for ready mixed paints	-
11.	IS : 6600 / 1972	Guide for loading oil immersed transformers	-
12.	IS - 104	Ready mixed paint, brushing zinc chromate, priming	
13.	IS - 649	Testing for steel sheets and strips and magnetic circuits	
14.	IS - 9335	Specification for Insulating Kraft Paper	IEC 554
15.	IS - 1576	Specification for Insulating Press Board	IEC 641
16.	IS - 2362	Determination of water content in oil for porcelain bushing of transformer	
17.	IS - 5561	Electrical power connector	
18.	IS - 6103	Testing of specific resistance of electrical insulating liquids	

19.	IS - 6262	Method of test for power factor and dielectric constant of electrical insulating liquids	
20.	IS - 6792	Determination of electrical strength of insulating oil	
21.	IS - 10028	Installation and maintenance of transformers.	

Note: <u>The bidder shall use ISS, however, wherever this standard is not available, corresponding IEC may be followed</u>.

Material:

Material conforming to ISS or the 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 standards, salient points of difference between the standards adopted and the specific standards shall be clearly brought out in relevant schedule. A copy of such standards with authentic English translations shall be furnished along with the offer.

a. The core shall be stack / wound type of 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. The core shall be stress relieved by annealing under inert atmosphere if required. The complete design of core must ensure permanency of the core loss with continuous working of the transformers. The value of the maximum flux density allowed in the design and grade of lamination used shall be clearly stated in the offer.

b. The bidder should offer the core for inspection and approval by the ARIES during manufacturing stage.

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

d. No-load current shall not exceed 3% of full load current and will be measured by energising the transformer at 433 volts, 50 Hz on the secondary. Increase of voltage of 433 volts by 12.5% shall not increase the no-load current by 6% (maximum) of full load current.

AMORPHOUS METAL:

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.

WINDINGS:

Material:

a. HV and LV windings shall be wound from Super Enamel covered / Double Paper covered copper conductor / foil winding.

b. LV winding shall be such that neutral formation will be at top.

c. The winding construction of single HV coil wound over LV coil is preferable.

d. Inter layer insulation shall be Nomex / Epoxy dotted Kraft Paper.

e. Proper bonding of inter layer insulation with the conductor shall be ensured.

f. Test for bonding strength shall be conducted.

g. Dimensions of winding coils are very critical. Dimensional tolerances for winding coils shall be with in limits as specified in Guaranteed Technical Particulars (GTP Schedule I).

h. Current density for HV and LV winding should not be more than 2.8 Ampere per sq mm for copper Conductor.

i. The core / coil assembly shall be securely held in position to avoid any movement under short circuit conditions.

j. Joints in the winding shall be avoided. However, if jointing is necessary the joints shall be properly brazed and the resistance of the joints shall be less than that of parent conductor. In case of foil windings, welding of leads to foil can be done within the winding.

TAPS:

a. Tapping shall be provided on the higher voltage winding for variation of HV voltage within range of (+) 10.0 % to (-)10.0 % in steps of 1.25%.

b. Tap changing shall be carried out by means of an externally operated self position switch and when the transformer is in de-energised condition. Switch position No.1 shall correspond to the maximum plus tapping. Each tap change shall result in variation of 1.25% in voltage. Provision shall be made for locking the taping switch handle in position. Suitable aluminium anodised plate shall be fixed for tap changing switch to know the position number of tap.

c. There will be a provision to bypass the OLTC in case of its failure and manual taping can be done during failure of OLTC.

OIL :

a. The insulating oil shall comply with the requirements of IS 335 or BS 148.Use of recycled oil is not acceptable. The specific resistance of the oil shall not be less than 2.5 $X10^{12}$ ohm-cm at 27^0C when tested as per IS 6103.

b. Oil shall be filtered and tested for break down voltage (BDV) and moisture content before filling.

c. The oil shall be filled under vacuum.

d. The design and all materials and processes used in the manufacture of the transformer, shall be such as to reduce to a minimum the risk of the development of acidity in the oil.

Lossess: TOLERANCES:
No positive tolerance shall be allowed on the maximum losses displayed on the label for both 50% and 100% loading values.

PERCENTAGE IMPEDANCE:
The value of impedance of transformers at 75^0 C shall be in accordance with IS 2026.

Temperature rise: The temperature rise over ambient shall not exceed the limits given below:
a. Top oil temperature rise measured by thermometer : 35^0C
b. Winding temperature rise measured by resistance method : 40^0C
Bids not meeting the above limits of temperature rise will be treated as non-responsive.
c. The transformer shall be capable of giving continuous rated output without exceeding the specified temperature rise. Bidder shall submit the calculation sheet in this regard.

INSULATION MATERIAL:
a. Electrical grade insulation epoxy dotted Kraft Paper / Nomex and pressboard of standard make or any other superior material subject to approval of the purchaser shall be used.
b. All spacers, axial wedges / runners used in windings shall be made of pre compressed Pressboard-solid, conforming to type B 3.1 of IEC 641-3-2. In case of cross-over coil winding of HV all spacers shall be properly sheared and dovetail punched to ensure proper locking. All axial wedges / runners shall be properly milled to dovetail shape so that they pass through the designed spacers freely. 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.

PENALTY FOR NON PERFORMANCE:
a. During testing at supplier's works if it is found that the actual measured losses are more than the values quoted by the bidder, the ARIES may reject the transformer.
b. Purchaser shall reject the transformer during the test at supplier's works, if the temperature rise exceeds the specified values.
c. Purchaser shall reject the transformer during the test at supplier's works, if the impedance values differ from the guaranteed values including tolerance.
Tank Construction:

(a) The tank shall be rectangular shape with round edges or round shape and be fabricated from tested quality of mild steel of adequate thickness i.e.

minimum 4mm for side walls and 5mm for top and bottom plates. The surface of the transformer body shall be Conventional tank with pressed steel radiator.

(b) To provide rigidity and to meet the pressure inside the tank due to short circuit current, the tank shall be suitably stiffened. The stiffeners wherever applicable are provided on all the four sides wall of the tanks, designed not to retain water.

(c) The tank cover shall be slightly slopping towards HV bushing and shall provide facilities for draining of water. The cover plate shall be bent to cover the tank packing.

(d) **The transformer tank shall be complete with all accessories, lifting lugs and shall be designed to allow the complete transformer tank, filled with oil to be lifted by crane or other means without risk of any damage and transported by rail/road/sea without straining any joints and without causing leakage of oil.**

(e) Bolted cover shall be provide on tank, top cover to inspect core, winding and have access to the bottom of bushing.

Fittings:

The transformers shall be complete with the following fittings:-

a) Oil conservator with oil level indicator, minimum level marking and drain plug for all transformers of capacity 750kVA.
b) On circuit type tap changer with position indicator and locking arrangement for the transformer.
c) Thermometer pocket with plug for all transformer of capacity above.
d) 100mm dial type/stem type thermometer with metal guard Dial type thermometer may have max. Temperature indicator and resetting device for transformers of capacity 750kVA.
e) Lifting lugs for the transformer.
f) Bi-directional /Unidirectional rollers to be specified.
g) Rating diagram and terminal marking plate for transformer.
h) Explosion vent for the transformer of capacity 750kVA.
i) Additional Neutral separately brought out on a bushing for earthling for the transformer.
j) Earth terminals (4nos.) for body earthing & neutral for the transformer.
k) Valves for filtration, drainage and filling etc. with necessary plugs for the transformer.
l) Radiator assembly for a transformer.

m) Silica gel breather for a transformer.
n) Air release plug for a transformer.
o) First filling of oil to IS 335/1993 including make-up fill during installation for a transformer.
p) Bushing terminations or cable box terminations as specified.
q) Necessary hardware, clams, lugs etc. for termination on HV etc. for all transformers.

The following standard fittings shall be provided :
i. Rating and terminal marking plates, non-detachable.
ii. Earthing terminals with lugs - 4 Nos.
iii. Lifting lugs for main tank and top cover
iv. Terminal connectors on the HV/LV bushings (For bare terminations only).
v. Thermometer pocket with cap - 1 No.
vi. Air release device
vii. HV bushings - 3 Nos.
viii. LV bushings - 4 Nos.
ix. Pulling lugs
x. Stiffener
xi. Radiators - No. and length may be mentioned (as per heat dissipation calculations)/ corrugations.
xii. Drain cum sampling valve.
xii. Top filter valve
xiii. Oil filling hole having p. 1-¼ '' thread with plug and drain plug on the conservator.
xiv. Silicagel breather
xv. Base channel with holes to make them suitable for fixing on a platform or plinth.
xvi. 4 No. rollers for transformer
xvii. Pressure relief device or explosion vent.

FASTENERS:

1. 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.
2. Bolts or studs shall not be less than 6 mm in diameter except when used for small wiring terminals.
3. All nuts and pins shall be adequately locked.
4. 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.
5. All ferrous bolts, nuts and washers placed in outdoor positions shall be treated to prevent corrosion, by hot dip galvanising, except high tensile steel bolts and spring washers which shall be electro-galvanised/plated. Appropriate

precautions shall be taken to prevent electrolytic action between dissimilar metals.

6. Each bolt or stud shall project at least one thread but not more than three threads through the nut, except when otherwise approved for terminal board studs or relay stems. If bolts and nuts are placed so that they are inaccessible by means of ordinary spanners, special spanners shall be provided.
7. 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.
8. Taper washers shall be provided where necessary.
9. Protective washers of suitable material shall be provided front and back of the securing screws.

OVERLOAD CAPACITY:

The transformers shall be suitable for loading as per IS 6600.

PROTECTION FEATURES:

Internal HV fuse on the HV side of transformer:

Expulsion / any other suitable type of fuse shall be placed in series with the primary winding. This fuse is mounted normally inside of the primary bushing for the three phases and is connected to the high voltage winding through a terminal block. This has to protect that part of the electrical distribution system which is ahead of the distribution transformers from faults which occur inside the distribution transformer i.e., either in the windings or some other part of the transformer. It shall be ensured that this fuse does not blow for faults on the secondary side (LT side) of the transformer i.e., the blowing characteristics of the fuse and LT breaker shall be so coordinated such that the fuse shall not blow for any faults on the secondary side of the transformer beyond LT breakers and those faults shall be cleared by the LT breaker only.

LOAD MANAGEMENT SIGNAL LIGHT:

A signal light shall be provided to give information about the loading condition of the transformer. It shall forewarn any overloading problem at the installation such that replacement of the existing transformer with a higher capacity transformer can be planned. The signal light mechanism shall not reset itself when the load drops from the overloaded condition. The signal light shall remain lighted once the signal light contacts close due to overload and can be turned off by manual operation. (The signal light shall not give indication for momentary overloading). Loading indication shall be available in adjustable steps of 10% starting from 70% to 110%

Explosion Vent

Explosion vent or pressure relief device shall be provided of sufficient size for rapid release of any pressure that may be generated within the tank and which might result in damage to the equipment. The device shall operate at a static pressure less than the hydraulic test pressure for transformer tank. Means shall be provided to prevent the ingress of moisture and of such a design to prevent gas accumulation.

Rating and Diagram plates

The following plates shall be fixed to transformer in a visible position.

a) A rating plate of weather proof material bearing the data specified in the appropriate clauses of IS: 2026/1977.
b) A diagram plate showing the internal connection and also the voltage vector relationship of the several windings in accordance with IS: 2026-1977 and a plan view of the transformer giving the correct physical relationship of the terminals.

Joints and Gaskets

All gaskets used for making oil tight joints shall be of proven material such as granulated cork bonded with synthetic rubber gaskets or synthetic rubber or such other good material.

PAINT MATERIAL:

a) Paint may be suitably used for the items to be painted at shop and supply of matching paint to site: Heat resistant paint (Hot oil proof) for inside surface
b) For external surfaces one coat of thermo setting powder paint or one coat of epoxy primer followed by two coats of synthetic enamel/polyurethene base paint. These paints can be either air drying or stoving.

TERMINAL CONNECTORS:

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

CABLE BOXES:

a) In case HV/LV terminations are to be made through cables the transformer shall be fitted with suitable cable box on 11 kV side to terminate one 11kV/ 3 core aluminium conductor cable up to 240 sq. mm. The bidder shall ensure the arrangement of HT Cable box so as to prevent the ingress of moisture into the box due to rain water directly falling on the box. The cable box on HT side shall be of the split type with faces plain and machined and fitted with Neo-k-Tex or similar quality gasket and complete with brass wiping gland to be mounted on separate split type gland plate with nut-bolt arrangement and MS earthing clamp. The bushings of the cable box shall be fitted with nuts and stem to take the cable cores without bending them. The stem shall be of copper with copper nuts. The cross section of the connecting rods shall be stated and shall be adequate for carrying the rated currents. On the HV side the terminal rod shall have a diameter of not less than 12 mm. The material of connecting rod shall be copper. HT Cable support clamp should be provided to avoid tension due to cable weight.
b) The transformer shall be fitted with suitable LV cable box having non-magnetic material gland plate with appropriate sized single compression brass glands on LV side to terminate 1.1 kV/single core XLPE armoured cable (Size as per requirement).

CURRENT TRANSFORMERS:

a) Current transformer shall be mounted inside the tank or outside with suitable marshalling box on LV side of the transformer.
b) The current transformers shall comply with IS 2705.
c) All secondary leads of bushing mounted CT's shall be brought to a terminal box near each bushing.
d) The CT terminals shall have shorting facility.
e) CT should not get saturated upto 200% of rated current.
f) CT shall have the following 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 they should be suitable for service with fluctuations in supply voltage upto plus 12.5% to minus 12.5%.

TESTS:

a) All the equipment offered shall be fully type tested by the bidder or his collaborator as per the relevant standards including the additional type tests. The type test must have been conducted on a transformer of same design **during the last five years** at the time of bidding. The bidder shall furnish four sets of type test reports along with the offer. Offers without type test reports will be treated as non-responsive.
b) Special tests other than type and routine tests, as agreed between purchaser and bidder shall also be carried out as per the relevant standards.
c) The requirements of site tests are also given in this clause.
d) The test certificates for all routine and type tests for the transformers and also for the bushings and transformer oil shall be submitted with the bid.
e) The procedure for testing shall be in accordance with IS1180/2026 as the case may be except for temperature rise test.
f) Before dispatch completely assembled transformer shall be subjected to the routine tests at the manufacturer's works.

TESTS AT SITE:

The purchaser reserves the right to conduct all tests on transformer after arrival at site and the manufacturer shall guarantee test certificate figures under actual service conditions.

QUALITY ASSURANCE PLAN:

a) The bidder shall invariably furnish following information along with his bid, failing which his bid shall be liable for rejection. Information shall be separately given for individual type of equipment offered.
b) Statement giving list of important raw materials, names of sub-suppliers for the raw materials, list of standards according to which the raw materials are tested, list of tests normally carried out on raw materials in the presence of bidder's representative, copies of test certificates.
c) Information and copies of test certificates as above in respect of bought out accessories.

d) List of manufacturing facilities available.
e) Level of automation achieved and list of areas where manual processing exists.
f) List of areas in manufacturing process, where stage inspections are normally carried out for quality control and details of such tests and inspection.
g) List of testing equipment available with the bidder for final testing of equipment along with valid calibration reports. These shall be furnished with the bid. Manufacturer shall posses 0.1 accuracy class instruments for measurement of losses.
h) Quality Assurance Plan (QAP) with hold points for purchaser's inspection.

DEVIATIONS:

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

SCHEDULE I

S.No.	Description	Value
1.	Core Grade	
2.	Core diameter	mm
3.	Gross core area	sq cm
4.	Net core area	sq cm
5.	Flux density	Tesla
6.	Mass of core	kg
7.	Loss per kg of core at the specified flux density	watt
8.	Core window height	mm
9.	Center to center distance of the core	mm
10.	No. of LV Turns	
11.	No. of H V turns	
12.	Size of LV conductor bare/covered	mm
13.	Size of HV conductor bare/covered	mm
14.	No. of parallels	
15.	Current density of LV winding	A/sq mm.
16.	Current density of HV winding	A/sq mm
17.	Wt. of the LV winding for Transformer	kg
18.	Wt. of the HV winding for Transformer	kg
19.	No. of LV Coils/phase	
20.	No. of HV coils / phase	
21.	Height of LV Windings	mm
22.	Height of HV winding	mm
23.	ID/OD of HV winding	mm
24.	ID/OD of LV winding	mm
25.	Size of the duct in LV winding	mm
26.	Size of the duct in HV winding	mm
27.	Size of the duct between HV and LV	mm
28.	HV winding to LV winding clearance	mm
29.	HV winding to tank clearance	mm
30.	Calculated impedance %	
31.	HV to earth creepage distance	mm
32.	LV to earth creepage distance	mm

CERTIFICATE FOR NO DEVIATION

I,_____ Of
M/s_____
mentioned in the Tender Specification.
SIGNATURE OF THE TENDERER
hereby certify that there is no deviation from the Tender conditions either technical or commercial and I am agreeing to all the terms and conditions mentioned in the Tender Specification.

SIGNATURE OF THE TENDERER

PRE-QUALIFICATION – PROFORMA-I
PARTICULARS OF THE BIDDERS TO BE FURNISHED FOR THE PURPOSE OF PRE-QUALIFICATION

S.No.	Description	Details
1.	Name of the Organization/firm/company	
2.	Year of establishment	
3.	Address & Telephone Numbers	
4.	Address & Telephone Numbers of service centre/ Branch office in Haldwani / Rudrapur/Bareilly. Mention the names and mobile numbers of contact persons	
5.	Whether registered with the registrar of companies /registrar of firms. If so mentioned number and date	
6.	Name and mobile numbers of Directors /Partners/proprietor	i
7.	Whether registered with central excise for service tax. Please submit a copy of Service Tax Registration Certificate	
8.	Whether registered for sale tax purpose. If so, Mentioned number and date. Furnish also copies of sales tax clearance. Mention VAT/LST/CST . Enclose the relevant copies.	
9.	Whether an assesses of income tax. If so, mention permanent account no. Furnish copy of PAN	
10.	State annual turnover of the company for the last financial year. Furnish the copy of audited Annual Turnover certificate for the last three financial years	
11.	Furnish copies of audited balance sheet and profit & loss account (audited) for the last three years	
12.	Specify the maximum value of single work executed in the year in the country. Enclose the order copies.	
13.	Status and details of disputes/litigation /arbitration, if any	

Note: Where copies are required to be furnished these is to be certified copies preferably by the concerned agencies or government officer.

PRE-QUALIFICATION PROFORMA – II

PARTICULARS IN RESPECT OF 3 SIMILAR WORKS EXECUTED IN LAST 3 YEARS

Sl no	Name of the work and project with address	Short description of work executed	Name and address of the owner	Value of work executed	Stipulated time of the completion	Actual time of completion	Name of consulting engineer