



Bharat Heavy Electricals Limited

Enquiry No. :

Due Date :

Supplier's Ref.:

Date :

Part A (Techno-Commercial Bid)

Section IV

Specification cum Compliance Certificate for 11kV/415V 1000kVA Transformer

Note:-

1. The 'Offered' Column and where applicable, the 'Deviations' & 'Remarks' Column of this format shall be filled in by the Vendor and submitted along with the offer. Inadequate / incomplete, ambiguous or unsustainable information against any of the clauses of the specifications / requirements shall be treated as non-compliance.

2. The offer and all documents enclosed with offer should be in English language only.

Name & Address of the supplier:

Telephone No.

Fax No.

e-mail :

Scope: Design, manufacture, supply, installation, testing & commissioning of 11kV/415V 1000kVA Transformer. complying with the following specifications

S No.	Description - BHEL's Requirement	Specified	Offered	Deviations	Remarks
1.0	Application and type				
1.1	Application	Indoor/Outdoor Service Transformer, Step down			
1.2	Type	Oil immersed			
2.0	Technical specifications				
2.1	Rating	1000 kVA			
2.2	Voltage Ratio (HV/LV)	11kV/415V			
2.3	No. of phases	03			
2.4	Rated Frequency	50 Hz			
2.5	Connection symbols/ Vector Group	Dyn11			
2.6	Connections: HV/LV	Delta/Star			
2.7	Tappings				
2.7.1	Type of taps provided	On load			
2.7.2	Taps provided on	HV side			
2.7.3	Range of variation	±5% to -15% in equal steps of 1.25%			
2.7.4	Method of tap change	OLTC, AVR and RTCC			
2.8	Temperature rise limits (above max. ambient temp)				
2.8.1	Oil	50°C			
2.8.2	Winding	55°C			
2.9	Efficiency at 75°C at unit power factor (min 98.5 %)	Vendor to specify			
2.10	Type of cooling	ONAN			
2.11	Standards				
2.11.1	IS 2026 Part I to IV – Power Transformers.	Vendor to confirm			

S No.	Description - BHEL's Requirement	Specified	Offered	Deviations	Remarks
2.11.2	IS 335 Transformer Oil.	Vendor to confirm			
2.11.3	IS 1886 Installation & Maintenance of Transformers.	Vendor to confirm			
2.11.4	IS 2099 Bushings	Vendor to confirm			
2.11.5	IS 6000 Loading of Oil Immersed Transformers	Vendor to confirm			
3.0	Construction of the transformer				
3.1	Tank				
3.1.1	The main tank of the transformer shall be fabricated from good low carbon steel.	Vendor to confirm			
3.1.2	All seams shall be double welded and welding should be stress relieved. The tank shall be reinforced with stiffener to ensure rigidity so that it can withstand without any deformation (a) Mechanical shock during transportation (b) oil filling by vacuum.	Vendor to confirm			
3.1.3	Manholes etc. of sufficient size shall be provided for access to leads, winding, bottom terminals of bushings and top.	Vendor to confirm			
3.2	Core				
3.2.1	The transformer shall be of core type. The core shall be built up of high grade non-aging, low loss, high permeability, grain oriented, cold rolled silicon steel lamination especially suitable for core material and core assembly shall be securely fixed in position so that no shifting and deformation occurs during movement of transformer and also under short circuit condition. The core lamination of each yoke as well as each limb shall be one piece and no joints shall be allowed in the same.	Vendor to confirm			
3.3	Coil				
3.3.1	The coils shall be manufactured from electrolytic Copper solid conductor, fully insulated for rated voltage.	Vendor to confirm			
3.3.2	The conductor size of H.T and LT shall accordingly be chosen from relevant IS specification and shall be of standard size as per ISS only.	Vendor to confirm			
3.3.3	All leads from the winding to the terminal board and bushing shall be rigidly supported to prevent injury from vibration or short circuit stresses.	Vendor to confirm			
3.4	Insulating Oil				
3.4.1	Transformer (tank) shall be filled with mineral insulating oil. However, 10% excess oil after top up of the transformer shall be provided in non-returnable container suitable for outdoor storage. Oil preservation shall be by means of conservator with silica gel breather.	Vendor to confirm			
3.5	Painting				

S No.	Description - BHEL's Requirement	Specified	Offered	Deviations	Remarks
3.5.1	All steel structures shall be thoroughly cleaned by sand blasting or chemical treatment so as to produce smooth surface and shall be given a coat of high quality red oxide followed by filler coats. The transformer shall be finished with two coats of grey synthetic enamel paint. The internal surface in contact with insulating oil shall be painted with heat resistance, oil insoluble insulating varnish.	Vendor to confirm			
3.6	Pre-dispatch inspection and acceptance				
3.6.1	BHEL shall conduct pre-dispatch inspection of the transformer and witness the tests at the works of the vendor. Dispatch clearance for the transformer shall be given by BHEL after witness of all the tests and acceptance of the test results.	Vendor to confirm			
3.7	Tests & Inspection				
3.7.1	Routine Tests				
3.7.1.1	During manufacture and on completion, the transformer shall be subject to Routine Tests at the manufacturer's works as laid down in the latest revision of IS 2026.	Vendor to agree			
3.7.2	Type test				
	Type test reports of the following type tests for similar rating transformer (not more than 5 yrs old)	Vendor to agree			
3.7.2.1	Full Wave Impulse Withstand Test (on one limb)				
3.7.2.2	Temperature Rise Test				
3.7.3	The routine and type test certificates of the transformer shall be furnished to BHEL for approval before dispatch. For accessories, bushing and oil, copies of manufacturer's test reports will be submitted for approval.	Vendor to agree			
4.0	Installation, Testing and Commissioning of Transformer				
4.1	The installation includes fixing of radiators, cooling fans, conservator, filling of oil, dehydration and any other job required to be carried out for installation of the transformer at purchaser's work. The supplier shall arrange to conduct all the required pre-commissioning tests.	Vendor to agree			
4.2	Successful working of full capacity of the transformer by the supplier shall be considered as part of commissioning.	Vendor to agree			
4.3	Tools, Tackles, instruments and other necessary equipments required to carry out all above activities should be brought by the supplier.	Vendor to agree			
4.4	Commissioning spares, required for commissioning of the transformer within stipulated time, shall be brought by the supplier on returnable basis.	Vendor to agree			

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4.5	Portion, if any, of the transformer, accessories and other supplied items where paint has rubbed off or peeled during transit or erection should be repainted and merged with the original surrounding paint by the vendor. For this purpose, the vendor should supply sufficient quantity of touch-up paint of various colours of paint used.	Vendor to agree			
4.6	Schedule of Erection and Commissioning shall be submitted with the offer.	Vendor to agree			
5.0	Packing				
5.1	Rigid packing for all items of complete machine with all Accessories and other supplied items to avoid any damage/loss in transit. When machine is despatched in containers, all small loose items shall be suitably packed in boxes.	Vendor to confirm			
6.0	Guarantee				
6.1	Guarantee for 24 months from the date of acceptance of the machine at BHEL works. During this Guarantee period at least 2 visits per year and/or whenever called by BHEL (within 24 hours of call) by the service engineer of the supplier to be made & the parts, items, spares etc. needing replacement to be replaced by the supplier free of cost. In support a Performance Bank Guarantee of 10% of Basic Value of P.O. valid for 24 months from the date of commissioning will have to be furnished by supplier	Vendor to confirm			
7.0	Drawings and documents to be furnished by the tenderer				
	Three sets of following documents (Hard copies) in English language should be supplied along with the machine. Only originals shall be supplied. Photocopies will not be accepted.	Vendor to confirm			
7.1	Along with the offer				
7.1.1	Typical general arrangement drawing showing construction features such as tank, conservator, level gauge, cooler banks, terminal arrangement, wheel base dimensions and details and assemblies/sub-assemblies/parts including Electrical circuit diagrams.	Vendor to confirm			
7.1.2	Type test certificates of similar type & rating transformer, as tested.	Vendor to confirm			
7.1.3	Technical leaflets of Buchholz Relays, Temperature Indicator and all other major components and BOIs.	Vendor to confirm			
7.1.4	Complete Master List of parts used in the transformer	Vendor to confirm			
7.2	After placement of order				
7.2.1	Outline dimensional drawing showing the general arrangement and indicating the space required for detachable type cable end box, wheel base dimension and details etc.	Vendor to confirm			

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7.2.2	Head clearance required for de-tanking of core and coil assembly, foundation plan and load data, transport/shipping dimension with net weight and weights of various parts.	Vendor to confirm			
7.2.3	Terminal arrangement, control schematic and wiring diagram, flow diagram of the cooling system showing the number of cooling banks, fans etc.,	Vendor to confirm			
7.2.4	Drawings of major components like bushings etc., any other relevant drawing or data necessary for satisfactory installation.	Vendor to confirm			
7.2.5	Installation, operation and maintenance manual.	Vendor to confirm			
8.0	Fittings & Accessories to be supplied along with Transformer				
8.1	HV and LV bushing terminal connectors.	Vendor to agree			
8.2	LV neutral bushing to be brought out separately for solid earthing (01 Nos)				
8.3	Oil conservator with filler cap, drain plug and plain oil level gauge (01 Nos)	Vendor to agree			
8.4	Silica gel dehydrating breather (1000 gms) (01 Nos)	Vendor to agree			
8.5	On load tap changer (OLTC) with AVR and RTCC (01 Nos)	Vendor to agree			
8.6	Explosion vent diaphragm (01 Nos)	Vendor to agree			
8.7	Thermometer pocket (01 Nos)	Vendor to agree			
8.8	Air release plug (01 Nos)	Vendor to agree			
8.9	Filler valve with plug (01 Nos)	Vendor to agree			
8.10	Rating and terminal marking plates (01 Nos)	Vendor to agree			
8.11	Drain valve with plug (01 Nos)	Vendor to agree			
8.12	Earthing terminals (02 Nos)	Vendor to agree			
8.13	Bi-directional flat rollers (04 Nos)	Vendor to agree			
8.14	Lifting lugs and jacking pads (04 Nos)	Vendor to agree			
8.15	Pulling lugs (04 Nos)	Vendor to agree			
8.16	Cover lifting lugs (02 Nos)	Vendor to agree			
8.17	HT and LT cable box (01 Nos)	Vendor to agree			
8.18	Marshalling box (01 Nos)	Vendor to agree			
8.19	6" Oil temperature indicator with A&T contacts (01 Nos)	Vendor to agree			
8.20	6" Winding temperature indicator with A&T contacts (01 Nos)	Vendor to agree			
8.21	Buchholz relay (01 Nos)	Vendor to agree			
8.22	4" Magnetic oil level guage (01 Nos)	Vendor to agree			
9.0	Spares				
9.1	Itemised breakup of (1) standard/essential mechanical, electrical and electronic accessories & spares (included in Basic machine cost), (2) Optional in sufficient quantity as per recommendation of Vendor for 5 years (After initial 24 month's Guarantee period) for trouble free operation should be offered by vendor. (Unit Price of each item of spare should be offered in the price bid)	Vendor to agree			

S No.	Description - BHEL's Requirement	Specified	Offered	Deviations	Remarks
10.0	General				
10.1	Transformer Model	Vendor to confirm			
10.2	Total weight	Vendor to confirm			
10.3	Detailed catalogues, sketch/photographs of the m/c and accessories/ attachments should be submitted with the offer.	Vendor to Submit			

Signature & Seal of Tenderor