



TESTING AND MEASURING EQUIPMENT/ALLOWED SUBCONTRACTING

General requirements for enclosures or accessories for household and similar fixed electrical installations

IEC 60670

2. Edition (1989) + Am.1 (1994)

R=Required by Lab

S=May be subcontracted

Clause	Measurement/testing	Testing / measuring equipment / material needed	Subcontracting
6	Indelibility of marking	Piece of cloth Water Petroleum spirit (Definition see note in clause 6)	R
7	Checking of dimensions	Under consideration	
8.1	Protection against electric shock	Standard jointed testfinger acc. Fig. 1 of IEC 60529 Dynamometer (Push), range 0-20 N. <u>IP20</u> ; Unjointed test finger. Dynamometer (Push), range 0-20 N. <u>IP30</u> ; Steel rod with diameter 2,5 mm acc. to Table VI of IEC 60529. Dynamometer (Push), range 0-5 N. <u>IP40</u> ; Test wire with diameter 1,0 mm acc. to Table VI of IEC 60529. Dynamometer (Push), range 0-2 N. Electric contact indicator with a voltage not less than 40V and not more than 50V.	R
8.3	Voltage drop, calculation of resistance in earthing circuit during fixing of metal covers or cover plates	Apparatus deriving a current from an A.C. source having a no-load voltage not exceeding 12V and equal to 25A. Measuring probe.	R

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9.2	Voltage drop, calculation of resistance between an earthing terminal and assessible metal parts to be connected thereto.	Apparatus deriving a current from an A.C. source having a no-load voltage not exceeding 12V and equal to 25A. Measuring probe.	R
10	Constructional requirements		
10.1	Mechanical tests on enclosures	See Clause 12	
10.3	Protection against harmful ingress of water	See Clause 11.4	
10.4	Size of drain-holes	Slide caliper, or appropriate probe.	R
10.6	Insulation surroundings of any metal parts of internal fixing means.	Slide caliper, appropriate micrometer.	R
10.7	Inlet openings for conduit entries.	Conduit samples with dimmensions in accordance with IEC 60423. Slide caliper, appropriate micrometer.	R
10.8	Torque test of screw fixing means for covers, assessories, etc.	Slide caliper Screwdriver with adustable torque (range 0,2 - 4 Nm)	R
11.1.1	Aging test on insulated and composite enclosures followed by relative humidity test and sticky or greasy test.	Heating cabinet. Humidity chamber Dry piece of rough cloth. (Test with 5N see note under clause 11.1.1)	R
11.1.2	Mechanical and termal tests on grommets with membranes in inlet openings.	Heating cabinet. Humidity chamber Unjointed test finger with same dimmensions as Fig.1 of IEC 60529 Dynamometer (Push) range 0-30N Stop watch	R
11.1.3	Low temperature test with maximum cable diameters on grommets with membranes in inlet openings	Refrigerator with a temp. of -25 ± 2 °C.	R
11.2.1	Humidity test	Humidity chamber with relative humidity 91-95%, temp. $20-30 \pm 1$ °C.	R
11.2.2	Insulation resistance	DC source of 500V and instruments. Metal foil Stop watch	R

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11.2.3	Voltage test	AC-voltage source (0 - 2,0 kV minimum, 50 -60 Hz) Metal foil Stop watch	R
11.3	Resistance against ingress of solid objects		
11.3.1	Torque test of fixing screws for enclosures	Screwdriver with adustable torque (range 0,1 - 3 Nm)	R
11.3.2	Degree of protection IP2x	Jointed test finger acc. Fig. 1 of IEC 60529. Dynamometer (Push) range 0 - 20 N	R
11.3.3	Degree of protection IP3X	Steel rod with diameter 2,5 mm acc. to Table VI of IEC 60529. Dynamometer (Push) range 0 - 5 N.	R
11.3.4	Degree of protection IP4X	Test wire with diameter 1,0 mm acc. to Table VI of IEC 60529. Dynamometer (Push) range 0 - 2 N.	R
11.3.5	Degree of protection IP5X	Test wire with diameter 1,0 mm acc. to Table VI of IEC 60529. Dynamometer (Push) range 0 - 2 N. Dust chamber acc. to test described in IEC 60529, Category 2. Drainage apertures if any shall Rt be open.	R
11.3.6	Degree of protection IP6X	Test wire with diameter 1,0 mm acc. to Table VI of IEC 60529. Dynamometer (Push) range 0 - 2 N. Dust chamber acc. to test described in IEC 60529, Category 1. (IEC 60529, clause 13.6.1 require Category 1 for IP6X) Drainage apertures if any shall Rt be open. Tests of clauses 11.3.2 - 11.3.6; an electric indicator with voltage Rt less than 40V and Rt more than 50V may be used.	R

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11.4	Resistance to harmful ingress of water IPX1 - IPX8	<p>IPX1; Drip box acc. to Fig. 3a of IEC 60529</p> <p>IPX2; Drip box acc. to Fig. 3b of IEC 60529</p> <p>IPX3; Oscillating tube or spray Rzzle, respectively Fig. 4 or Fig. 5 of IEC 60529, spray 60° from each side of vertical, or spray Rzzle with counterbalanced shield mounted.</p> <p>IPX4; Same as IPX3 equipment, except spray 180° from each side of vertical, or spray Rzzle without counterbalance shield mounted.</p> <p>IPX5; Water jet hose Rzzle acc. to Fig. 6 of IEC 60529. Rzzle 6,3 mm diameter.</p> <p>IPX6; Same as IPX5, except Rzzle 12,5 mm diameter.</p> <p>IPX7; Immersen tank suitable for the purpose.</p> <p>IPX8; Same as IPX7 equipment, but waterlevel by agreement.</p> <p>Screwdriver as mentioned under clause 11.3.1</p> <p>Voltage test equipment as mentioned under clause 11.2.3</p>	R
12.1.1	Impact test for enclosures intended for casting into concrete.	<p>Impact test apparatus acc. to Fig. 4, or on larger enclosures, spring hammer acc. to IEC 60817.</p> <p>Refrigerator adustable to $-25 \pm 1^\circ\text{C}$.</p>	R
12.1.2	Compression test for enclosures intended for a max. temperature of 90 Cel. during the building process. (Prefabricated concrete)	<p>Heating cabinet adjustable to min. $90 \pm 5^\circ\text{C}$.</p> <p>Hardwood plates and a load of 500 N</p> <p>Stop watch.</p>	R
12.2	Impact test on enclosures other than those intended for casting into concrete.	<p>Impact test apparatus acc. to Fig. 1, 2, 3a and 3b, or on larger enclosures, spring hammer acc. to IEC 60817.</p> <p>Standard jointed test finger acc to Fig. 1 of IEC 60529</p> <p>Dynamometer (Push), range 0 - 20 N</p> <p>Unjointed test finger</p> <p>Dynamometern (Push), range 0 - 20 N</p>	R
12.3.1	Tension test of enclosures intended for the suspension of loads from a ceiling.	<p>Heating cabinet adjustable to min. $90 \pm 2^\circ\text{C}$.</p> <p>Load of 250 N.</p> <p>Screwdriver with adjustable torque (range 0,1 - 3 Nm)</p>	R

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12.3.2	Tension test of fixing means of enclosures intended to be used in or on a wall and also intended for suspension of a load	Heating cabinet adjustable to min. 40 ± 2 °C. Load of 100N. Screwdriver with adjustable torque (range 0,1 - 3 Nm)	R
13.1	Ball - pressure test on parts necessary to retain current - carrying parts and parts of the earthing circuit in position.	Ball - pressure test apparatus acc. to Fig. 5 Heating cabinet adjustable to min. 125 ± 2 °C. Stop watch.	R
13.2	Ball - pressure test on parts Rt necessary to retain current carrying parts	Same as under 13.1, but heating cabinet adjustable to min. 70 ± 2 °C.	R
13.3	Ball - pressure test of parts of insulating materials of flush mounted enclosures	Same as under 13.2, but heating cabinet adjustable to min. 90 ± 2 °C.	R
14	Glow-wire test	Glow-wire test apparatus acc. to IEC 60695-2-1/0, with pinewood board and tissue paper.	R
15	Resistance to rusting	Carbon-tetrachloride , trichloroethane or equivalent degreasing agent. Stop watch. 10% solution of ammonium chloride in water. Humidity chamber, saturated with moisture. Heating cabinet adjustable to min. 100 ± 5 °C.	
16	Resistance to tracking	Tracking test apparatus acc. to IEC 60112	R

Rte: The presence of equipment alone does not indicate a satisfactory situation. Assessors must evaluate the equipment design, calibration, uncertainty and documentation to ensure compliance with the directions of the standard. The requirements of ISO Guide 25 regarding validation are applicable, as the tests of this standard are not standardised tests.