

Standard GTP Format

Sl No	Technical parameters	To be filled in by the Tenderer
	(vi) 1min Discharge rate in Amp (vii) 30sec Discharge rate in Amp (viii) 1sec Discharge rate in Amp Tenderer shall furnish a graph showing Amps against time for the type of battery offered)	
11	Short Circuit Current (Amps)	
12	(i) Material of Cell Containers (ii) Material of Battery Box (iii) Trays	
13	Thickness, Type & Material of Separators	
14	Constructional details & Dimensions: Surface area plates of (i) Positive Plate (ii) Negative Plate in Sq.mm.	
15	(i) Ampere Hour efficiency (%) (ii) Watt Hour efficiency (%)	
16	(i) Recommended Float Charge Current & Voltage (ii) Recommended Boost Charge Current & Voltage	
17	Time required for Boost Charging from Discharged condition	
18	(i) Max. Charging Current/Cell (ii) Nominal Charging Rate	
19	(i) Whether explosion proof or vent plugs provided (ii) Whether vent is spill proof	
20	Type of Inter Cell connection & whether they are covered with plastic sleeves	
21	(i) Dimensions of each 2V Block/Cell a. Length (mm) b. Width (mm) c. Height (mm) (ii) Thickness of Container (mm)	

8. GUARANTEED AND OTHER TECHNICAL PARTICULARS FOR POWER/AUTO TRANSFORMERS (500MVA, 160 MVA, 50 MVA)

Sl. No.	Description	Unit	Specified by Buyer	Offered by manufacturer
1.	General Information i) Supplier ii) Name of Manufacturer iii) Place of Manufacture (Country & City) iv) Type of transformer (Core/Shell)			
2.	Applications i) Indoor/Outdoor ii) 2wdg/3wdg/Auto iii) GT/Step-down/ICT/Station Start-up/ Auxiliary/ Rail Trackside Supply			
3.	Corrosion Level at Site i) Light ii) Medium iii) Heavy iv) Very Heavy			

4.	Site altitude above mean sea level	M		--
5.	Seismic zone and ground acceleration at site (both in horizontal & vertical direction)			--
6.	Maximum and minimum ambient temperature at site			
7.	Applicable Standards i) IEC: 60076 ii) IS : 2026 iii) Any other, please specify			
8.	Rated Capacity / Full load rating (HV/IV/LV)	MVA		
9.	3-Phase/Bank of Three Single Phase (A,B,C)			
10.	Rated No Load Voltages (HV/IV/LV)	kV		
11.	Currents at normal tap (HV/IV/LV)	Amp		
12.	Rated Frequency	Hz		
13.	Connections and phase displacement symbols (Vector Group)			
14.	Weight Schedules (Minimum with no negative tolerance)			
	i) Active part (Core + coil)	Kg		
	ii) Insulating Oil (excluding mass of extra oil)	Kg		
	iii) Tank and Fittings	Kg		
	iii) Total weight	Kg		
	iv) Transportation Weight	Kg		

	v) Overall dimensions L x B x H	Mm		
	vi) Size of heaviest package L x B x H	Mm		
	vii) Weight of heaviest package	Kg		
	viii) Weight of 5% extra oil	kg		
	ix) Weight of core	Kg		
	x) Weight of copper (HV/IV/LV/ Regulating)	kg		
	xi) Insulating Oil volume (excluding 5% extra oil)	Ltrs		
	xii) Quantity of oil in OLTC	Ltrs		
15.	Transport limitation			
16.	LV Winding Stabilizing tertiary (Yes/No) Loaded (Yes/No)			
17.	Tappings i) Type (OLTC/OCTC) and make of tap changer ii) Position of Tapping on the winding iii) Variation on iv) Range of variation No. of Steps vi). Whether control suitable for: <ul style="list-style-type: none"> • Remote/local operation • Auto/manual operation vi) Parallel Operation Requirements	%		
18.	Impedance and Losses			
	i) Guaranteed No load loss at rated voltage and frequency	kW		

	Tolerance (to be considered for loss evaluation)	%		
	ii) Guranteed I ² R Loss at rated current & frequency (at 750C) at principal tap	kW		
	Tolerance (to be considered for loss evaluation)	%		
	iii) Eddy current and stray loss at rated current & frequency (at 750C) at principal tap	kW		
	iv) Load Loss(I ² R+Eddy and Stray) at rated current & frequency (at 750C)at principal tap	kW		
	v) Guaranteed Auxiliary loss at rated voltage and frequency	kW		
	Tolerance (to be considered for loss evaluation)	%		
	vi) Calculated Fan Loss	kW		
	vii) Calculated Pump Loss	kW		
	viii) Air core reactance of HV winding	%		
	ix) Guaranteed Impedance (at Highest MVA base)	%		
	(a) HV-IV (at Pricipal tap) (b) HV-LV(at Pricipal tap) © IV-LV(at Pricipal tap)			
	Tolerance			
	x) Impedance at extreme tappings at Highest MVA base [for HV-IV for 3winding transformer (or) HV-LV for two winding transformer] a) Max. Voltage tap b) Min. Voltage tap	%		
	Tolerance	%		

	xi) Zero sequence impedance at principal tap (for 3-phase transformers)			
19.	Capacitance to earth for HV/IV/LV	pF		
20.	Regulation at full load at 75 0C winding temperature at: a) upf b) 0.8 pf			
21.	Guaranteed maximum Magnetizing Current at rated Voltage	%		
22.	Efficiency: At 100% load upf 0.8 lead 0.8 lag At 75% load upf 0.8 lead 0.8 lag At 50% load upf 0.8 lead 0.8 lag	%		
23.	Load at Maximum efficiency	%		
24.	Any limitations in carrying out the required test? If Yes, State limitations			
25.	Fault level of system (in kA) and its duration (in sec)	kA (sec)		
26.	Calculated short Circuit current (in kA) withstand capability for 2 seconds(3 seconds for generator transformers) without exceeding temperature limit (i.e. Thermal ability to withstand SC current)	kA		
27.	Test current (in kA) and duration (in ms) for short Circuit current test (i.e. Dynamic ability to withstand SC)	kA & msec		
28.	Over fluxing withstand time (due to combined voltage & frequency fluctuations): 110% 125% 140% 150% 170%	msec		
29.	Free space required above the tank top for removal of core			

30.	Maximum Partial discharge level at $1.58 U_r/\sqrt{3}$	pC		
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A. MAGNETIC SYSTEM

Sl. No.	Description	Unit	Specified by Buyer	Offered by manufacturer
1.	Core Type: i) 3 Phase 3 Limb (3 wound limbs) ii) 3 Phase 5 Limb (3 wound limbs) iii) 1 Phase 2 Limb (2 wound limbs) iv) 1Phase 3 Limb (1 wound limb) v) 1 Phase 4 Limb (2 wound limbs) vi) 1Phase 5 Limb (3 wound Limbs)			
.	Type of Core Joint: i. Mitred ii Step Lap			
3.	CRGO: i) Make & Country of Origin ii). Thickness, mm iii) Max. Specific loss at 1.7 T, 50Hz, in Watts/kg iv) Grade of core as per BIS v) Insulation between core lamination v) BIS certified (Yes/No)			
4.	Minimum Gross & Net Area of: 1). Core ii) Limb iii) Yoke iv) Unwound limb (May be verified during manufacturing stage – at the discretion of buyer)	cm ²		
5.	Stacking Factor	%		
6.	Voltage per turn	V		
7.	Apparent Core Density for Weight Calculation			
8.	Minimum Net Weight of Silicon Steel Lamination CRGO (may be verified during manufacturing stage by calculation)	Kg		

9.	Maximum Flux density at 90%, 100% and 110% voltage and frequency(may be verified during manufacturing stage by calculation)	T			
10.	W/kg at working flux density				
11.	Building Factor Considered				
12.	Calculated No Load Loss at rated voltage and Frequency(Net Weight x W/kg x Building factor)	kW			
13.	Magnetizing inrush current	Amp			
14.	No load current at normal ratio and frequency for :85% of rated voltage 100% of rated voltage 105% of rated voltage	Amp			
15.	Core Isolation test	kV			
16.	Core bolt in limb / yoke	Yes/No			
17.	Core bolt insulation withstand voltage for one minute	kV			
18.	Maximum temperature rise of any part of core or its support structure incontact with Oil	0C			

B. CONDUCTING SYSTEM

Sl. No.	Description	Unit	Offered by manufacturer			
			HV	IV	LV	Regulating
1.	Type of Winding Helical/Disc/Layer/inter wound					

2.	Type of Conductor PICC/CTC/CTCE/CTCEN/BPICC					
3.	Minimum Yield Strength of Conductor for 0.2% elongation	N/mm ²				
4.	Maximum Current density at CMR and conductor area at any tap: i) HV ii) IV iii) LV	A/mm ² & sq. mm				
5.	Maximum current density under short circuit: i) HV ii) IV iii) LV	A/mm ²				
6.	Bare Weight of copper without paper insulation and lead (Minimum)	Kg				
7.	Per Phase Maximum resistance of winding at rated tap at 75 °C	ohm				
8.	Number of Turns/Phase					
9.	Insulating material used for HV/IV/LV winding					
10.	Insulating material used between : i) HV and IV winding ii) IV and LV winding iii) LV winding and core iv) Regulating winding and adjacent winding/core					
11.	Details of special arrangement provided to improve surge voltage distribution in the winding.					
12.	Dielectric Shielding used: i) Interleaved winding ii) Wound in Shield iii) Others					
13.	Magnetic Shielding used: i) Yoke Shunt on core clamp ii) Magnetic shunt on tank iii) Electromagnetic (Copper/Aluminum) shield on tank iv) Others					
14.	Noise level when energized at normal voltage and frequency without load	dB				

C. COOLING SYSTEM

Sl. No.	Description	Unit	Specified by Buyer	Offered by manufacturer
1.	Type of Cooling [ONAN (or) ONAN/ONAF (or) ONAN / ONAF / OFAF (or) ONAN / ONAF/ODAF etc.]			
2.	Percentage Rating Corresponding to Cooling Stages (HV/IV/LV)			
3.	No. of Cooler banks (2x50% / 2x100% / 1x100% etc.)			
4.	Temperature gradient between windings and oil			
5.	Time in minutes for which the transformer can run at full load without exceeding maximum permissible temperature at reference ambient temperature when supply to fans and / or pumps is cut off	min		
6.	Guaranteed Maximum Temperature rise at 1000 mts. altitude and at actual altitude at site at ambient temperature at cooling specified at sl. No. 1: i) Top Oil by thermometer ii) Average Winding by resistance iii) Winding hot spot	0C		
7.	Type of Cooler: i) Radiator Bank ii) Oil to Air Heat Exchanger (Unit Cooler) iii) Oil to Water Cooler (Single Tube) iv) Oil to Water Cooler (Double Tube) v) Tank Mounted vi) Header Mounted vii) Separately Mounted viii) Degree of Protection of terminal box			
8.	Cooling Fans: i) Type ii) Size iii) Rating (kW) iv) Supply voltage v) Quantity (Running + Standby) per cooler bank vi) Whether fans are suitable for continuous operation at 85% of their rated voltage calculated time constant: <ul style="list-style-type: none"> natural cooling forced air cooling vii) Degree of Protection of terminal box			
9.	Oil Pumps: i) Type ii) Size iii) Rating (lpm and kW) iv) Supply voltage v) Quantity (Running + Standby) per cooler bank vi) Efficiency of motor at full load vii) Temperature rise of motor at full load viii) BHP of driven equipment			

10.	Coolers (Oil to Air): i) Quantity (Running + Standby) ii). Type and Rating			
11.	Coolers (Oil to Water): i) Quantity (Running + Standby) ii) Type and Rating iii) Oil flow rate (lpm) iv) Water flow rate (lpm) v) Nominal Cooling rate (kW) vi) Material of tube			
12.	Radiators: i) Width of elements (mm) ii) Thickness (mm) iii) Length (mm) iv) Numbers			
13.	Cooler loss at rated output, normal ratio, rated voltage, rated frequency at ambient temperature of 50°C	kW		

D. DIELECTRIC SYSTEM

Sl. No.	Description	Unit	Offered by manufacturer				
1.	Geometric Arrangement of winding with respect to core: g: Core-LV-IV-HV-Reg Coarse-Reg Fine						
2.	Regulating Winding: i) Body Tap ii) Separate						
3.	HV Line Exit point in winding: i) Top ii) Center						
4.	Varistors used across Windings If yes, Details	Yes/No					
5.	Insulation Levels of windings		HV	IV		HV-N	IV-N
	i) Lightning Impulse withstand voltage (1.2/50μs)	kVp					

	ii) Chopped wave Lightning Impulse withstand voltage	kVp					
	iii) Switching Impulse withstand voltage (250/2500μs)	kVp					
	iv) Power frequency withstand voltage	kVrms					
	(one minute / 5 minutes)						
6.	Tan delta of windings at ambient temperature	%					

E. ACCESSORIES

Sl. No.	Description	Unit	Offered by manufacturer	Specified by Buyer
1.	Tap Changers			
	i) Control a-Manual b-Automatic- Remote d-Local			
	ii) Voltage Class and Current Rating of Tap Changers			
	iii) Make and Model			
	iv) Make and Type of Automatic Voltage Regulator (AVR)			
	v) Tie-in resistor requirement (to limit the recovery voltage to a safe value) and its value			
	vi) OLTC control and monitoring to be carried out through Substation Automation System.	Y/N		
	vii) Power Supply for control motor (No. of Phases/Voltage/Frequency)			
	viii) Rated Voltage for control circuit (No. of Phases/Voltage/Frequency)	V		
2.	Tank			
	i) Tank Cover: Conventional/Bell/Bottom Plate			
	ii) Material of plate for tank			
	iii) Plate thickness : side, bottom, cover	mm		
	iv) Rail Gauge	mm		
	v) Minimum Clearance height from rail for lifting Active Part	mm		
	vi) Wheels : Numbers/Plane/Flanged/Uni-Directional/Bi-Directional/Locking Details			
	vii) Vacuum withstand Capability a) Tank b) Radiators/Conservator/Accessories	mm of Hg		

	High Pressure withstand Capability Tank Radiators/Conservator/Accessories	mm of Hg					
	ix) Radiator fins/ conservator plate thickness	mm					
	x) Tank Hot spot temperature	O C					
3.	Bushings:		HV	IV	LV	HV-N LV-N	
	i) Termination Type a). Outdoor b) Cable Box (oil/Air/SF6)c- Plug in Type						
	ii) Type of Bushing: OIP/RIP/RIS/oil communicating						
	iii) Bushing housing - Porcelain / polymer						
	iv) Rated Voltage Class	kV					
	v) Rated Current	A					
	vi) Lightning Impulse withstand voltage (1.2/50µs)	kVp					
	vii) Switching Impulse withstand voltage (250/2500µs)	kVp					
	viii) One minute Power frequency withstand voltage(dry & wet)	kVrms					
	ix) Minimum Creepage Distance	mm					
	x) Quantity of oil in bushing and specification of oil used						
	xi) Make and Model						
	xii) Tan delta of bushings	%					
	xiii) Max Partial discharge level at Um	pC					
	xiv) Terminal Pad details						
	xv) Weight of assembled bushings	kg					
	xvi) Whether terminal connector for all bushings included in the scope of supply						
4.	Minimum clearances between bushings (for HV, IV and LV) i) Phase to phase ii) Phase to ground						
5.	Indicator / Relay						

	i) Winding temperature thermometer/ indicator Range Accuracy		
	ii) Oil temperature thermometer/ indicator Range Accuracy		
	iii) Temperature sensors by fiber optic (if provided)		
	iv) Oil actuated/gas operated relay		
	v) Oil level Indicators: Main Conservator OLTC Conservator		
	vi) Oil Sight Window: Main Tank Main Conservator OLTC Conservator		
6.	Conservator: i) Total volume ii) Volume between highest and lowest visible oil levels		
7.	Conservator Bag (air cell) i) Material of air cell ii) Continuous temperature withstand capacity of air cell		
8.	Air cell rupture relay provided	Yes / No	
9.	Pressure Relief Device: i) Number of PRDs provided ii) Location on the tank iii) Operating pressure of relief device		
10.	Sudden Pressure Relay / Rapid Pressure rise relay provided; if yes, i) Location on the tank ii) Operating pressure	Y/N	
11.	Dehydrating Breathers (Type & No. of breathers) a) For main Conservator tank b) For OLTC conservator		
12.	Flow sensitive Conservator Isolation Valve Provided	Y/N	
13.	Tap Changer protective device		
14.	Type and material of gaskets used at gasketed joints		
15.	Bushing CTs: (HV side and IV/LV side) i) Voltage class ii) No. of cores iii) Ratio iv) Accuracy class v) Burden vi) Accuracy limit factor vii) Maximum resistance of secondary winding viii) Knee point voltage	kV VA Ω V A	

	ix) Current rating of secondaries		
16.	Neutral CTs: i) Voltage class ii) No. of cores iii) Ratio iv) Accuracy class v) Burden vi) Accuracy limit factor vii) Maximum resistance of secondary winding viii) Knee point voltage ix) Current rating of secondaries	kV VA Ω V A	
17.	Transformer Oil i) IS 335 / IEC60296 / as per specification ii) Inhibited/ un-inhibited iii) Mineral / Natural Ester / Synthetic Ester iv) Spare oil as percentage of first filling v) Manufacturer vi) Quantity of oil (before filling and before commissioning) vii)Moisture vii) content (mg/L or ppm) viii) Tan delta (Dielectric Dissipation Factor) at 90oC ix) Resistivity (Ω -cm))		
	x) Breakdown Voltage (before and after treatment) (kV) xi) Interfacial tension at 20 oC (N/m) xii) Pour point (oC)xii)Flash point(oC) xiii) Acidity (mg KOH/gm) xiv) Inhibitors (for inhibited oil) (%) xv) Oxidation Stability		
18.	Press Board: i) Make ii) Type		
19.	Conductor Insulating Paper i) Kraft paper ii) Thermally upgraded Kraft paper iii) Nomex		
20.	Provision for fire protection system (as per spec), if yes, provide details	Y/N	
21.	Insulation of core bolts, washers, end plates etc.		
22.	Weights and Dimensions: i) Weights: a) Core b) Windings c) Tank d) Fittings e) Oil f) Total weights of complete transformers with oil and fittings ii) Dimensions; a) Overall Height above track b) Overall length c. Overall breadth		

	iii) Minimum bay width required for installation of the transformer iv) Weight of the heaviest package of the transformer arranged for transportation.		
23.	Lifting Jacks i) Number of jacks included ii) Type and Make iii) Capacity iv) Pitch v) Lift v) Height in close position		
24.	Rail Track gauges 1. Rails or 3 rails or 4 rails 2. Distance between adjacent rails on shorter axis 3. Distance between adjacent rails on longer axis		

F. NIFPS SYSTEM FOR TRASFORMER

Sl. No	Particulars	To be filled in by theTenderer
	Name of Manufacture of Nitrogen Injection Fire Protection System.	
	Details of system equipments for NIFPS	
	Fire Extinguishing Cubicle (FEC) of NIFPS	
1	Dimensions (LXBXH) mm	
	Weight Kg	
	Capacity of Nitrogen cylinder	
	Number of cylinders	
	Minimum distance of FE cubicle from the transformer	
	Method of mounting	
	Whether the following items are provided in FE cubicle. If so furnish make, type & other details.	
	Contact manometer	
	Pressure Regulator	
	Oil Release Unit	
	Gas release unit	
	Oil drain assembly	
	Pressure /limit switches	
	No of contacts & spare contacts (NO & NC)	
	Oil drain valve (above FEC)	
	Make	
	Type	
	Size	
	Type of metal	
	Nitrogen Injection Valve (above FEC)	
	Make	
	Type	
	Size	
	Oil drain pipe	
	Size	
	Length	
	Number of openings in the transformer tank	
	Material	

2	Control Box of NIFPS	
	Dimensions (LXBXH) mm	
	Weight	
	Type & Thickness of sheet steel	
	Details of components provided in the control box	
	Control voltage	
	Method of mounting	
	Whether audio and visual alarms provided?	
3	Transformer Conservator Isolation Valve of NIFPS	
	Make	
	Type	
	Location	
	Whether suitable for pipe of size 80mm dia	
	No of contacts & spare contacts (NO &N)	
	Padlocking provision	
4	Detectors of NIFPS	
	Make	
	Type	
	Quantity required	
	Method of fixing	
	Effective heat sensing area	
	Temperature recommended for effective heat sensing	
	Number of contacts NO/NC	
5	Power Supply of NIFPS	
	Control box	
	FEC (lighting)	
	Extinction period	
	On system activation	
	On commencement of Nitrogen injection	
6	FEC suitable for capacity of NIFPS	
	Dimensions (LXBXH) mm	
	Weight	
	Nitrogen cylinder capacity	
7	Control Box of NIFPS	
	Dimensions (LXBXH) mm	
	Weight	
8	Detectors of NIFPS	
	Heat sensing temperature	
	Time of Operation	Transformer Tank Explosion Prevention
	For system activation	
	For reduction of pressure in Tank by Nitrogen release	
	Any other technical details not covered above	

5. FIRE FIGHTING SYSTEM

Sl.No.		To be filled in by the
1	Name and Address of the Fire Protection System Supplier	