TESTING AND MEASURING EQUIPMENT/ALLOWED SUBCONTRACTING
IEC 62368-1:2023
Audio/video, information and communication technology equipment - Part 1: Safety requirements
PROVISIONAL

IEC 62368-1 test equipment has been identified for use in the sub-grouped below:
R = **R**equired to be at Lab
RA = **R**equired for **A**mplifiers; in addition to **RB**, required for apparatus with audio amplifiers (audio power > 0,5 Watts)
RB = **R**equired **B**asic – test and measurement equipment required for all apparatus
RC = **R**equired for **C**able distribution system; in addition to **RB**, required for apparatus with connection(s) to a cable distribution system
ROUT = **R**equired for equipment intended for installation **Outd**oors
RSH = **R**equired for **Sh**redder; in addition to **RB**, required for shredder
RT = **R**equired for **T**elecom; in addition to **RB**, required for apparatus with connection(s) to a telecommunication network
RV = **R**equired for CRT / Plasma/LCD or other Video equipment in addition to RB required for testing CRT Cathode ray Tubes/ picture tubes, plasma/LCD or other video apparatus
RWPT = **R**equired for equipment that functions as a **W**ireless **P**ower **T**ransmitter

“R”	Required
“S”	May be subcontracted, see OD 2012
“SP”	Specialized Facility, see IECEE 02-2
“W”	Witness testing in the categories “MED” and “MEAS”
“3PPS”	Three Phase Power Supply required

Clause	Measurement/testing	Testing / measuring equipment / material needed	LISUN Model	Equipment Classification
4.1.4	Equipment Installation (Outdoor), Conditioning	Test chamber: minimum range of –33°C to +40°C.		ROUT
4.1.8	Liquids, refrigerants and liquid filled components (LFCs)	Test equipment according to using refrigerants, see IEC 60335-2-40 and IEC 61010-2-011.		S

Clause	Measurement/testing	Testing / measuring equipment / material needed		LISUN Model	Equipment Classification
4.1.9	Electrical measuring instruments	Measuring instrument used to measure voltage having a minimum impedance of 1 MΩ			RB
4.7	Equipment for direct insertion in to mains socket-outlets	Test equipment (see Fig. 11 of IEC 60065)			RB
4.8	Coin/button cell batteries	30 N ± 1N applied by rigid test finger (Figure V.1); test hook (Figure 20) using a force of approximately 20 N; calliper; timer		SMT-S15	RB
		Crush Test (330 N ± 5N); flat surface measuring 100 mm by 250 mm; timer			RB
		Torque gauges (0,5Nm), angle meter			RB
5.2.2.2	Steady- state voltage and current limits	Ampere- and voltmeter suitable for the current and waveform, frequency meter Measuring instruments in according to IEC 60990:2016 Figure 4 and 5, timer, 2 kΩ resistor			RB
5.2.A.4	Single pulse limits	Oscilloscope		OSP3104AE	RB
5.3.2.	Accessibility to electrical energy sources and safeguards	Test probes (Figures V.1, V.2, V.3, V.5);force gauge having at least 30 N; calliper		SMT-PA100A-UZ11 SMT-PBC SMT-TD15 SMT-S113	RB
5.4.1.4, 9.3, Annex E	Maximum operating temperatures for materials, components and systems	Voltage supply	Single phase voltage supply systems/variability/adequacy		RB
			Three phase voltage supply systems		S
		Temperature (rise)	Temperature recorder (multi-channel)		RB
			Thermocouples		RB
			Winding resistance (normally > 1,0 Ω 2-wire, 4-wire <1,0 Ω).		RB
		Voltage	Voltmeters (ac/dc)		RB

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			High voltage meter (probe)		RB
		Current	Currents (ac/dc)		RB
		Loading	Loads (resistive)		RB
5.4.1.5.3	Thermal cycling test procedure	Full draught oven (± 2ºC) Cooling facility (0º±2 C)			S
5.4.1.10	Thermoplastic parts on which conductive metallic parts are directly mounted	Vicat test B 50 of ISO 306			S
		Ball pressure test apparatus according to IEC 60695-10-2, Oven at least 125ºC ± 2°C		ZBP-T GW-225	RB
5.4.2, 5.4.3, 5.4.4, Annex X	Clearances, creepage distance, solid insulation	Oscilloscope		OSP3104AE	RB
		Dial gauge or calliper			RB
		Micrometer			RB
		Pins etc. with different diameters			RB
		Microscope			RB
		Impulse test generator circuit 1 of Table D.1. Impulse test generator circuit 2 of Table D.1. impulse test generator circuit 3 of Table D.1		SUG-CCITT-A SUG255XX SUG255CX	RT S RC
		Test equipment for tracking index per IEC 60112		TTC-1	S
		Mandrel (figure 25 to 28), metal foil, equipment suitable for electrical strength test loads Stop watch, weight			S
5.4.5.2 5.4.5.3	Antenna terminal insulation	Insulation resistance meter (500V > 40MΩ), antenna interface test generator circuit 3 of Table D.1; timer, See electric strength test of Clause 5.4.9.		WB2681A	RC
5.4.8	Humidity conditioning	Chamber RH (93 ± 3)%, (20…30)°C		GDJS-010A	RB
		Chamber RH (93 ± 3)%, (40 ± 2)°C			RB
		Extra large environmental testing chamber			S

Clause	Measurement/testing	Testing / measuring equipment / material needed	LISUN Model	Equipment Classification
		Test instrument / equipment with the relevant voltage, frequency and tripping current		S
5.4.9	Electric strength test	Test instrument / equipment with the relevant voltage, frequency and tripping current; Stop watch;		RB
		Test instrument / equipment according to Figure 29 for electric strength (of solid / thin sheet insulation)		S
5.4.10	Safeguards against transient voltages from external circuits	Blunt probe figure V.3; Insulation resistance meter (500V > 2 MΩ); See electric strength test of Clause 5.4.9.	SMT-TD15 WB2681A	RB
		Impulse test generator circuit 1 of Table D.1.		RT
5.4.11	Separation between external circuits and earth	Non-inductive resistor 5000Ω, Ampere meter		RB
5.4.12	Insulating liquid	Test equipment with relevant voltage and trip current		RB
5.5.2.2	Capacitor discharge	Measuring instrument with input impedance 100M Ω± 5 MΩ in parallel with an input capacitance of 25pF or less; timer		RB
5.5.8	Insulation between the mains and an external circuit consisting of a coaxial cable	See voltage surge test of G.10.4; the impulse test of G.10.5		
5.6.3	Requirements for protective earthing conductors	Calliper, micrometer		RB
5.6.4.1	Resistance of protective conductors and their terminations	High current source with a voltage not exceeding 12 V,		RB
	Determination of the overcurrent protective device and circuit (Annex R)	Source with at least 1500A short circuit		S
5.7	Prospective touch voltage touch current and protective conductor current	Networks in according IEC 60990:2016 figures 4 and 5; ampere meter	MNTC-G2G3	RB

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5.8	Back feed safeguard in battery backed up supplies	Measuring instrument with input impedance 100MΩ± 5 MΩ in parallel with an input capacitance of 25pF or less; oscilloscope; timer; calliper		RB
6.2.2	Power source circuit classification	Watt meter, variable resistor load, stop watch		RB
6.3.1, 6.4.6	Flammability test	Glow-Wire according to IEC 60695-2-11.	ZRS-3H	S
6.4.8.3.3, Annex S.2	Top openings and top openings properties	Cheesecloth bleached cotton cloth 40g/m^2; timer		RB
7.2	Reduction of exposure to hazardous substances	Investigation of the effects of the chemical on the material of the container		S
8.2	Mechanical energy source classifications	Scale up to 25kg		RB
8.5.4.3	Equipment having an electromechanical device for destruction of media	Test probe (jointed) of Annex V (figure V.1 and V.2) and wedge probe V.4 Force 45N and 90 N with wedge probe	SMT-PA100A-UZ11 SMT-PBC SMT-S113	RB RSH RSH
8.5.5.2.	High pressure lamps	Dark sticky mat, magnified glass with a resolution of 0,1 mm		RB
8.6.2	Static stability for floor standing equipment	Inclined plane 10° Several weights up to 100N; scale		RB
		Several weights up to 250N; scale Test tool 800Nwith a flat surface 12,5cm by 20cm Ruler		RB
8.6.4	Glass slide test	Glass plate, Inclined plane 10°		RB
8.6.5	Horizontal force test	Inclined plane 15°; several weights at least 250 N; scale		RB
8.7	Equipment mounted to a wall or ceiling	Several weights, timer, scale Torque gauges; push-pull gauge		RB
8.8	Handle strength test method	Belts with 75mm width, several weights, scale, timer		RB

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8.9	Wheels or casters attachment requirement	Force 20N, stop watch			RB
8.10	Carts, stands and similar carriers	Force up to 440 N with a circular plan surface ≥ 30mm, stop watch,			RB
8.11	Mounting means for rack mounted equipment	Several weights, timer, scale			RB
8.12	Telescoping or rod antennas (Annex T.11)	test tool for applying torque up to 0,6Nm, test tool for applying force 20N, stop watch			RA
9.6.3	Wireless power transmitters	Figure 49 – Steel disc Figure 50 – Aluminium ring Figure 51 – Aluminium foil Spacers with 2.0 ± 0.5 mm thick and 5.0 ± 0.5 mm thick			RWPT
10	Radiation	Laser (including laser diodes)	Several special equipment for laser classification (IEC 60825-1:2014, IEC 60825-2, IEC 60825-12)		S
		Light emitting diodes (LEDs)	Several special equipment for LED classification (IEC 62471:2006)	EN62471-C	S
		Image Projector	Several special equipment for image projectors (IEC 62471-5:2015)		S
		X-ray	. Radiation monitor, ionizing chamber type with an effective area of 1 000 mm²		S
		Effect of UV radiation on materials (Annex C)	Test equipment according to ISO 178, 179-1, 180, 527 and 8256 and according ISO 4892 series		S
		Human exposure to UV radiation (Annex C)	Measuring equipment according to IEC 62471		S
		Acoustics	Special equipment for acoustic measurements (EN50332-1, -2 & -3)		S

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Annex B.2.5	Input test	Ampere meter suitable for the current and waveform, power meter, voltmeter (See Clause 4.1.9)		RB
		Variable loads		RB
		Signal generator in acc. IEC 60107-1:1997		RV
Annex B.3.2	Covering of ventilation openings	piece of card with minimum 200 g/m² density		RB
Annex C	UV radiation	Carbon-arc light-exposure test - apparatus described in ISO 4892-4, or equivalent, in accordance with the procedures given in ISO 4892-1 and ISO 4892-4 using a type 1 filter, with water spray. Xenon-arc light-exposure test - apparatus described in ISO 4892-2:2013, or equivalent, in accordance with the procedures given in ISO 4892-1 and ISO 4892-2 using cycle 1 of method A of Table 3, without water spray. Tensile strength, ISO 527 Flexural strength, ISO 178 Charpy impact, ISO 179-1 Izod impact, ISO 180 Tensile impact, ISO 8256	XD-80LS	S
Annex E	Test conditions for equipment intended to amplify audio signals	Signal generator (sinus) 1kHz or alternative Band-pass filter for wide-band noise measurement, pink noise signal generator Variable wood test box	EMI-9KC	RA
Annex F.3.7	Equipment IP rating marking	IP test equipment according to IEC 60529		SP
Annex F.3.10.2	Durability	water/piece of cloth/ timer		RB

Clause	Measurement/testing	Testing / measuring equipment / material needed	LISUN Model	Equipment Classification
Annex F.3.10.3	Durability	Petroleum spirit (85% n-hexane), (CAS# 110-54-3)		RB
G.1	Switches		CZKS-3 DFX-20	
Annex G.5.4.5.3 G.5.4.6.3 G.9.3 S.3.1 S.3.2	Alternative test method	Cheesecloth (bleached cotton cloth 40g/m^2), Wrapping Tissue (12g/ m^2 – 30g/m^2)		RB
Annex G.5.3.4	Test for FIW	Test equipment according to IEC 60851-5:2008, IEC 60317-0-7 and IEC 60317-56 Test equipment with relevant voltage and trip current Full draught oven (± 2ºC) Cooling facility (0º±2 C) Partial discharge test equipment		S
Annex G.7	Mains supply cords	Test equipment according IEC 60227		S
		Appropriate weights		RB
		Torque meter or equivalent		RB
Annex G.8.2.2	Varistor overload test	AC power supply source, variable loads		RB
Annex G.8.2.3	Temporary overvoltage test	The combination pulse generator according to IEC 61643-11:2011; Temporary overvoltage generator		S
Annex G.9	IC current limiters	Variable loads Capacitor 470 μF; resistor 0 Ω Chamber (-30 to 70 ± 2)°C		S
Annex G.10	Test for resistor serving as safeguard Test sequence	Impulse test generator circuit 1 of Table D.1. Impulse test generator circuit 2 of Table D.1. impulse test generator circuit 3 of Table D.1 Test according to IEC 60068-2-78		S

Clause	Measurement/testing	Testing / measuring equipment / material needed	LISUN Model	Equipment Classification
Annex G.13.6.2	Test method and compliance criteria	Full draught oven (± 2ºC)		S
Annex G.13.6.2	Abrasion resistance test	Scratch test device with steel pin		S
Annex G.15	Hydrostatic pressure	Hydrostatic pressure test device		S
	Tubing and fittings compatibility test Creep resistance test	Tensile strength test device in acc. To ISO 527 series, timer test chamber up to 87°C, timer		S
	Vibration test	Vibration generator (0,35mm/10Hz-55Hz-10Hz) IEC 60068-2-6	LVD-100KG-6D	S
Annex G.16	Discharge function	Chamber RH (93 ± 3)%, 20...30ºC, (40 ± 2)ºC		S
		Impulse test generator (capable of delivering an impulse as specified in Circuit 2 of Table D.1 that can be superimposed on the Mains)		S
Annex H	Criteria for telephone ringing signals	5 000Ω resistor		RT
Annex J	Insulated winding wires for use without interleaved insulation	Test equipment according to IEC 60851-3:2009 and IEC 60851-5:2008		S
J.2	Oven Temperature		GW-225	
Annex M.4.2, M.4.4.4	Charging voltage and current			S
Annex M.7	Concentration of hydrogen gas	Hydrogen gas analyzer		S
Annex M.8.2	Protection against internal ignition from external spark sources – Spark Test	Equipment according to IEC 60896-21:2004 Sub cl. 6.4		S
Annex P.2	Safeguards against entry of solid foreign objects	Suitable tool (or tools) to simulate a straight metal object, 1mm in diameter, length up to 13 mm		RB
Annex. P.4	Metallized coatings and adhesives securing parts	Oven		S

Clause	Measurement/testing	Testing / measuring equipment / material needed	LISUN Model	Equipment Classification
Annex R	Limited Short-circuit test	Current generator, 1500 A		S
Annex S	Tests for resistance to heat and fire	Needle flame test apparatus acc. to IEC 60695-11-5:2016, gauge for flame hight	ZY-3	SP
		Distillate fuel oil as described in annex S.3.2		S
		500W flame test apparatus in acc. to IEC 60695-11-20:2015		SP
		Cheesecloth (bleached cotton cloth 40g/m^2), wrapping tissue (12g/ m^2 – 30g/m^2)		RB
		fuel tablet in according to S.6		SP
Annex T.2 - T.4	Steady force test	10N ± 1N Test finger (figure V1 or V2 unjointed, 30N± 3N) Test tool 100N± 10N with a circular plan surface ∅30mm Stop watch		RB
Annex T.5	Steady force test, 250 N	Test tool 250N ± 10N with a circular plan surface ∅30mm.		RB
Annex T.6	Enclosureimpact test	∅50mm/500g ± 25g steel ball, ruler		RB
Annex T.7	Drop test	Hard wood 13mm on 18mm ± 2mm plywood, two layers. ruler up to 1000 mm ± 10mm		RB
AnnexT.8	Stress relief test	Measuring equipment according to IEC 60695-10-3 or Oven 70K over normal temp.		RB
Annex T.9	Impact Test	steel ball ∅ 50mm, 500 ± 25 g., ruler		RB
Annex T 10	Fragmentation test	Centre punch (having a head with a mass of 75 g ± 5 g and a conical tungsten carbide tip with an angle of 60° ± 2°; IEC 60335-2-24:2010/AMD2:2017 Subclause 22)* and a square of 50 mm side		RB
Annex U	Mechanical strength of CRTs and protection against the effects of implosion	Test equipment acc.IEC 61965 Scale, diamond stylus, cooling liquid, timer		S

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Annex V.1.2	Test method 1 – Surfaces and openings tested with jointed test probes	Figure V.1 – Jointed test probe for equipment likely to be accessible to children Figure V.2 – Jointed test probe for equipment not likely to be accessible to children	SMT-PA100A-UZ11 SMT-PB	RB
Annex V.1.3	Test method 2 – Openings tested with straight unjointed test probes	Figure V.1: straight unjointed version of the respective test probe applied with a force of 30 N.		RB
Annex V.1.4	Test method 3 – Plugs, jacks, connectors	Figure V.3 – Blunt probe	SMT-TD15	RB
Annex V.1.5	Test method 4 – Slot openings	Figure V.4 – Wedge probe		RSH
Annex V.1.6	Test method 5 – Terminals intended to be used by an ordinary person	Force 1 N ± 0,1N Terminal probe IEC 61032:1997 figure 4	SMT-IP30T	RB
Y.2 (Annex C)	Ultraviolet light conditioning test	Ultraviolet light test apparatus – see annex C.	UV-263LS	
Y.3	Resistance to corrosion, water borne contaminants	Salt spray test apparatus according to IEC 60068-2-11 Test chamber according to ISO 22479	YWX/Q-010	S
Y.3.3	Water- sulphur dioxide test	Water - sulphur dioxide test chamber	SQ-010	S
Y.4.3	Tensile strength and elongation tests	Tensile strength test apparatus		S
Y.4.4	Compression test	Cylindrical weight for 69 kPa Air oven Environmental test chamber capable of testing to –33 °C 1,35 kg impact hammer apparatus Clear spruce wood pieces		S
Y.4.5	Oil resistance	Oil immersion test equipment per ISO 1817:2022 or ASTM D471- 98		S
Y.5	Protection from moisture	IP X4 to X8 water test apparatus	JL-34 JL-56 JL-8	SP

Clause	Measurement/testing	Testing / measuring equipment / material needed	LISUN Model	Equipment Classification
Y.5.3	Water spray test	Water spray test apparatus (alternative to IPX4)	JL-UL	S
Y.5.5	Protection from excessive dust	IP 5X/6X dust test apparatus	SC-015	SP
Y.6.2	Impact test	Test chamber capable of testing to –33°C		ROUT

*Agreed during the TC 108 IEC TC 108 WG HBSTD hazard-based Meeting 2019 Raleigh