



## Transformer Data Sheet 275/13.8/13.8 kV, 140/70/70 MVA, ONAN/ONAF, 3 phase

### Transformer Details

Continuous Maximum Rating		
HV – LV1 and HV – LV2	MVA	47/70 – 47/70
HV – (LV1 + LV2)	MVA	94/140
HV Voltage	(kV)	275
LV1 – LV2 Voltage	(kV)	13.8 – 13.8
Tapping Range (OLTC)		275 kV -19.5% to +25.5% 31 positions, 30 x 1.5% steps Principal tap shall be position 18
Impedance at principal tap – position 18 (%)		
HV – LV1 and HV – LV2 @ 70 MVA		14.0%
HV – (LV1 + LV2) @ 140 MVA		15.6%
LV1 – LV2 @ 70 MVA		25.0%
Vector Group		YNd11-d11
Cooling		ONAN/ONAF
Maximum Top Oil Rise	(°C)	60
Maximum Average Winding Rise	(°C)	65
Frequency	(Hz)	50
Connections:		
HV		Oil/air bushings
HVN		Oil/air bushing
LV		Oil/air bushing
Finish Shade		BS 381C – 632 Dark Admiralty Grey
Maximum Sound Pressure Level		
Transformer only	dB(a)	65
Transformer plus coolers	dB(a)	68
BIL HV/LV	kVp	1050/125
BIL HVN	kVp	125
SIL HV (kVp)	kVp	850
IVPD enhanced level		1.8
IVPD one-hour level		1.58
Applied Voltage		
HV to LV and earth	kV <sub>rms</sub>	395
LV to HV and earth	kV <sub>rms</sub>	38



Guaranteed Losses		Transformer losses shall be such as to comply with EU 548/2014, Tier 2 July 2021.
Minimum efficiency		99.770%.



## Technical Schedules

Item	Units	Specified by Company	Guaranteed by GE
Continuous Maximum Rating			
HV – LV1 and HV – LV2	MVA	47/70 – 47/70	47/70 – 47/70
HV – (LV1 + LV2)	MVA	94/140	94/140
HV Voltage	(kV)	275	275
LV1 – LV2 Voltage	(kV)	13.8 – 13.8	13.8 – 13.8
Tapping Range (OLTC)		275 kV -19.5% to +25.5% 31 positions, 30 x 1.5% steps Principal tap position 18	275 kV -19.5% to +25.5% 31 positions, 30 x 1.5% steps Principal tap position 18.
Impedance at principal tap – position 18			
HV – LV1 and HV – LV2 @ 70 MVA		14.0%	14% (IEC tolerance +/- 7.5%)
HV – (LV1 + LV2) @ 140 MVA		15.6%	15.6% (IEC tolerance +/-10%)
LV1 – LV2 @ 70 MVA		25.0%	25% (IEC tolerance +/-10%)
Impedance at maximum tap position 1			
HV – LV1 and HV – LV2 @ 70 MVA		-	16.4% (IEC tolerance +/-10%)
HV – (LV1 + LV2) @ 140 MVA		-	17% (IEC tolerance +/-10%)
LV1 – LV2 @ 70 MVA		-	TBA
Impedance at minimum tap position 31			
HV – LV1 and HV – LV2 @ 70 MVA		-	15.2% (IEC tolerance +/-10%)
HV – (LV1 + LV2) @ 140 MVA		-	15.9% (IEC tolerance +/-10%)
LV1 – LV2 @ 70 MVA		-	TBA
Vector Group		YNd11-d11	YNd11-d11
Cooling		ONAN/ONAF	ONAN/ONAF
Maximum Top Oil Rise	(°C)	60	60k
Maximum Average Winding Rise	(°C)	65	65k
Frequency	(Hz)	50	50
Connections:			
HV		Oil/air bushings	Oil/air bushings
HVN		Oil/air bushing	Oil/air bushings
LV		Oil/air bushing	Oil/air bushings
Finish Shade		BS 381C – 632 Dark Admiralty Grey	BS 381C – 632 Dark Admiralty Grey
Maximum Sound Pressure Level			
Transformer only	dB(a)	65	65 @1m. Sound Intensity method
Transformer plus coolers	dB(a)	68	68 @2m. Sound Intensity method
BIL HV/LV	kVp	1050/125	1050/125
BIL HVN	kVp	125	125
SIL HV (kVp)	kVp	850	850 (IEC60076-3 – Table 2)
IVPD enhanced level		1.8	1.8



IVPD one-hour level		1.58	1.58
Applied Voltage			
HV to LV and earth	kV <sub>rms</sub>	395	395
LV to HV and earth	kV <sub>rms</sub>	38	38
Guaranteed Losses			
No load	kW	EU 548/2014, Tier 2 July 2021	54 @1pu rated Voltage.
Full load	kW	EU 548/2014, Tier 2 July 2021	440 @ 140MVA, both LV's loaded on Nom Tap Pos 18
Minimum efficiency		99.770%.	99.78%



Core Detail	GE Transformer
Core construction, step-lap etc.	Core type, step lap.
Type of core - 3 limb, 5 limb, etc.	3 Limb.
Core plate material type	M105-30P5.
Core plate material thickness (mm)	0.3
Core diameter (mm)	773
Core area (mm <sup>2</sup> )	432400
Flux density at 100% volts & 50 Hz (Tesla)	1.65
Core weight excluding clamps (kg)	51000
Core weight including clamps (kg)	Approximately 55850.
Clamping type, tie-rod, flitch plate	Flitch Plate.
Tie rod diameter, flitch plate thickness (mm)	10
Top/Bottom clamp thickness (mm)	70 / 50
Method of securing (bands, belts etc.)	Bands.



Winding Detail	GE Transformer			
Winding disposition core/___/___/___	LV1 Bottom - LV2 Top / HV / Taps			
Winding name	LV1 Bottom	LV2 Top	HV	Taps
Winding type - spiral/disc etc.	Layer	Layer	Shielded Disc	Disc
Total turns	87	87	1031	240
Total no. of discs/sections	2 layers	2 layers	2 x 70	2 x 32
Turns/disc or section	43.5 T/layer	43.5 T/layer	15	7.5
Min cooling gap between discs/sects (mm)	3	3	4	4
Copper hardness	80MPA	80MPA	80MPA	140MPA
Conductor type	Netted/mylar CTC	Netted/mylar CTC	CTC	Strip
For CTC - No. strips in l1el	37	37	9	N/A
Bare conductor size (mm)	4.35 x 1.7	4.35 x 1.7	4.8 x 1.3	9 x 2.6
No. conductors in l1el	2	2	1/half stack	2/half stack
Epoxy bonded Y/N	Y	Y	Y	N
Conductor ins - radial enamel/paper (mm)	0.04/0.075 mylar	0.04/0.75 mylar	0.04/0.55	N/A / 0.55
Conductor area (mm <sup>2</sup> )	520.4	520.4	108.5	91.4
Max current density @ CMR (A/mm <sup>2</sup> )	3.25	3.25	2.71	3.22
Wdg ID/OD (mm)	807 / 977	807 / 977	1109 / 1377	1507 / 1625
Wdg pressed height (mm)	2130 over LV1 + LV2	2130 over LV1 + LV2	2090	1518
Final clamping pressure (kN/mm <sup>2</sup> ). Based on worst case end force.	3.7	3.7	3.7	3.7
Shield wire used Y/N	N	N	Y	N
Dimensions and ins of shield wire	N/A	N/A	9.7x1 with 0.55 rad PC	N/A
Winding gradient to oil (°C) (ONAF)	13k calc	13k calc	15k calc	17k calc
Max winding hotspot temperature (°C) (ONAF)	69k rise	69k rise	72k rise	74k rise
Position of max wdg hotspot	Top 2 turns	Top 2 turns	Top 2 discs	Top 2 discs



Tank and Fittings	GE Transformer
Tank material	Mild Steel
Sheet thickness (mm) Bottom Sides Top	25 10 25
Tank external dimensions L/W/H (m)	Refer to Tender General Arrangement Drawing Enclosure 12.1
High/Low kerb?	Low
Tank vacuum withstand (mm of Hg)	0.75 inside tank
Tank overpressure withstand (kPa)	Normal head plus 35 kPa
Tank suitable for skidding in both axes?	Yes
Detail tank wall shunt/flux rejectors	Tank magnetic shunts 15mm thick
Conservator thickness (mm)	8
Conservator size - diameter x length (mm)	Refer to Tender General Arrangement Drawing
Volume between high/low levels (litres)	Refer to Tender General Arrangement Drawing
No. of radiators	20
Radiator height (m)	2.5
No. of radiator elements	28