



TESTING AND MEASURING EQUIPMENT/ALLOWED SUBCONTRACTING
IEC 60335-1:2020

Household and similar electrical appliances – Safety – Part 1: General requirements

- “R” Required
- “S” May be subcontracted, see OD 2012
- “SP” Specialized Facility, see IECEE 02-2
- “3PPS” Three Phase Power Supply required

Clause	Measurement/testing	Testing / measuring equipment / material needed	Required / May be Subcontracted / Specialized Facility / Three Phase Power Supply Required Equipment Classification
<i>All Relevant Clauses - General</i>	<i>All test specifications requiring a measurement for mechanical dimensions (size, length, thickness, etc.)</i>	<i>Measuring device (electronic and/or mechanical) for relevant size, length, thickness, etc.</i>	R
	<i>All test specifications requiring a measurement for time</i>	<i>Timer</i>	R
5	<i>General conditions for tests</i>	<i>Resistive-capacitive low pass filter with a -3 dB roll off frequency of 5 kHz ± 0,5 kHz</i>	R
7	Marking and instructions	Petroleum spirit	R



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8	Protection against access to live parts	Test probe B, 13, 18 and 41 of IEC 61032, voltmeter, milliammeter, oscilloscope, force gauges, 2000 ohm non-inductive resistor	R
		Coulometer, energy meter	S
10	Power input and current	Chronometer, Voltmeter, ammeter, wattmeter	R
11	Heating	Temperature controlled room, Temperature Recorder, Thermocouples with diameter not exceeding 0,3 mm, blackened disks of copper or brass, 15 mm diameter and 1 mm thick, Test corners, Winding resistance measurement system, Probe for measurement of surface temperature	R
12	Charging of metal-ion batteries	Charging system: Heating/cooling cabinet, Temperature Recorder, Thermocouples with diameter not exceeding 0,3 mm, DC power source for charging to a predetermined state of charge for Li-ion cells or battery packs, multimeter, Equipment for current measurement and monitoring with an averaging period of 1 to 5s, Variable load(s) for discharging Li-ion cells or batteries at different C rates	R or SP
13	Leakage current and electric strength at operating temperature	Metal foil, Voltmeter, Leakage current meter, Isolation transformer, High voltage tester, Network (Fig.4 of IEC60990)	R



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14	<i>Transient overvoltage</i>	<i>Impulse voltage test generator and monitor</i>	S
15	<i>Moisture resistance</i>	<i>IP test equipment, Measurement beaker, Spray nozzle (for testing appliances that cannot be placed under the oscillating tube specified in IEC 60529) as appropriate according to the requirement of Part 2s (Only when the second numeral more than "0" is given)</i>	R
		<i>NaCl, Rinsing agent</i>	R
		<i>Humidity cabinet capable of (93 ± 3)%RH at selected temperature, High voltage tester</i>	R
16	<i>Leakage current and electric strength</i>	<i>Metal foil, Low impedance ammeter, HV test supply</i>	R
17	<i>Overload protection of transformers and associated circuits</i>	<i>Included in Clause 11 above</i>	
19	<i>Abnormal operation</i>	<i>Electrostatic discharge test apparatus (IEC 61000-4-2), Radiated field test apparatus (IEC 61000-4-3), Fast transient burst test apparatus (IEC 61000-4-4), Voltage surge test apparatus (IEC 61000-4-5), Injected current test apparatus (IEC 61000-4-6), Voltage dip and interruption test apparatus (IEC 61000-4-11), Mains signal test apparatus (IEC 61000-4-13) Other equipment as included in Clauses 11, 16</i>	S

Clause	Measurement/testing	Testing / measuring equipment / material needed	Required / May be Subcontracted / Specialized Facility / Three Phase Power Supply Required Equipment Classification
		<i>Shorting means with a resistance not to exceed 10 mΩ ± 2 mΩ; DC power source for charging to a predetermined state of charge for Li-ion cells or battery packs</i>	R
20	<i>Stability and mechanical hazards</i>	<i>Inclined plane, Inclinometer, masses, force gauges, test probe similar to test probe B of IEC 61032 with circular stop face 50 mm Ø, Test probe 18, other equipment as indicated in Clause 11</i>	R
21	<i>Mechanical strength</i>	<i>Spring hammer, Hardened steel pin, Force gauges; Free fall test apparatus (IEC 60068-2-31, Procedure 2)</i>	R
22	<i>Construction</i>	<i>Test rig for torque on pin supported appliance, Heating cabinet (70°C ±2°C), Test probe 11 of IEC 61032, Test fingernail (Figure 7), Force gauge, Plug discharge voltage decay measurement instrument with input impedance ≥ 100 MΩ, ≤ 25 pF</i>	R
		<i>Pressure test apparatus</i>	R
		<i>Automatic cord reel test apparatus</i>	S
		<i>Oxygen bomb with pressure apparatus</i>	S
		<i>Methylated spirits</i>	S



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		<i>Small parts cylinder in Figure 13</i>	R
23	Internal wiring	<i>Flexing test apparatus, High voltage tester, Metal foil</i>	R
24	<i>Components</i>	<i>Laboratory may or may not have facilities for testing to component standards. Certification by specialist laboratories is accepted for compliance</i>	S
25	<i>Supply connection and external flexible cords</i>	<i>Flexing test apparatus, Cord anchorage force & torque tester</i>	R
26	<i>Terminals for external conductors</i>	<i>Torque screwdriver</i>	R
27	<i>Provision for earthing</i>	<i>Earth continuity tester, access to ISO2178 and ISO1463 testing</i>	R
28	<i>Screws and connections</i>	<i>Torque gauge</i>	R
29	<i>Clearances, creepage distances and solid insulation</i>	<i>Mechanical measurement tools, Force gauges, Rod or ball gauges, Proof tracking test apparatus</i>	R
30	<i>Resistance to heat and fire</i>	<i>Ball Pressure test apparatus, Glow wire & Needle flame test apparatus, Apparatus for low power circuit determination</i>	R
		<i>Horizontal and vertical burning test apparatus - ISO 9772 and ISO 9773 testing</i>	S

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31	<i>Resistance to rusting</i>	<i>Part 2 requirements</i>	
32	<i>Radiation, toxicity and similar hazards</i>	<i>Optical radiation test equipment</i>	S
Annex B	<i>Battery-operated appliances, separable batteries and detachable batteries for battery-operated appliances</i>	<i>Free-fall test apparatus (IEC 60068-2-31, procedure 1)</i>	R or SP
		<i>DC power source for charging to a predetermined state of charge for Li-ion cells or battery packs⁽¹⁾</i>	R or SP
		<i>Temperature Recorder, Thermocouples with diameter not exceeding 0,3 mm</i>	R or SP
		<i>Variable load(s) for discharging Li-ion cells or batteries at different C rates, Shorting means with a resistance not to exceed 10 mΩ ± 2 mΩ⁽¹⁾</i>	R or SP
		<i>Apparatus designed to deliver 20; 30; 50; 100 ml ± 10 % of air at an initial pressure of 2 070 kPa ± 10 % through a (2,85 ± 0,05) mm diameter orifice, Pressure gauge</i>	S
		<i>Vibration tester Subclause 7.3.8.1 and mechanical shock tester Subclause 7.3.8.2 of IEC 62133-2:2017 Explosion proof chamber</i>	S
Annex C	<i>Ageing test on motors</i>	<i>See referenced clauses</i>	R
Annex D	<i>Thermal motor protectors</i>	<i>See referenced clauses</i>	R



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<i>Annex E</i>	<i>Needle flame test</i>	<i>Needle flame test apparatus (IEC 60695-11-5)</i>	<i>R</i>
<i>Annex F</i>	<i>Capacitors</i>	<i>Impulse voltage test apparatus, Endurance test apparatus (IEC 60384-14)</i>	<i>S</i>
<i>Annex G</i>	<i>Safety isolating transformers</i>	<i>Part 2 requirements</i>	
<i>Annex H</i>	<i>Switches</i>	<i>Endurance test apparatus (IEC 61058-1)</i>	<i>S</i>
<i>Annex I</i>	<i>Motors having basic insulation that is inadequate for rated voltage of appliance test</i>	<i>See referenced clauses</i>	<i>R</i>
<i>Annex J</i>	<i>Coated printed circuit boards</i>	<i>Coated printed circuit boards test apparatus (IEC 60664-3)</i>	<i>S</i>
<i>Annex N</i>	<i>Proof tracking test</i>	<i>Proof tracking test apparatus (IEC 60112)</i>	<i>R</i>
<i>Annex R</i>	<i>Software evaluation</i>	<i>Capability for Software evaluation</i>	<i>S(2A and1B)</i>
<i>Annex T</i>	<i>UV-C radiation effect on non-metallic materials</i>	<i>Testing apparatus related to UV-C radiation</i>	<i>S</i>
<i>Annex U</i>	<i>Evaluation for remote communication through public networks</i>	<i>Capability for evaluation of remote communication through public networks</i>	<i>S</i>



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<p>1: Power supply and variable load shall be requested for general use. However, in some special cases such as special chargers or loads, applicants provide them.</p>			
<p>2A: Capability of software evaluation according Annex R in accordance with OD-2045, Guideline Document and Instruction for testing purposes on how to implement the Annex R of IEC 60335-1 and Annex H of IEC 60730-1</p>			
<p>2B: Although no specific test equipment for 60335-1 is required, the relevant information according to the Annex R of IEC60335-1 shall be supplied by the manufacture in accordance with OD-2045</p>			

NOTE – For all clauses with a test specification that references another clause, see reference clause for testing/measuring/material needed, e.g., Clause 19 (19.13) references Clause 16 (16.3). In addition, testing/measuring/material is not necessarily described again where it was previously covered under a preceding clause.