DOC No. CMD-III/IS 1554(Pt 2)/1
Date :

RECOMMENDED LIST OF TEST EQUIPMENTS PVC INSULATED (HEAVY DUTY) ELECTRIC CABLES-PART 2 : FOR WORKING VOLTAGES FROM 3"3KV UPTO AND INCLUDING 11KV AS PER IS 1554 (Part 2):1988

Sl. No.	Test	Test Equipments	Details
1.	Annealing Test (for copper)	- Tensile Testing Machine - Vernier calipers - Micro meter - Suitable Scale	0-250kgf LC= 0.01 mm LC = 1mm
2.	Tensile Test (for aluminium)	- Tensile Testing Machine - Micrometer - Suitable Scale - Weighing Balance	0-250kgf LC= 0.01 mm LC = 1mm Sensitivity 0.01 g
3.	Wrapping Test	- No specific equipment required - Grip or Revolving chuck may be used	
4.	Conductor Resistance Test	- Kelvin Double Bridge or Wheatstone Bridge or Digital Meters - DC Source - Sensitive Galvanometer - Connecting Leads - Thermometer	Accuracy 0.2% Accuracy 0.5% Equiv. Accuracy LC = 1°C
5.	Thickness of Insulation & Sheath	- Micrometer - Vernier Calliper - Measuring Microscope X 7 (Magnification) - Graduated Magnifying Glass	LC = 0.01mm LC = 0.01mm LC = 0.01mm LC = 0.01mm
6.	Tensile Strength& Elong. At break	- Dumbell Punching Die - T.T.M. - Analytical Balance - Mechanical/Optical Instrument for measuring dimension of specimen - Conditioning Chamber	 0 – 250 kgf Sensitivity 0.1 mg LC 0.01 mm 27 ± 2°C

Sl. No.	Test	Test Equipments	Details
7.	Loss of Mass Test	- Thermostatic Heating Oven with controlled air flow - Thermometer - Weighing Balance - Suitable Tubes - Dumbell Punching Dies	Rate of Air Flow 8 – 20 changes per hour LC 0.2 mg Approx, dia 100 mm and length 300 mm
8.	Thermal Ageing in air	- Thermostatic Heating Oven with controlled air flow - Thermometer	Rate of Air Flow 8 – 20 changes per hour Upto 200°C L.C. 1°C
9.	Shrinkage Test	- Thermostatic Oven - Scale	Upto 250°C L.C. 0.5mm
10.	Heat Shock Test	- Thermostatic Oven - Suitable Mandrels	
11.	Hot Deformation Test	- Electric Oven - Hot Pressure Apparatus - Smooth Metal Pins (Mandrel) or Tube and Loading Weights - Measuring Microscope or graduated Magnifying Glass	Accuracy ± 2°C Edge 0.70±0.10 mm wide
12.	Cold Bend Test	- Refrigerator/Thermostatic Controlled Cold Chamber - Thermometer - Steel Metal Mandrel	
13.	Cold Impact Test	- Refrigerator/Thermostatic Controlled Cold Chamber - Thermometer - Low Tem. Impact Apparatus - Cylindrical Pipe	The hammer made of steel 200 g w t. 15 mm diameter Diameter 16 mm Length 30 cm

Sl. No.	Test	Test Equipments	Details
14.	Insulation Resistance	- Voltage source - Electronic MegOhmmeter - Standard Resistance - Thermostatically controlled water bath - Conditioning Chamber	500±50 V or 300±30 VDC Range more than $10x10^6$ MOhm Not less than 1 MOhm With Hour Meter, stirrer and range upto 110°C Temp. 27±2°C
15.	Spark Test	- Spark Tester having High Voltage source, electrodes and fault indicator	As per Appendix A of IS 10810 (Part 44): 1984
16.	High Voltage Test	- Appropriate High Voltage Source - Thermostatically controlled water bath with stirrer of suitable dimension	As per IS 2071(Pt2):1974
17.	Flammability Test	- Test Chamber - Gas Burners (Bunsen Burners) - Test wire Appropriate balance for measurement of mass for test specimen - Stop watch - Scale - Conditioning chamber	As per IS 10810(Pt 53):1984 Two Nos. Diameter 0.71±0.025 mm Cu LC 0.1 Sec. LC 0.5 mm°C

Remarks:

1. For Acceptance/Type Tests firm may please refer to different parts of IS 10810.
2. Firm to ensure appropriate size of tank/water bath for single and multi core cables based on their manufacturing capabilities.
3. Suitable cage should be ensured for carrying out HV test.

ADDITIONAL EQUIPMENTS REQUIREDAS PER IS 1554(Pt 2)

Sl. No.	Test	Test Equipments	Details
1.	Water Absorption Test (Gravimetric	- Thermostatically controlledVacuum Oven - Balance - Desiccator - DistilledWater - Calcium Chloride - Dry Cloth or Filter Paper	Accuracy 0.1 mg
2.	Partial Discharge Test	- High Voltage Power supply - Coupling Capacitor - High Voltage Voltmeter - 4 Terminal Measuring Impedance - VariableResistance - Measuring Instruments (Amplifier with an Oscilloscope) - Calibrated pulse generator - Screened enclosure and test circuit	As per IS 6209:82
3.	Impulse Test	- Impulse Generator and sphere gap - Current Loading Transformers - Temp. Measuring Device - CRO (Cathode Ray Oscilloscope) - Barometer - Humidity Meter - Impulse Peak Voltmter - Camera or any other recording device - Conditioning Chamber	Temp. upto 100°C

4.	Dielectric Power Factor Test	- Power Factor Measuring set up - High Voltage source - Current loading transformer or a temp. bath - Insulating Mats - Thermometer	As per IS 4486: 1967 Temp. upto 100°C
5.	Heating Cycle Test	- Current Loading Transformer with Control gears and measuring instrument - Thermometer - Equipments as stated at Test Sl Nos. 47 &48	 Temp, 0-100°C
6.	Bending Test	- Test cylinder or Mandrels - Vernier Calipers	As specified in relevant ISS LC 0.01 mm

Remarks:

4. For Acceptance/Type Tests firm may please refer to different parts of IS 10810.

Note : Feedback/suggestion for improvement (Details to be provided) may be sent to CMD-III.