

REQUEST FOR INFORMATION
FOR 400/170 KV,
650 MVA LOW NOISE OUTDOOR THREE-PHASE AUTO-TRANSFORMER,
SOUND POWER LEVEL 93 DBA

1. Rating

	Three phase auto-transformer (line-to-line)
1.1 Continuous throughout rating with full forced cooling (MVA) at 65 ⁰ K and 25 ⁰ C average yearly temperature of the external cooling medium	650
1.2 Continuous rating of tertiary winding with full forced cooling (MVA)	150
1.3 Rated winding voltage at principal tap	400/170/ $U_{ter_{rated}}$
1.4 Rated ratio at maximum tap (kV/kV/kV)	*400/170+a%/ $U_{ter_{min}}$
1.5 Rated ratio at minimum tap (kV/kV/kV)	*400/170-b%/ $U_{ter_{max}}$

1. **170.8+15% shall be equal to 195.5 kV**
2. **170.8-10% shall be equal to 153 kV**
3. $U_{ter_{rated}}$ -is the rated voltage of tertiary winding at principal tapping (see clause
4. $U_{ter_{max}}$ - is the maximum rated step voltage of the tertiary winding.
5. $U_{ter_{min}}$ - is the minimum rated step voltage of the tertiary winding.

2. Three-Phase Auto-Transformer Main Parameters

Rated Power [MVA]	Sound Power Level dB(A) ^(a)	OLTC ^(b)	Cooling Method ^(c)	Connection group	Bushing Type ^(d)	
					400 kV	170 kV
650	93	common neutral	OFAF or ODAF	YNa0d	Oil-air,	Oil-air

^(a)The guaranteed maximum sound power level of the three-phase auto-transformer, under full load with all cooling sections (coolers) in operation shall be up to 93 dBA at any tap-changer position.

^(b) See above clause 1

^(c) The coolers shall be low-noise type and **shall be mounted directly on the auto-transformer tank**

^(d) The bushings insulating body shall be resin-impregnated paper (RIP) type. The outer insulation shall be made from silicone rubber

3. The guaranteed impedance at 75⁰C measured between HV (400 kV) and LV (170 kV) winding terminals shall be not less than 22.1% (based on 650 MVA) at all the tapping positions. The highest impedance should be at maximum tap, and the lowest impedance at minimum tap. The highest impedance shall not exceed 24.8%.

4. Rated insulation level:
 - 4.1. LI:
 - 4.1.1. 400 kV line terminal -1425 kV peak
 - 4.1.2. 170 kV line terminal - 650 kV peak
 - 4.1.3. neutral end terminal - 250 kV peak
 - 4.1.4. TV winding terminal - Manufacturer's choice, shall be minimum 200 kV peak
 - 4.2. Rated switching impulse withstand voltage: 400 kV line terminal -1050 kV peak.
 - 4.3. Power frequency withstand voltage kV (r.m.s)
 - 4.3.1. 170 kV line terminal -275 kV r.m.s
 - 4.3.2. neutral end terminal - 95 kV r.m.s.
 - 4.3.3. TV winding - Manufacturer's choice, shall be minimum 70 kV r.m.s.
5. Overload capability according to IEC 60076-7/2018
6. Dimensions and Weights

Overall dimensions and Weights	Auto-transformer with oil-air bushings on 400 kV terminals		
a1. Dimensions (m) with sound reduction walls (where applicabale)	Length	Width	Height
	15*	8	12*
a2. Dimensions (m) without sound reduction walls	13*	6	12*
b. Total Weight (t)	400		
c. Shipping Weight (t)	300		

*The length and height values are for the auto-transformer completed mounted (conservator, cooling system, bushings) and include the sound reduction means (sound enclosure or equivalent where applicable).

7. The Auto-Transformer shall be installed in outdoor facilities.
8. Please submit the following data in connection with the aforementioned requirements:
 - 8.1. Maximum Overall dimensions, please submit drwaing.
 - 8.2. Guaranteed impedances at 75⁰C
 - 8.3. Oil quantity
 - 8.4. Load and no load losses
 - 8.5. Auxiliary power and number of coolers
 - 8.6. Estimated Delivery Times including shipping [mounth]
 - 8.7. Budgetary price for 650 MVA Outdoor Three-phase Auto-transformer, Sound Power Level 93 dB(A).

9. Reference list of the similar equipment for at least 6 units supplied for at least 3 different clients and operated successfully for at least 5 years, sound power level up to 95 dBA. The outdoor autotransformer/transformer parameters are listed below:
 - 9.1. Three-Phase Auto-Transformer or
 - 9.2. Three-Phase Transformer or
 - 9.3. Three-Phase Auto-Transformer Bank (3Xsingle phase units) or
 - 9.4. Three-Phase Transformer Bank (3Xsingle phase units).
 - 9.5. Rated Power at least 350 MVA , rated voltage at least 220 kV on H.V. side and at least 145 kV on L.V. side, sound power level at least 95 dBA and below.
10. Please submit Type and Routine test report of three (3) similar low noise outdoor three-phase auto-transformer (see clause 8). They shall be in, the English language