



**Low Voltage Switchgear and Control Gear  
IEC 60947-1 General Rules  
IEC 60947-2 Circuit Breakers**

**TESTING AND MEASURING EQUIPMENT/ALLOWED SUBCONTRACTING**

R= Required by Lab

S= May be subcontracted

Clause	Measurement / Testing	Testing / measuring equipment / material required	Subcontracting
8.3.3	Sequence I		
8.3.3.1	Tripping limits and characteristics	Temperature acquisition unit Current/ voltage source	R
8.3.3.2	Dielectric properties	Impulse voltage generator (1.2/50µs) Oscilloscope High voltage probe AC High-voltage source (0 – min. 3.5 KV) Voltmeter (min. 3.5 KV) Leakage current measurement (<6mA	R
8.3.3.3	Mechanical operation and operational performance capability	Short-circuit testing unit for currents higher than 10kA Measuring devices for voltage, current, cos φ, time, I <sup>2</sup> t values Robotic actuator to close circuit breaker	S
8.3.3.4	Overload performance	Variable voltage source	R



		Robotic actuator to operate circuit breaker Voltmeter Oscilloscope	
8.3.3.5	Verification of dielectric withstand	Impulse voltage generator (1.2/50 $\mu$ s) Oscilloscope High voltage probe AC High-voltage source (0 – min. 3.5 KV) Voltmeter (min. 3.5 KV) Leakage current measurement (<6mA)	R
8.3.3.6	Verification of temperature rise	Temperature acquisition unit Current/ voltage source	R
8.3.3.7	Verification of overload releases	Variable current source	R
8.3.3.8	Verification of undervoltage and shunt releases (if applicable)	Variable current source	R
8.3.3.9	Verification of main contact position (for circuit breakers suitable for isolation)	Operating force actuator Force measurement transducer	R
8.3.4.3	Verification of dielectric withstand (test 8.3.3.5)	Impulse voltage generator (1.2/50 $\mu$ s) Oscilloscope High voltage probe AC High-voltage source (0 – min. 3.5 KV) Voltmeter (min. 3.5 KV) Leakage current measurement (<6mA)	R
8.3.4.4	Verification of temperature rise (test 8.3.2.5)	Temperature acquisition unit Current/ voltage source	R
8.3.4.5	Verification of overload releases (test 8.3.3.7)	Variable current source	R



8.3.5	Sequence III		
8.3.5.1	Verification of overload releases	Variable current source	R
	Degree of protection	Sphere 50 mm diameter Jointed test finger Test rod 2.5mm diameter Test wire 1.0mm diameter Sphere 12.5mm diameter	R
	Degree of protection	Dust Chamber Drip box Drip box 15° Oscillating tube/ spray ± 60° or spray nozzle/spray ± 60° Oscillating tube/ spray ± 180° Oscillating tube/ spray ± 180° Water jet hose nozzle - nozzle 12.5mm diameter Immersion tank	R
	Impact strength	Cooling chamber Spring impact hammer	R
	Resistance to rusting	Ammonium Chloride Balance Refined petrol or methylchloroform Climatic chamber Heating chamber	R
	Resistance of insulating materials to heat	Heating chamber Ball pressure test apparatus	R



IEC SYSTEM FOR CONFIRMITY TESTING AND  
CERTIFICATION OF ELECTRICAL EQUIPMENT

COMMITTEE OF TESTING LABORATORIES

	Resistance of insulating materials to abnormal heat and fire	Glow wire test apparatus	R
	Resistance to humidity	Climatic chamber AC High-voltage source (0 – min. 3.5 KV) Voltmeter (min. 3.5 KV)	
	Mechanical strength of fastening means of enclosures	Sliding gauge Screwdriver or wrench for applying a torque	R
	Clearances and creepage distances	Sliding gauge	R