

Form III

Specification of goods and materials (technical characteristics)

(filled form shall be approved by manufacturer of transformers)

No.	Parameter	Technical data	
		Required	Proposed
1.	Manufacturing plant (name, country)	(for example ETD transformatory, Končar, Comel, Westrafo, Siemens, ABB, MR (Reinhausen)	
2.	Manufacturing standard	- IEC 60076 - 548/2014 regulation (Ecodesign, 2nd level)	
3.	Type	Three-phase power transformer with oil isolation intended for the assembly at the outdoor switchgear	
4.	Rated power (S, MVA)	25	
5.	Rated voltage (U _N , kV)	11 / 110	
6.	Voltage range (U, kV)	9.35 -12.65 / 93.5 - 126.5 <i>(according to the requirements of EU regulation 2016/631)</i>	
7.	Step-by-step switch	- Side of higher voltage - On-load switching (automatically and manually) - Steps: ±6 x 2.5% -Continuously maximum calculated allowable voltage 1.2 of U _n =13.2/132 kV)	
8.	Rated frequency (f, Hz)	50	
9.	Range of frequency (f, Hz)	47.5-51.5 <i>(according to the requirements of EU regulation 2016/631)</i>	
10.	Insulation class (kV)	LI550; AV230	
11.	Neutral point, ("N")	Complete 110 kV network insulation class. Transformers shall be able to operate both with earthed and unearthed HV winding neutral. Insulation in accordance with HV winding rated voltage	
12.	No load losses, (P ₀ ,kW)	According to Regulation 548/2014 (2nd level)	

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13.	Load losses (P_k , kW)	According to Regulation 548/2014 (2nd level)	
14.	Peak efficiency index (PEI, %)	≥ 99.700 According to Regulation 548/2014 (2nd level)	
15.	Short-circuit voltage (U_k , %)	$\leq 10\%$	
16.	Noise level (full load, all coolers being in operation), - $db(A)$ - Measurement distance, m	≤ 80 1	
17.	Vector group	YN/d-11	
18.	Operating modes of 110kV network neutral of transformer	Solidly earthed through disconnector or isolated (depending on the operating modes of transformers)	
19.	Transformer 110 kV phase and single-winding current transformers built in the neutral: - Rated primary current, A - Rated secondary current, A - Accuracy class - Rated output power, VA	600/5A 5P20/50VA 600 5 5P20 50	
20.	Cooling - Number of fans, pcs - Power of one fan, W - Total power of fans, W	Forced air and oil self-circulation (ONAF)	
21.	Voltage of cooling system fans, V	400 AC	
22.	Operating voltage, V	220 DC	
23.	Dimensions, mm - Length - Width - Height of the upper part of tank - Height to the higher voltage terminals - Height of the upper part of conservator tank - Distance between the wheels	See the limiting values of height in Annex 2 Construction solution of the manufacturer	
24.	Weight of transformer, t - Weight of the core - Weight of the windings - Total weight without oil - Weight of oil - Weight at transportation - Total weight with oil	In accordance with the technical data of the manufacturing plant	

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25.	Temperature rise limits under rated power: - Top oil temperature rise, K - Average winding temperature rise, K	60 65	
26.	Location of terminals on the transformer	<i>Shall be specified during the development of Construction design</i>	
27.	110 kV high voltage terminals	With porcelain external insulation. Hard internal insulation (resin impregnated paper – RIP), unserviceable, for medium air pollution	
28.	11 kV terminals	With porcelain external insulation. Hard internal insulation (resin impregnated paper – RIP), unserviceable, for medium air pollution	
29.	Terminal phase designations Neutral designation	A B C N	
30.	Transformer oil	Mineral oil (according to IEC 60296)	
31.	Short-circuit current on 110 kV busbars, (I, kA) - Thermal - Maximum aperiodic	18,9 47	
32.	Short-circuit current on 11 kV busbars, (I, kA) - Thermal - Maximum aperiodic	11,8 33	
33.	Thermal stability class	A	
34.	Protection class, IP	> IP 54	
35.	Conservator with oil level gauge	Oil level indicators - clock type.	
36.	Equipped with gas protection (Buchholz relay)	Yes	
37.	Equipped with oil flow relay	Yes	
38.	Respiratory filter (catcher of interior humidity) with indicator silica gel	The preferred type and performance is COMEM (self-dehydrating). Wetting level colour changes may be in accordance with the manufacturer's solution.	

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		Easily exchangeable silica gel.	
39.	Colour	Light grey (RAL 7035 or similar) Transformer frame shall be painted with high infrared radiation emission paint, resistant to effects of environment and oil.	
40.	Ambient temperature, °C	-40 ÷ +40	
41.	Lightning stroke standard impulse withstand voltage (LI, kV) - HV winding - LV winding	550 110	
42.	Condensed lightning stroke standard impulse withstand voltage (LIC, kV) - HV winding - LV winding	605 121	
43.	Short duration induced or separate source AC withstand voltage (AV/LTAC, kV) - HV winding - LV winding peak	230 34	
44.	Switching voltage standard impulse withstand voltage (SI, kV) - HV winding	460	