

Heavy Power Equipment Plant, Bharat Heavy Electricals Limited, Ramachandrapuram -502032, Hyderabad, INDIA.		Enquiry No. & Dt.:			
		Due Date :			
		Supplier's Ref.:			
		Date :			
Specification cum Compliance Certificate for 2000KVA, 11KV/415V DISTRIBUTION TRANSFORMERS					
Note:-					
1. Vendor must submit complete information against clause no. 20.0 The offer meeting this clause would only be processed.					
2. 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.					
3. The offer and all documents enclosed with offer should be in English language only.					
Name & Address of the supplier:			Name & Address of the Indian Agent:		
Telephone No.					
Fax No.					
e-mail :					
Scope: Supply of 2000KVA, 11KV/415V DISTRIBUTION TRANSFORMERS complying with the following specification					
SNO	DESCRIPTION OF BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
1.0	This specification covers design, manufacture, testing at manufacturer's works, packing and dispatch to site along with all accessories and fittings of 2000KVA 11/415V Indoor Distribution Transformer.				
2.0	CODES AND STANDARDS:				
	The equipment shall comply with the following latest Indian Standards. Equipment offered shall also comply with latest IEC Standards				
	IS-2026 Power Transformers				
	IS-3639 Fitting & Accessories				
	IS-335 Oil				
	IS-2099 Bushings				
	IS-2147 Degree of Protection				
	IS-3637 Buchholtz Relay				
	IS-5 Painting				
3.0	GENERAL DESIGN FEATURES:				
3.1	TANK				
3.1.1	Material - Low carbon steel welded construction				
3.1.2	Tanks, Radiators, Coolers, Conservators, Bushings etc shall withstand.				
	a) Vacuum Pressure as per CBIP recommendations				
	b) Internal gas pressure of 0.35kg/sq.cm with oil at operating level				

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3.1.3	Detachable top tank cover. All removable covers shall be provided with hot oil resistant weather proof gaskets				
3.1.4	Material of gaskets – Cork or Neoprene as per applicable national standards				
3.2	CORE AND COILS				
3.2.1	Transformers shall be core type.				
3.2.2	Core material – cold rolled grain oriented silicon steel laminations				
3.2.3	Windings – Electrolyte copper conductor with insulation suitable for voltage levels specified				
3.2.4	Complete core and coil assembly shall be dried in vacuum at not more than 0.5mm of mercury				
3.2.5	Insulation structure for the core to bolts, core clamp plates and core to structure steel shall withstand voltage of 2KV AC for one minute.				
3.2.6	Flux density at 110% rated voltage shall not be more than 1.9 tesla				
3.3	TAPPINGS				
3.3.1	Off Circuit Tap Changer				
	A)The Off Circuit Tap Changer shall be operated by means of an operating handle/wheel brought outside the tank and shall be located at operating level from ground level				
	B) It shall have an indicating device to show the tap in use with a locking arrangement				
	C)Tap changer contacts shall be silver plated .				
3.4	VALVES				
3.4.1	Forged carbon steel upto 50 mm size				
3.4.2	Gun metal or cast iron bodies with gun metal fitting for size above 50 mm				
3.4.3	Valves shall be provided with open/close indicators and locking facility in either position				
3.4.4	Oil right blank flanges shall be provided for each connection for use during maintenance				
3.4.5	Drain valve size – 50 mm	50mm			
3.4.6	Filter valves at top of transformers tanks – 1 no of 50mm size	1 no. of 50mm size			
3.5	TRANSFORMER OIL				
3.5.1	The oil shall be mineral oil, non slegging type				
3.5.2	First fill of plus 20% extra shall be supplied in non returnable containers suitable for outdoor storage				
3.6	BUSHING				
3.6.1	Material – Porcelain material				
3.6.2	Bushing rated for 400A and above shall have non ferrous flanges condenser type. For low current ratings, porcelain bushings on HV side and epoxy bushings on LV side shall be provided				

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3.6.3	Wherever winding is star connected separate neutral bushing and suitable copper earthing strip from neutral terminal shall be brought out duly insulated on porcelain insulators upto 300mm from the ground level				
3.6.4	For 11KV & 415V terminations the arrangement of the cable will be intimated to successful bidder during detailed engineering and the same shall be accepted by the bidders without any price implications				
3.6.5	Location of HV & LV terminations arrangement for indoor shall be generally at right angles to the transformer tank. However exact arrangement will be confirmed during detailed engineering to the successful bidder keeping in view of the transformer withdrawal aspects and the same shall be compiled with by the vendors without any price implication				
3.7	TRANSFORMER COOLING EQUIPMENT				
3.7.1	Tank mounted detachable radiators/coolers with flanged connection shall be provided separately, mounted radiator tank shall have bolted flanged connections and pipe extension to permit withdrawal of transformer tank without disturbing radiator. Interconnection pipes shall have plug air release vent				
3.7.2	Radiator accessories:				
	a) Shut off valve and blanking plates at each point of connection.				
	b) Top and bottom shut – off valves and blanking plates.				
	c) Lifting lugs.				
	d) Top oil filling plug 19mm size.				
	e) Air release plug at top.				
	f) Oil drain plug at top.				
	g) Thermometer on the inlet pipes for separate mounted radiators				
3.8	Marshalling Box & Aux. Cont. Circuit Requirements				
3.8.1	Marshalling box shall be provided with the following features. Enclosure protection of Marshalling box IP 55				
	a) Terminal blocks ELMAX 10sq.mm.				
	b) Lamp, Door switch, space heater thermostat, plug/socket.				
	c) All contacts and alarm points to wire up to TB.				
	d) 2.5sq.mm FRLS PVC wires.				
	e) 20% spare terminals.				
	f) All devices shall have same tag nos/name plates as shown in scheme drawing/wiring diagram.				
	g) All contacts provided for alarm & trip shall rated breaking 0.5A DC at 30V and 240V AC				

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4.0	PAINTING				
	a) Interior of transformer	Two coats of heat resistant oil insoluble, Insulating varnish			
	b) Outside of transformer	Premier – Zinc Chromate, Final 2 coats of UV resistant epoxy based paint.			
	c) Colour Shade	631 as per IS 5 (Enamel Light Grey)			
5.0	ACCESSORIES & FITTINGS TO BE FURNISHED				
	a) Oil conservator with filling hole cap and drain plug.				
	b) Silica gel breather.				
	c) Drain cum bottom filter valve with plug.				
	d) Filter valve with plug.				
	e) Double diaphragm explosion vent with sight glass (rotatable).				
	f) Air release device.				
	g) Rating plate – SS 316 material.				
	h) Terminal marking plate – SS 16 material.				
	i) Two nos. earthing terminals with fastening hardware suitable for 50 x 6 GI strip.				
	j) Two nos. thermometer pockets (without thermometer)				
	k) Four nos. bi-directional flat / flanged type rollers.				
	l) Lighting lugs – for tank and for ID.				
	m) Jacking pads with pulling eyes.				
	n) Inspection cover with lifting handle.				
	o) Double float Buchholtz relay with alarm and trip contacts.				
	p) Shut of valves on either side of the buchholtz relay.				
	q) 150mm dial oil temperature indicator with maximum reading pointer and alarm and trip contacts of micro switch type.				
	r) 150mm dial Winding temperature indicator with maximum reading pointer and alarm and trip contacts of micro switch type.				
	s) Magnetic oil level gauge with low level alarm & trip contacts.				
	t) Marshalling box.				
	u) Suitable stem type thermometer.				
	v) Sampling valve with plug.				
	w) First filling of transformer oil confirming to IS 335/20% extra oil to be included.				
	x) Foundation hardware.				
	y) Cable boxes supporting hardware.				

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	z) Prismatic oil level indicator.				
	aa) One 1 litre tin of paint for touching up at site.				
	bb) Erection & Commissioning spares of extra one OTI, one WTI, one Breather, one Buchholtz Relay are required.				

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6.0	OPERATIONAL REQUIREMENTS				
6.1	The transformer shall deliver				
	a. Continuously at 110% of rated output.				
	b. For one minute at 125% of rated output.				
	c. For 5 sec at 140% of rated output.				
	d. Flux density at 110% of rated voltage shall not exceed 1.9 Tesla.				
6.2	Over fluxing capacity shall be for 1 minute at 125% and 5 sec for 140% and continuously at 110%				
6.3	Noise level shall not exceed more than 5 db above that specified in NEMA TRL				
6.4	At 105% rated voltage, transformer shall be capable of delivery rated current without exceeding temperature rise limits				
6.5	Variation in Input supply to transformer shall be is as follows. (Power supply as well as control supply)				
	a) Voltage : +/- 10%				
	b) Frequency : +/- 5%				
	c) Combined V&f : +/- 10%				
6.6	Transformer shall be capable of continuous operation under these conditions. Transformer shall be able to withstand short circuit stress for 3 sec. Minimum when a terminal fault occurs on one winding and full voltage is maintained on the other winding				
7.0	TESTS TO BE CARRIEDOUT				
7.1	The following tests shall be conducted in presence of BHEL representative at free of cost.				
	a. All routine tests as per IS 2026.				
	b. Vacuum test on tank.				
	c. Any stage inspection as agreed in QA plan.				
7.2	Following type tests shall be conducted				
	a. Temperature rise.				
7.3	The cost of the basic transformer should be inclusive of all routine & type tests. Offers without acceptance of routine & type tests are laible for rejection.				
7.4	Clause wise deviations (if any) shall be brought clearly by the supplier in his offer for technical evaluation/considerations. In case no deviations, the offer will be treated as in line with BHEL specification.				
8.0	DOCUMENTATION				
8.1	Along with bid (in duplicate)				
	a. Filled 'Enquiry format' as per annexure-1				
	b. Price format duly filled in the supplier.				

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8.2	For approval during detailed engineering (in 3 sets) within 2 weeks of placing the order, the following documents shall be sent for approval.				

SNO	DESCRIPTION OF BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
	1. GA drg. showing description of all fitments, rail gauge size & spacing, foundation plan, weight and dimensions for shipping, installation and undertaking, withdrawal direction, untanking details etc.				
	2. BOM of all fitments, accessories, lugs, glands, foundation and supporting structure hardware as applicable.				
	3. Cable termination details.				
	4. Details of CTs and Bushing.				
	5. GA schematic diagram, wiring diagrams and termination diagrams for				
	a) Marshalling box,				
	b) Name plate particulars.				
	c) Warning plate particulars.				
	d) Details of transformer locking arrangement.				
	e) Filled up final data sheets.				
	f) Quality assurance plan.				
8.3	Final Documentation (in 6 sets)				
	With one week of inspection of the equipment, following final documentation shall be furnished				
	1. All items mentioned in documentation list.				
	2. Erection, operation and instruction manuals.				
	3. Test reports of all tests conducted.				
	4. Type test reports.				
	5. Test certificates of bought out items.				
	The final documentation shall be furnished in plastic covered hard bound files, 2 sets of reproducible tracing for the drawings mentioned above shall be furnished along with final documentation.				
9.0	TECHNICAL PARTICULARS: -				
9.1	Quantity	One			
9.2	Rated KVA	2000			
9.3	Service	Indoor			
9.4	Mounting	Plinth			
9.5	Wound	Double			
9.6	Winding Material	Copper			
9.7	Type of cooling	ONAN			
9.8	Temperature rise in °C	50			
9.9	Temperature rise by resistance in °C	55			
9.10	Vector Group	Dyn11			
9.11	Primary Connection	Delta			
9.12	Primary volts	11000			

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9.13	Primary frequency[Hz]	50			
9.14	Primary Phases	3			
9.15	Primary wires	3			
9.16	Secondary connection	Star			

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9.17	Secondary Volts	415			
9.18	Secondary Phases	3			
9.19	Secondary wires	4			
9.20	Taps on primary/secondary winding for Primary/secondary voltage variation	+5% to -5% in steps of 2.5%			
9.21	Terminal Arrangement				
	a) H.V	Cable box suitable for 1Rx3Cx95 sq.mm XLPE cable.			
	b) L.V	Cable box with aluminium gland plate suitable for 20Rx1Cx400 sq.mm PVCFRLS cable			
9.22	*No Load Losses[Watts]	2200 (max)			
9.23	*Load Losses[Watts]	22000 (max)			
9.24	*Impedance(Z)[Percentage]	6.25%			
9.25	Paint	Enamel Light grey,Shade No.632 of IS: 5			
* - Subject to IS tolerance					
10	STANDARD FITTINGS AND ACCESSORIES				
S.NO	DESCRIPTION	QUANTITY			
1	Rating and terminal marking plate	One			
2	Earthing Terminals	Two			
3	Lifting Lugs (minimum)	Two			
4	Off-circuit tap switch	One			
5	Conservator with Drain plug	One			
6	Oil filling hole with cap	One			
7	Oil Level Indicator	One			
8	Dehydrating Silicagel Breather	One			
9	Air release device	One			
10	Thermometer pocket	Two			
11	Drain cum filter valve with blanking plate	One			
12	Filter valve with blanking plate	One			
13	Explosion vent with Diaphragm	One			
14	Radiators (Detachable)	Adequate			
15	Bi-directional Flat Rollers	Four			
16	Separate Neutral Terminal	One			
17	Gas & Oil Relay with A&T Contacts	One			
18	OTI for Alarm and Trip Contacts (micro switch type)	One			
19	WTI for Alarm and Trip Contacts(micro switch type)	One			

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20	Marshalling Box	One			
21	Jacking Lugs	Four			
22	MOG with LOLA contacts	One			
23	Inspection cover	One			

SNO	DESCRIPTION OF BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
24	Equaliser pipe	One			
25	NCT(3000/1A,5P20,20VA)&(300/1A,CLPS)	One			
26	Sampling valves	Two			
27	Earth quake clamps	One			
28	5 ltrs paint Tin for touch up at site	Provided			
29	PRV	One			
11.0	Technical offer in DUPLICATE must have 3 view GA drawing with complete details of parts / components, Weight of transformer.	Vendor to offer & confirm			
12.0	Supplier must submit point wise reply to specification, Deviations if any must be seperately submitted with reasons for each.	Vendor to accept & confirm			
13.0.	REFERENCE LIST / QUALIFYING CONDITIONS :Vendor to submit, along with offer, reference list of customers where similar transformers have been supplied mentioning broad specifications of the supplied transformers	Required			
	Only those vendors, who have supplied and commissioned atleast one 11KV/415V Distribution type Indoor transformer of same or higher size for similar applications in the past five years and such transformer is working satisfactorily for more than one year, after commissioning, should quote. The following information should be submitted by the vendor about the companies where similar machines have been supplied. This is required from all the vendors for qualification of their offer.	Confirm			
	1. Name of the customer / company where similar machine is installed.				
	2. Complete postal address of the customer.				
	3. Month & Year of commissioning.				
	4. Application for which the transformer is supplied with details of accuracies achieved on the job.				
	5. Name and designation of the contact person of the customer.				
	6. Phone, FAX no. and email address of the contact person of the customer.				
	7. Performance certificate from the customers regarding satisfactory performance of transformer supplied to them				
	8. BHEL reserves the right to verify the information provided by vendor. In case the information provided by vendor is found to be false/incorrect the offer shall be rejected.				