



TESTING AND MEASURING EQUIPMENT/ALLOWED SUBCONTRACTING

Test Methods

IEC 60227-2 2. Edition (1997-11)

and additional tests according to IEC 60811 and IEC 60332

R=Required by Lab
S=May be subcontracted

Clause	Measurement/testing	Testing / measuring equipment / material needed	Subcontracting
1.8	Checking of the durability of colours and markings.	Piece of cotton wool or cloth and water.	R
1.9	Measurement of insulation thickness.	Profile projector or measuring microscope of at least 10 x magnification.	R
1.10	Measurement of sheath thickness.	Profile projector or measuring microscope of at least 10 x magnification.	R
1.11	Measurement of overall dimensions and quality.	Profile projector, dial micrometer, vernier calliper.	R
2.1	Electrical resistance of conductor.	Measuring bridge or equivalent electronical equipment. Thermometer or temperature compensation to 20°C.	R
2.2	Voltage test carried out on completed cables.	AC voltage source (AC 0...2500 V). Water bath.	R
2.3	Voltage test on cores.	AC voltage source (AC 0...2500 V). Water bath.	R
2.4	Insulation resistance.	Insulation resistance tester with DC source between 80 V and 500 V. Heatable water bath, thermometer.	R



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3.1	Flexing test.	Flexing apparatus, pulleys made of metal with different diameters. Weights. For current load a low voltage or a voltage about 230/400 V to be used. For voltage load between conductors, about 230 V a.c (two-core) and/or about 400 V a.c. (more cores).	R
3.2	Bending test.	Bending test apparatus moving through 180° angle and flexing rate of 60 per minute, - weight 0,5 kg, current load 0,1 A.	R
3.3	Snatch test.	Weight 0,5 kg, current load 0,1 A, rigid support.	R
3.4	Test for separation of cores.	Tensile machine.	R

Additional tests:

Clause	Measurement/testing	Testing / measuring equipment / material needed	Subcontracting
IEC 60811-1-1 Sub Clause 9.1 and IEC 60811-1-2 Sub Clause 8.1	Tensile test before and after ageing.	Tensile machine, equipment for punching dumb-bell test pieces and equipment for cutting or grinding the insulation to obtain 2 parallel surfaces. Optical measuring device / dial gauge. Air oven with natural air flow, airflow rate: 8...20 complete air changes per hour. A fan shall not be used inside the oven.	R
IEC 60811-3-2 Sub Clause 8.1	Loss of mass test.	Air oven with natural air flow, airflow rate: 8...20 complete air change per hour. Analytical balance with a sensitivity of 0,1 mg. Punching dies for dumb-bell test pieces. Desiccator with silicagel or similar material.	R



Clause	Measurement/testing	Testing / measuring equipment / material needed	Subcontracting
IEC 60811-3-1 Sub Clause 8.1 and Sub Clause 8.2	Pressure test at high temperature for insulation and sheath.	Indentation device with a blade $0,7 \pm 0,01$ mm wide, loads (weights), supports, air oven, microscope or profile projector with two decimal places.	R
IEC 60811-1-4 Sub Clause 8.1 and Sub Clause 8.2	Cold bending test for insulation and sheath.	Cold bend test apparatus consisting essentially of a revolving mandrel and guiding devices for the test pieces. Refrigerator, mandrels with different diameters.	R
IEC 60811-1.4 Sub Clause 8.4	Cold elongation test for insulation. (Only applicable if the overall diameter of the cable exceeds the limit specified in the test method)	Tensile machine with a cooling device or elongation machine installed in a cooling chamber.	R
IEC 60811-1.4 Sub Clause 8.5	Impact test for insulation and sheath.	Impact test apparatus, refrigerator, hammers, pad of sponge rubber.	R
IEC 60811-3-1 Sub Clause 9.1 and Sub Clause 9.2	Heat shock test for insulation and sheath.	Mandrels with different diameters. Air oven.	R
IEC 60332-1	Test of flame retardance.	Propane gas burner, 3-sided metallic screen 1200 mm high, 300 mm wide and 450 mm deep with open front and closed top and bottom.	R