

Laboratory Electrical Test Laboratory, CTR Manufacturing Industries Limited,  
E-79, MIDC Ambad, Nashik, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5224

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Validity 21.12.2017 to 20.12.2019

Last Amended on 26.09.2018

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
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**ELECTRICAL TESTING**

<b>I. TRANSFORMERS AND REACTORS</b>				
1.	On Load and De-energized (Off Circuit ) Tap Changers from 11 kV to 300 kV class	Full wave Lightning Impulse test	IEC 60214-1 Cl. No. 5.2.8.5 Cl. No. 7.2.5.5 IS 8468 Cl. No. 8.10.7 IEC 60060-1 IEC 60060-2	40 kVp to 1200 kVp
		Chopped wave Lightning Impulse	IEC 60214-1 Cl. No. 5.2.8.6 Cl. No. 7.2.5.6 IEC 60060-1 IEC 60060-2	40 kVp to 1320 kVp
		Switching Impulse	IEC 60214-1 Cl. No. 5.2.8.7 Cl. No. 7.2.5.7 IEC 60060-1 IEC 60060-2	40 kVp to 1000 kVp
		Applied Voltage	IEC 60214-1 Cl. No. 5.2.8.8 Cl. No. 7.2.5.8 IS 8468 Cl. No. 8.10.6 IEC 60060-1 IEC 60060-2	10 kV to 480 kV
		Short Circuit Current	IEC 60214-1 Cl. No. 5.2.4 Cl. No. 7.2.3. IS 8468 Cl. No. 8.7	500 A to 10 kA
		Temperature Rise of Contacts	IEC 60214-1 Cl. No. 5.2.2, Cl. No. 7.2.2. IS 8468 Cl. No. 8.5	100 A to 2520 A

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		Auxiliary Circuit Insulation	IEC 60214-1 Cl. No. 5.3.4, Cl. No. 6.3.2, Cl. No. 8.3.2 IS 8468 Cl. No. 8.4 Cl. No. 11.4	1 kV to 5 kV
		Mechanical Endurance	IS 8468 Cl. No. 8.9.1	Qualitative (200000 operations)
		Mechanical Load Test of Drive	IS 8468 Cl. No. 11.5	Qualitative (200000 operations)
		Service Duty Test at Rated step Voltage	IEC 60214-1 Cl. No. 5.2.3.2.2. IS 8468 Cl. No. 8.6.1.1	10 A to 1500 A 50 V to 3800 V
		Breaking Capacity	IEC 60214-1 Cl. No. 5.2.3.3. IS 8468 Cl. No. 86.2	10 A to 1500 A 50 V to 3800 V
		Transition Impedance Test	IEC 60214-1 Cl. No. 5.2.5 IS 8468 Cl. No. 8.8.1	10 A to 1500 A 50 V to 3800 V
		Sequence Test	IEC 60214-1 Cl. No. 5.2.6.3 IS 8468 Cl. No. 8.9.2	Qualitative
		Mechanical test of tapchanger	IEC 60214-1:2014 Cl. 5.3.2, Cl. 7.3.2	Qualitative
		Mechanical test of motor drive mechanism for tapchanger	IEC 60214-1:2014 cl. 6.3.1., Cl. 8.3.1	Qualitative
		Tightness	IEC 60214-1 Cl. 5.2.7.2, Cl. 5.2.7.3	Acetylene: 4 µl/L to 150000 µl/L
		Tan delta	IEC 60250 Cl. 6 IS 4486	0.05% to 5%

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		Contact Resistance	SOP (ETL/TP/3001/19) Issue No.00, Amnd. No.00, dated 20.4.2017	0.2 mΩ to 3 mΩ
		Operation under maximum allowable static pressure	IEC 60214-1 Cl. 5.2.6.4.2	0.07 kg/cm <sup>2</sup> to 1 kg/cm <sup>2</sup>
		Pressure and vacuum tests of on load tap changer	IEC 60214-1 Cl. 5.2.6.5, 5.3.5, 7.2.4.2, 7.3.2	Pressure: 0.1 kg/ cm <sup>2</sup> to 2 kg/ cm <sup>2</sup> Vacuum: 10 <sup>-6</sup> kg/ cm <sup>2</sup> to 10 <sup>-3</sup> kg/ cm <sup>2</sup>
		Overrun test of motor drive mechanism	IEC 60214-1 Cl. 6.2.2. Cl. 8.2.2 IS 8468 Cl. 11.6	Qualitative
		Partial Discharge	IEC 60214-1 Cl. 5.2.8.9, Cl. 7.2.5.9 IEC 60270	5 pC to 100 pC
		Mechanical Endurance Test 500000 operations. Final Measurement: Visual Examination	IEC 60214-1 Cl. No. 5.2.6.2 Cl. No. 7.2.4.1 (excluding at -25°C)	1 Operations to 500000 Operations
		Mechanical Load Test of Drive Mechanism 500000 operations. Final Measurement: Visual Examination	IEC 60214-1 Cl. No. 6.2.1 Cl. No. 8.2.1	Qualitative
<b>II.</b>	<b>TRANSMISSION LINE EQUIPMENT &amp; ACCESSORIES</b>			
<b>1.</b>	<b>Insulated bushings from 1 kV to 36 kV class</b>	Dry power-frequency withstand test	IEC 60137 Cl. No. 8.2 BS EN 50387 Cl. No. 3.5	2 kV to 76 kV
		Dry lightning impulse voltage withstand test	IEC 60137 Cl. No. 8.4 BS EN 50387 Cl. No. 3.5	8 kVp to 220 kVp

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		Temperature rise test	IEC 60137 Cl. No. 8.8	100 A to 2520 A, 10 °C to 150 °C
		Verification of dimensions	IEC 60137 Cl. No. 8.14	0.02 mm to 1000 mm
		Measurement of partial discharge quantity	IEC 60137 Cl. No. 9.5	5 pC to 50 pC
		Tightness test at flange or fixing device	IEC 60137 Cl. No. 9.10	Qualitative

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