GUARANTEED PARTICULARS FOR POWER TRANSFORMER 50/65 MVA, 11/66 kV

Design Conditions and Operating Data		
Ambient Temperature)	Max: 40 deg. C	Min: 11.5 Deg. C
Relative Humidity	Max: 95 %	Min: 48%
Altitude above sea level	<=1000 m	
Wind Speed	Average = 280 km/hour, 3 sec Gust	
Outdoor	Yes	
Seismic factor (horizontal)	None	
Service	Continuous Operation	
Temperature Rise: Windings Oil Hottest Spot	 60 deg. C 55 deg. C 68 deg. C	
Climatic conditions	The climate in Mauritius is of tropical and maritime type and the atmosphere is subject to sea mist, which means the atmosphere is corrosive and salty.	
Special Conditions	The transformer is intended to be connected to generator through 11kV switchgear in such a way that it shall be able to withstand 1.4 times rated voltage for 5 s subject to load rejection conditions.	
General Requirement and Ratings		
Transformer Name	TX 6	TX 7
Continuous Rating	50/65 MVA under the specified conditions for temperature and humidity	
Max. Rating (Without fans)	50 /65 MVA, at all taps	
Number of windings	2	
Number of phases	3	
Core Type	3-PHASE, 3-LIMB TYPE	
No. of limbs	3	
Windings insulation class	A	

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Winding conductor materials: Primary Secondary	 COPPER COPPER
Type of cooling	ONAN/ONAF
Rated power	50/65 MVA
Vector Group	YNd11
Rated Frequency	50 Hz
System Earthing Method of: H.V side L.V. side	Solidly Earthed NA
Overload Condition	As per IEC
Losses in kW No load (iron) losses Load (copper) losses Total losses in kW	 22 kW Maximum 169 kW Maximum @ 65MVA 193 kW Maximum @ 65 MVA including Aux. Losses
Rated voltage (Un): HV side at No Load LV side at No Load	 66 kV 11 kV
Highest Voltage (r.m.s) (Um): HV side LV side	72.5 kV continuously 12 kV
Insulation level (peak): HV windings LV windings HV line bushings HV Neutral bushing LV bushings	 325 kVp 75 kVp 325 kVp 170 kVp 75 kVp
Power Frequency Test Voltage 1 min (r.m.s): HV windings LV windings HV line bushings HV Neutral bushing LV bushings	 140 kV rms 28 kV rms 140 kV rms 70 kV rms 28 kV rms
Max. sound pressure level @0.3m	As per IEC 60076-10
Max. sound power level	As per IEC 60076-10

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Transformer type	Oil immersed
Type of enclosure: HV side LV side Auxiliary box (es) Control Panel (s) On load Tap changer control box	 Bare OIP Bushings Air insulated Cable box Yes,IPW55 Yes,IPW 55 Yes, IPW 55
Type of Earthing of 11 kV system	Neutral earthed on generating unit star point side via neutral resistor
Short-circuit capability at 66 kV	As per specification
Impedance voltage, principal tap	At least 12 %
Parallel operation	Yes, operated in parallel between new ones to be supplied under this contract
Connections	
Types of connections: HV side LV side	 Bushings with a creepage distance not less than 32mm/kV of highest system voltage (phase/phase) Air Insulated, according to specification for transformer, Section 9.2
Bushings: HV side Neutral	 OIP bushings Open Porcelain bushings
Chamber and terminal box filling: LV side	 Air filled cable box
Cable box entry: LV side	 Bottom Entry
Cable type: HV side LV side	 As per specification As per specification
Surge arresters (*complete with supports*) : HV side	 Not Applicable

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Equipment		
Tap Changer: Type Make On load motor operated: Manual controlled: Remote controlled: Voltage variation per tap in % Number of tapping Principal tapping Maximum tapping Minimum tapping Remote tap changer panel	 On Load motor-operated ABB, Sweden Yes, for maintenance Yes, manual Refer to Section 10.3 & 10.4 1.5 15 0 +7 -7 Yes	
Skids	Yes	
Jacking lugs & lifting eyes	4 & 4 No(s)	
Earthing bolts / terminals	2 No(s)	
Rating plate (stainless steel)	Yes	
Detachable radiators	Yes	
Valves f. radiators – 2 per radiator	Yes	
Cooling Fans and Quantity	Yes 4 Running + 2 stand by fans	
Marshalling box	Yes	
Control Panel	Yes	
Cooling liquid: Supplied by Make How to be shipped	ABB India Limited Apar Industries limited, India Make Transformer tanks to be shipped filled with oil. Separate oil will be shipped in drums	
	Main Tank	**Tap changer**
Oil conservator with rubber sack diaphragm (only for main tank)	Yes	Yes
Conservator insulating valve	Yes	Yes
Conservator drain valve	Yes	Yes
Conservator breather	2 in parallel	2 in parallel
Top valve(s)	1 No. 50 mm bore	1 No. (25 mm)
Bottom valve(s)	1 No. 50 mm bore	
Drain valve(s)	1 No. 80 mm	
Liquid sampling devices	2	1
No. of thermometer pockets	2 + 1 spare	1
Buchholz isolating valves	2	2
Pressure relief	Yes	Yes

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Protective Devices				
	Main Tank	**Tap changer**	**Alarm contact**	**Trip contact**
Oil level gauge adjusted at 25°C	Yes at 30deg.C	Yes at 30deg.C	Yes (Low level	NA
Dial type thermometer for oil temp with max. temp indicator	Yes	No	2	2
Thermal image protection for HV&LV winding with max temp indicator	Yes	No	2	2
Buchholz relay	Yes	Yes	1	1
Pressure relief device	Yes	Yes	NA	2
PT100 for temp measurement: HV windings LV windings Oil	 Yes Yes Yes			
Current Transformers: HV side LV side HV Neutral On tank	 No. 1 for thermal image protection 600/1A; CL3; FS5; 20VA No. 1 for thermal image protection 3500/1A; CL3; FS5; 20VA one CT: Core 1 - 600/1, CL5P20; 10 VA (for REF prot.) Toroidal type CT 100/1, CL5P10, 10 VA for tank leakage			
Surface treatment	As per Specification			
Tank outside/Inside	As per Specification			
Radiators inside/Outside Colour code	As per Specification RAL 7031			
One Spare change of silica gel for each TX	Noted and Confirmed			
Physical Dimensions in mm: Height Length Width	Overall Dimensions : 5840 mm approx 7780 mm approx 4670 mm approx			

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Weight in kg: Copper Core and windings Tank and fittings Conservator tank Total weight of TX	 14200 Kgs approx. 52300 Kgs approx 14950 Kgs approx 850 Kgs approx 86150 Kgs approx
Liquid: Weight Liquid quantity in Liters	 18050 kg Approx 20300 Litres Approx
Material thickness in mm: Tank wall Tank base Tank cover Conservator tank Radiators	 8 mm approx 16 mm approx 16 mm approx 6 mm approx 1 mm approx

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GUARANTEED PARTICULARS FOR INSULATING OIL

MINERAL INSULATING OIL FOR TRANSFORMER

Item No.	Description	Unit	Offered
1.	Sludge Value (max.)	%	As per IEC60296
2.	Acidity after oxidisation (max.)	mg KOH/g	As per IEC 60296
3.	Flash point (closed) (min.)	ºC	As per IEC 60296
4.	Viscosity (a) at 15ºC (max.)	mm^2/s	As per IEC 60296
	(b) at 20ºC (max.)	mm^2/s	As per IEC 60296
5.	Pour point (max.)	ºC	As per IEC 60296
6.	Electric strength (breakdown) min. for oil received in Mauritius in drums	kV/mm	As per IEC60296
7.	Acidity (neutralization value) (max.)	mg KOH/g	As per IEC60296
8.	Corrosive sulphur		As per IEC60296
9.	Water content (max.) for oil received in Mauritius in drums	p.p.m.	As per IEC 60296
10.	Density at 20ºC (max.)	g/ml	As per IEC 60296
11.	Loss tangent at 90ºC (max.)		As per IEC 60296
12.	Resistivity		As per IEC 60296
13.	Polycyclic aromatic content (IP 346)	%	As per IEC 60296
14.	Polychlorinated Biphenyls	(mg/kg)	free PCB
15.	Reference of standard specifications		As per IEC60296
16.	Are any precautions to be taken in compliance with the EEC Dangerous Substance Directive 67/548/EEC?		Not required/ As per specification

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