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TEST REPORT
IEC 60335-2-29
Safety of household and similar electrical appliances
Part 2-29: Particular requirements for battery chargers

Report Number. .....:	231201069SHA-001
Date of issue .....:	2024-01-24
Total number of pages.....:	189
Name of Testing Laboratory preparing the Report.....:	Intertek Testing Services Shanghai
Applicant's name.....:	GlobTek, Inc.
Address .....:	186 Veterans Dr. Northvale, NJ 07647 USA
Test specification:	
Standard .....:	IEC 60335-2-29:2016, AMD1:2019 for use in conjunction IEC 60335-1:2010, COR1:2010, COR2:2011, AMD1:2013, COR1:2014, AMD2:2016, COR1:2016
Test procedure.....:	CB Scheme
Non-standard test method.....:	N/A
Test Report Form No.....:	IEC60335_2_29M
Test Report Form(s) Originator .:	SIQ
Master TRF .....:	Dated 2020-03-12

If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description .....:	X-plore 8000 Multi-Unit Charger
Trade Mark(s).....:	Dräger
Manufacturer.....:	Same as applicant
Model/Type reference .....:	GT-93600SHG3050
Ratings .....:	Class I, IP20 Input: 100-240V~, 50-60Hz, 1.5A MAX Output: 9-12.6VDC, 4A AC inlet: Max. 10A, 100-240V~ AC outlet: Max. 6.3A, Max. 1.5kW, 100-240V~

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**CB Testing Laboratory:**	Intertek Testing Services Shanghai.	
Testing location/ address ..... :		Building No.86, 1198 Qinzhou Road (North), Shanghai 200233, China	
Tested by (name, function, signature) ..... :		Leo Li (Engineer)	Leo li
Approved by (name, function, signature) .. :		Hans Wang (Mandated reviewer)	Hans Wang
☐	**Testing procedure: CTF Stage 1:**		
Testing location/ address ..... :			
Tested by (name, function, signature) ..... :			
Approved by (name, function, signature) .. :			
☐	**Testing procedure: CTF Stage 2:**		
Testing location/ address ..... :			
Tested by (name + signature) ..... :			
Witnessed by (name, function, signature). :			
Approved by (name, function, signature) .. :			
☐	**Testing procedure: CTF Stage 3:**		
☐	**Testing procedure: CTF Stage 4:**		
Testing location/ address ..... :			

Tested by (name, function, signature) ..... :		
Witnessed by (name, function, signature) . :		
Approved by (name, function, signature) .. :		
Supervised by (name, function, signature) :		

List of Attachments (including a total number of pages in each attachment):

Appendix no. 1: National differences for Australia and New Zealand (page 139 to page 146, total 8 pages).

Appendix no. 2: Photos of the product (page 147 to page 161, total 15 pages).

Appendix no. 3: Annex BB of IEC 61558-2-16:2021 (page 162 to page 189, total 28 pages).

Summary of testing:

The test results presented in this report relate only to the item tested. The results indicates that the specimen complies with standard “IEC 60335-2-29:2016, AMD1:2019 for use in conjunction IEC 60335-1:2010, COR1:2010, COR2:2011, AMD1:2013, COR1:2014, AMD2:2016, COR1:2016”.

Tests performed (name of test and test clause):		**Testing location:**
Marking Durability Test	7.14	Building No.86, 1198 Qinzhou Road (North), Shanghai 200233, China
Protection against Access to Live Parts	8.1.1 & 8.1.2	
User Accessible Voltage and Current Test, Working voltage test	8.1.4& 22.42	
Power Input/Output Current	10.1,10.2 &10.101, 10.102	
Heating Test	11.8	
Leakage Current Test	13.2	
Electric Strength Test	13.3	
Humidity Test	15.3	
Leakage Current Test	16.2	
Electric Strength Test	16.3	
Abnormal Operation –Fault Conditions of Electronic Circuit	19.11& 19.12	
Mechanical Strength	21.1	
Strength of Accessible Parts of Solid Insulation	21.2	
Undue Strain Test on Socket-Outlet	22.3	
Plug Discharge Test	22.5	
Creepage Distance and Clearance	29	
Ball Pressure Test	30.1	
Glow Wire Test	30.2.1 & 30.2.3	

Summary of compliance with National Differences (List of countries addressed):

Group differences for CENELEC countries are considered.

☒ **The product fulfils the requirements of EN 60335-2-29:2021 + A1:2021"to be used in conjunction with "EN 60335-1: 2012 + A11:2014 + A13:2017 + A1:2019 + A2:2019 + A14:2019 + A15:2021" and "EN 62233:2008**

Statement concerning the uncertainty of the measurement systems used for the tests

(may be required by the product standard or client)

☐ **Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:**

Procedure number, issue date and title:

Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

☒ **Statement not required by the standard used for type testing**

(Note: When IEC or ISO standard requires a statement concerning the uncertainty of the measurement systems used for tests, this should be reported above. The informative text in parenthesis should be delete in both cases after selecting the applicable option)

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

Test item particulars ..... :	
Classification of installation and use ..... :	Portable appliances and for indoor use only
Supply Connection ..... :	Appliance inlet
..... :	
Possible test case verdicts:	
- test case does not apply to the test object .....:	N/A
- test object does meet the requirement .....:	P (Pass)
- test object does not meet the requirement .....:	F (Fail)
Testing .....:	
Date of receipt of test item .....:	2023-12-01
Date (s) of performance of tests .....:	2023-12-01 to 2024-01-18

General remarks:

"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.

Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided..... :	☒ **Yes** ☐ **Not applicable**

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies).....:	1.GlobTek (Suzhou) Co., Ltd Building 4, No. 76 JinLing East Road, Suzhou Industrial Park, Suzhou, JiangSu, 215021, China 2.GlobTek, Inc. 186 Veterans Dr. Northvale, NJ 07647 USA

General product information and other remarks:

The product is battery charger for charging 10.8V Lin-ion battery pack type R59585 including PSU and limited use for household only.

The X-plore 8000 Multi-Unit Charger can be used with detachable power supply cord. There are appliance inlet and appliance outlet used on the device, which can provide with earthing connection. Two pieces of outer enclosure are screwed.
The product was evaluated for maximum manufacturer's recommended ambient of 50 °C.

The products are not intended to use in environment which altitude exceed 5000m.

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
5	**GENERAL CONDITIONS FOR THE TESTS**		P
	Tests performed according to clause 5, e.g. nature of supply, sequence of testing, etc.	Leakage current under 60Hz, other tests under 50Hz	P
5.2	If the test of 21.101 is carried out two additional battery chargers required (IEC 60335-2-29)		P
5.101	Battery chargers tested as motor-operated appliances (IEC 60335-2-29)		P
6	**CLASSIFICATION**		**P**
6.1	Protection against electric shock: Class 0, 0I, I, II, III	Class I	P
	For a class III construction with a detachable power supply part the appliance is classified according to the detachable power supply part		N/A
6.2	Protection against harmful ingress of water	IP20	N/A
	Battery chargers for outdoor use at least IPX4 (IEC 60335-2-29)	Indoor used	N/A
7	**MARKING AND INSTRUCTIONS**		**P**
7.1	Rated voltage or voltage range (V).....	See page 4	P
	Symbol for nature of supply, or.....	See page 4	P
	Rated frequency (Hz).....	See page 4	P
	Rated power input (W), or.....	See page 4	N/A
	Rated current (A)	See page 4	P
	Manufacturer's or responsible vendor's name, trademark or identification mark	See page 4	P
	Model or type reference.....	See page 4	P
	Symbol IEC 60417-5172, for class II appliances	See page 4	N/A
	IP number, other than IPX0	See page 4	P
	Symbol IEC 60417-5180, for class III appliances, unless		N/A
	the appliance is operated by batteries only, or		N/A
	for appliances powered by rechargeable batteries recharged in the appliance		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	Symbol IEC 60417-5018, for class II and class III appliances incorporating a functional earth		N/A
	Symbol IEC 60417-5036, for the enclosure of electrically-operated water valves in external hose-sets for connection of an appliance to the water mains, if the working voltage exceeds extra-low voltage		N/A
	Battery chargers marked with (IEC 60335-2-29):		—
	- rated d.c. output voltage (V)		P
	- rated d.c. output current (A)		P
	No other output current shall be marked		P
	- rated current (A) of protective devices incorporated in a d.c. distribution board		N/A
	– the polarity of the output terminals unless incorrect polarity connection is prevented	Incorrect polarity connection is prevented	N/A
	- The positive terminal indicated by symbol IEC 60417-5005 (2002-10) and the negative terminal by symbol IEC 60417-5006 (2002-10)	Incorrect polarity connection is prevented	N/A
	- time-current characteristic of fuse-links of the time-lag type	Non-replaceable current fuse used. “F1 3.15A 250V” marked on PCB	P
	If the output exceeds 20 VA, battery chargers marked with (IEC 60335-2-29):		—
	- “Before charging, read the instructions” or symbol ISO 7000-0790 (2004-01) (IEC 60335-2-29:2016/AMD1:2019)		P
	“For indoor use” or symbol IEC 60417-5957 (2004-12) or “Do not expose to rain” or symbol IEC 60417-6062 (2011-05) (IEC 60335-2-29:2016/AMD1:2019)		P
	Not required if the battery charger output is less than 20 VA or the battery charger has a degree of protection against harmful ingress of water of at least IPX4 (IEC 60335-2-29:2016/AMD1:2019)		N/A
	If the output exceeds 20 VA and the battery charger is for lead-acid batteries, battery chargers marked with (IEC 60335-2-29):		—

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	- disconnect the supply before making or breaking the connections to the battery		N/A
	- WARNING: Explosive gases. Prevent flames and sparks. Provide adequate ventilation during charging.		N/A
	Battery chargers incorporating an engine cracking switch allowing the charger to supply a supplementary starting current for the engine marked with (IEC 60335-2-29):		—
	- maximum “on” time		N/A
	- minimum “off” time or maximum ratio between “on” time and “off” time		N/A
7.2	Warning for stationary appliances for multiple supply		N/A
	Warning placed in vicinity of terminal cover		N/A
7.3	Range of rated values marked with the lower and upper limits separated by a hyphen	Supply voltage and frequency	P
	Different rated values marked with the values separated by an oblique stroke		N/A
7.4	Appliances adjustable for different rated voltages or rated frequencies, the voltage or the frequency setting is clearly discernible	Not adjustable	N/A
	Requirement met if frequent changes are not required and the rated voltage or rated frequency to which the appliance is to be adjusted is determined from a wiring diagram		N/A
	If the battery charger can be adjusted to different rated DC output voltages, the output voltage to which the battery charger is adjusted clearly discernible (IEC 60335-2-29)		N/A
7.5	Appliances with more than one rated voltage or one or more rated voltage ranges, marked with rated input or rated current for each rated voltage or range, unless	One rated voltage range	P
	the power input or current are related to the arithmetic mean value of the rated voltage range		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	Relation between marking for upper and lower limits of rated power input or rated current and voltage is clear		N/A
7.6	Correct symbols used		P
	Symbol for nature of supply placed next to rated voltage		P
	Symbol for class II appliances placed unlikely to be confused with other marking	Class I appliance	N/A
	Units of physical quantities and their symbols according to international standardized system		P
	The positive polarity terminal (plus) indicated by symbol IEC 60417-5005 (2002-10) and the negative polarity terminal (minus) by symbol IEC 60417-5006 (2002-10) (IEC 60335-2-29)	Incorrect polarity connection is prevented	N/A
	for indoor use only indicated by symbol IEC 60417-5957 (2004-12) (IEC 60335-2-29:2016/AMD1:2019)		P
	do not expose to moisture indicated by symbol IEC 60417-6062 (2011-05) (IEC 60335-2-29:2016/AMD1:2019)		N/A
7.7	Connection diagram fixed to appliances to be connected to more than two supply conductors and appliances for multiple supply, unless	No requirement for connection diagram	N/A
	correct mode of connection is obvious		N/A
7.8	Except for type Z attachment, terminals for connection to the supply mains indicated as follows:		N/A
	- marking of terminals exclusively for the neutral conductor (letter N)	No such terminals	N/A
	- marking of protective earthing terminals (symbol IEC 60417-5019)		N/A
	- marking of functional earthing terminals (symbol IEC 60417-5018)		N/A
	- marking not placed on removable parts		N/A
7.9	Marking or placing of switches which may cause a hazard	No switch	N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
7.10	Indications of switches on stationary appliances and controls on all appliances by use of figures, letters or other visual means.....	No switch	N/A
	This applies also to switches which are part of a control		N/A
	If figures are used, the off position indicated by the figure 0		N/A
	The figure 0 indicates only OFF position, unless no confusion with the OFF position		N/A
7.11	Indication for direction of adjustment of controls	No adjustment controls	N/A
7.12	Instructions for safe use provided		P
	Details concerning precautions during user maintenance	No maintenance required	N/A
	The instructions state that:		P
	- the appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction		P
	- children being supervised not to play with the appliance		P
	For a part of class III construction supplied from a detachable power supply unit, the instructions state that the appliance is only to be used with the unit provided	Class I	N/A
	Instructions for class III appliances state that it must only be supplied at SELV, unless	Class I	N/A
	it is a battery-operated appliance, the battery being charged outside the appliance	Not battery-operated appliance	N/A
	For appliances for altitudes exceeding 2000 m, the maximum altitude is stated	5000m	P
	The instructions for appliances incorporating a functional earth states that the appliance incorporates an earth connection for functional purposes only		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	The instructions shall (IEC 60335-2-29:2016/AMD1:2019):		—
	- state that during charging, the battery must be placed in a well-ventilated area (for chargers for batteries that release gases into the atmosphere during normal charging)		N/A
	- state that the battery charger must only be plugged into an earthed socket-outlet (for portable class I battery chargers for outdoor use)		N/A
	- explain the automatic function, stating any limitation (for automatic battery chargers)		N/A
	The instructions for type 1 battery chargers shall also:		—
	- specify the types, the number of batteries and the rated capacity of the batteries that can be charged		P
	- include a warning against recharging non-rechargeable batteries.		P
	The instructions for type 2 battery chargers shall also:		—
	- specify the batteries intended to be charged, such as by a catalogue number, series identification or the equivalent		N/A
	- specify the ambient temperature range for the charger during charging		N/A
	If symbol IEC 60417-5957 (2004-12) or symbol IEC 60417-6062 (2011-05) is used, its meaning shall be explained.		N/A
	Battery chargers for charging automobile batteries include substance concerning (IEC 60335-2-29):		—
	- the battery terminal not connected to the chassis has to be connected first. The other connection is to be made to the chassis, remote from the battery and fuel line. The battery charger is then to be connected to the supply mains		N/A
	- after charging, disconnect the battery charger from the supply mains. Then remove the chassis connection and then the battery connection		N/A
7.12.1	Sufficient details for installation supplied	No requirement for installation	N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	For an appliance intended to be permanently connected to the water mains and not connected by a hose-set, this is stated		N/A
	If different rated voltages or different rated frequencies are marked, the instructions state what action to be taken to adjust the appliance		N/A
	The instructions for battery chargers for installation in caravans and similar vehicles shall state that the connection to the supply mains is to be in accordance with the national wiring rules		N/A
7.12.2	Stationary appliances not fitted with means for disconnection from the supply mains having a contact separation in all poles that provide full disconnection under overvoltage category III, the instructions state that means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules	Portable appliances	N/A
7.12.3	Insulation of the fixed wiring in contact with parts exceeding 50 K during clause 11; instructions state that the fixed wiring must be protected	Not for fixed wiring	N/A
7.12.4	Instructions for built-in appliances:		N/A
	- dimensions of space	Not for built-in use	N/A
	- dimensions and position of supporting and fixing		N/A
	- minimum distances between parts and surrounding structure		N/A
	- minimum dimensions of ventilating openings and arrangement		N/A
	- connection to supply mains and interconnection of separate components		N/A
	- allow disconnection of the appliance after installation, by accessible plug or a switch in the fixed wiring, unless		N/A
	a switch complying with 24.3		N/A
7.12.5	Replacement cord instructions, type X attachment with a specially prepared cord	No supply cord provided	N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	Replacement cord instructions, type Y attachment		N/A
	Replacement cord instructions, type Z attachment		N/A
7.12.6	Caution in the instructions for appliances incorporating a non-self-resetting thermal cut-out that is reset by disconnection of the supply mains, if this cut-out is required to comply with the standard	No non-self-resetting thermal cut-out	N/A
7.12.7	Instructions for fixed appliances stating how the appliance is to be fixed	Not fixed appliances	N/A
7.12.8	Instructions for appliances connected to the water mains:		N/A
	- max. inlet water pressure (Pa).....	Not for connecting to water mains	N/A
	- min. inlet water pressure, if necessary (Pa)		N/A
	Instructions concerning new and old hose-sets for appliances connected to the water mains by detachable hose-sets		N/A
7.12.9	Instructions specified in 7.12 and from 7.12.1 to 7.12.8 appear together before any other instructions supplied with the appliance		P
	These instructions may be supplied with the appliance separately from any functional use booklet		P
	They may follow the description of the appliance that identifies parts, or follow the drawings/sketches		P
	In addition, instructions are also available in an alternative format such as on a website or on request from the user in a format such as a DVD		P
	In addition, instructions are also available in an alternative format such as on a website or in a format such as a DVD.....	Available on a website	P
7.13	Instructions and other texts in an official language	English	P
7.14	Markings clearly legible and durable:		P

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	Signal words WARNING, CAUTION, DANGER in uppercase having a height as specified	Min. 2.0mm	P
	Uppercase letter of the text explaining the signal word not smaller than 1,6 mm	Min. 1.6mm	P
	Moulded in, engraved, or stamped markings either raised above or have a depth below the surface of at least 0,25 mm, unless	Not moulded in, engraved, or stamped markings.	N/A
	contrasting colours are used		N/A
	Markings checked by inspection, measurement and rubbing test as specified		P
7.15	Markings on a main part	On the enclosure	P
	Marking clearly discernible from the outside, if necessary after removal of a cover		P
	For portable appliances, cover can be removed or opened without a tool	No removable cover without tools	N/A
	For stationary appliances, name, trademark or identification mark and model or type reference visible after installation	Portable appliances	N/A
	For fixed appliances, name, trademark or identification mark and model or type reference visible after installation according to the instructions	Portable appliances	N/A
	Indications for switches and controls placed on or near the components. Marking not on parts which can be positioned or repositioned in such a way that the marking is misleading	No switches and controls	N/A
	The symbol IEC 60417-5018 placed next to the symbol IEC 60417-5172 or IEC 60417-5180		P
7.16	Marking of a possible replaceable thermal link or fuse link clearly visible with regard to replacing the link	No replaceable thermal link or fuse link	N/A
7.101	D.C. distribution boards marked with (IEC 60335-2-29):		N/A
	- maximum output current (A) for each output circuit.....	No d.c. distribution board	N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	- types of any additional power supply which can be connected		N/A
8	**PROTECTION AGAINST ACCESS TO LIVE PARTS**		**P**
8.1	Adequate protection against accidental contact with live parts		P
	During insertion or removal of batteries having a battery voltage exceeding 42,4 V, protection against contact with live parts of the battery or of the battery charger ensured (IEC 60335-2-29)		N/A
8.1.1	Requirement applies for all positions, detachable parts removed		P
	Lamps behind a detachable cover not removed, if conditions met	No removable lamps	N/A
	Insertion or removal of lamps, protection against contact with live parts of the lamp cap		N/A
	Use of test probe B of IEC 61032, with a force not exceeding 1 N: no contact with live parts		P
	Use of test probe B of IEC 61032 through openings, with a force of 20N: no contact with live parts		P
8.1.2	Use of test probe 13 of IEC 61032, with a force not exceeding 1 N, through openings in class 0 appliances and class II appliances/constructions: no contact with live parts	Class I	N/A
	Test probe 13 also applied through openings in earthed metal enclosures having a non-conductive coating: no contact with live parts		N/A
8.1.3	For appliances other than class II, use of test probe 41 of IEC 61032, with a force not exceeding 1 N: no contact with live parts of visible glowing heating elements or supporting parts	Class I	P
	For a single switching action obtained by a switching device, requirements as specified	No switching device	N/A
	For appliances with a supply cord and without a switching device, the single switching action may be obtained by the withdrawal of the plug	No supply cord employed, only appliance inlet provided.	N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
8.1.4	Accessible part not considered live if:		P
	- safety extra-low a.c. voltage: peak value not exceeding 42.4 V		N/A
	- safety extra-low d.c. voltage: not exceeding 42.4 V	Max output voltage: 12.6 VDC	P
	- or separated from live parts by protective impedance		P
	If protective impedance: d.c. current not exceeding 2 mA, and		N/A
	a.c. peak value not exceeding 0.7 mA	Max. 0.220mA	P
	- for peak values over 42.4 V up to and including 450 V, capacitance not exceeding 0,1 μF	0.0011μF	P
	- for peak values over 450 V up to and including 15 kV, discharge not exceeding 45 μC		N/A
	- for peak values over 15kV, the energy in the discharge not exceeding 350 mJ		N/A
	For type 2 battery chargers, voltages and currents are also measured between relevant accessible parts of opposite polarity (IEC 60335-2-29:2016/AMD1:2019)		N/A
8.1.5	Live parts protected at least by basic insulation before installation or assembly:		N/A
	- built-in appliances	No installation or assembly required	N/A
	- fixed appliances		N/A
	- appliances delivered in separate units		N/A
8.2	Class II appliances and constructions constructed so that there is adequate protection against accidental contact with basic insulation and metal parts separated from live parts by basic insulation only	Class I	N/A
	Only possible to touch parts separated from live parts by double or reinforced insulation		N/A
9	**STARTING OF MOTOR-OPERATED APPLIANCES**		**N/A**

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	Requirements and tests are specified in part 2 when necessary	Battery charger	N/A
10	**POWER INPUT AND CURRENT**		**P**
10.1	Power input at normal operating temperature, rated voltage and normal operation not deviating from rated power input by more than shown in table 1.....	(see appended table)	N/A
	If the power input varies throughout the operating cycle and the maximum value of the power input exceeds, by a factor greater than two, the arithmetic mean value of the power input occurring during a representative period, the power input is the maximum value that is exceeded for more than 10 % of the representative period		N/A
	Otherwise the power input is the arithmetic mean value		N/A
	Test carried out at upper and lower limits of the ranges for appliances with one or more rated voltage ranges, unless		N/A
	the rated power input is related to the arithmetic mean value		N/A
10.2	Current at normal operating temperature, rated voltage and normal operation not deviating from rated current by more than shown in table 2	(see appended table)	P
	If the current varies throughout the operating cycle and the maximum value of the current exceeds, by a factor greater than two, the arithmetic mean value of the current occurring during a representative period, the current is the maximum value that is exceeded for more than 10 % of the representative period	No duty cycle	N/A
	Otherwise the current is the arithmetic mean value		N/A
	Test carried out at upper and lower limits of the ranges for appliances with one or more rated voltage ranges, unless	100-240VAC	P
	the rated current is related to the arithmetic mean value of the range		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
10.101	The DC output voltage of type 1 battery chargers not exceed 120 V (IEC 60335-2-29:2016/AMD1:2019)	Max. 12.6Vdc	P
	The DC output voltage of type 2 battery chargers not exceed 250 V (IEC 60335-2-29:2016/AMD1:2019)		N/A
10.102	For type 1 battery chargers, the arithmetic mean value of the output current not deviate from the rated DC output current by more than 10 % (IEC 60335-2-29:2016/AMD1:2019)	(see appended table)	P
	For type 2 battery chargers, the arithmetic mean value of the output current not exceed the rated DC output current by more than 10 % (IEC 60335-2-29:2016/AMD1:2019)	(see appended table)	N/A
11	**HEATING**		**P**
11.1	No excessive temperatures in normal use		P
11.2	The appliance is held, placed or fixed in position as described	Placed on wooden support.	P
	Battery chargers placed in the test corner as specified for heating appliances (IEC 60335-2-29)		P
11.3	Temperature rises, other than of windings, determined by thermocouples		P
	Temperature rises of windings determined by resistance method, unless	Switching transformer	N/A
	the windings are non-uniform or it is difficult to make the necessary connections		P
11.4	Heating appliances operated under normal operation at 1,15 times rated power input (W)		N/A
11.5	Battery chargers are operated under normal operation and supplied with the most unfavourable voltage between 0,94 times and 1,06 times the rated voltage.	94V/254.4V	P
11.6	Combined appliances operated under normal operation at most unfavourable voltage between 0,94- and 1,06-times rated voltage (V)		N/A
11.7	Battery chargers operated until steady conditions are established (IEC 60335-2-29)		P

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
11.8	Temperature rises monitored continuously and not exceeding the values in table 3	(see appended table)	P
	If the temperature rise of a motor winding exceeds the value of table 3, or	No motor	N/A
	if there is doubt with regard to classification of insulation,		N/A
	tests of Annex C are carried out		N/A
	Sealing compound does not flow out	No sealing compound	N/A
	Protective devices do not operate, except		P
	components in protective electronic circuits tested for the number of cycles specified in 24.1.4		N/A
13	**LEAKAGE CURRENT AND ELECTRIC STRENGTH AT OPERATING TEMPERATURE**		**P**
13.1	Leakage current not excessive and electric strength adequate		P
	Heating appliances operated at 1.15 times the rated power input (W)		N/A
	Motor-operated appliances and combined appliances supplied at 1,06 times the rated voltage (V)	254.4V	P
	Protective impedance and radio interference filters disconnected before carrying out the tests		P
13.2	The leakage current is measured by means of the circuit described in Figure 4 of IEC 60990:1999		P
	For class 0I appliances and class I appliances, except parts of class II construction, C may be replaced by a low impedance ammeter	Class I	P
	Leakage current measurements	(see appended table)	P
13.3	The appliance is disconnected from the supply		P
	Electric strength tests according to table 4	(see appended table)	P
	No breakdown during the tests		P
14	**TRANSIENT OVERVOLTAGES**		**N/A**

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Clause	Requirement + Test	Result - Remark	Verdict
	Appliances withstand the transient over-voltages to which they may be subjected		N/A
	Clearances having a value less than specified in table 16 subjected to an impulse voltage test, the test voltage specified in table 6.....	(see appended table)	N/A
	No flashover during the test, unless		N/A
	of functional insulation if the appliance complies with clause 19 with the clearance short-circuited		N/A
15	**MOISTURE RESISTANCE**		**P**
15.1	Enclosure provides the degree of moisture protection according to classification of the appliance	IP20	N/A
	Compliance checked as specified in 15.1.1, taking into account 15.1.2, followed by the electric strength test of 16.3		N/A
	No trace of water on insulation which can result in a reduction of clearances or creepage distances below values specified in clause 29		N/A
15.1.1	Appliances, other than IPX0, subjected to tests as specified in IEC 60529.....	IP20	P
	Water valves containing live parts in external hoses for connection of an appliance to the water mains tested as specified for IPX7 appliances		N/A
15.1.2	Hand-held appliance turned continuously through the most unfavourable positions during the test	Not hand-held appliance	N/A
	Built-in appliances installed according to the instructions	Not built-in appliances	N/A
	Appliances placed or used on the floor or table placed on a horizontal unperforated support		P
	Appliances normally fixed to a wall and appliances with pins for insertion into socket-outlets are mounted on a wooden board	Used on the floor or table	N/A
	For IPX3 appliances, the base of wall mounted appliances is placed at the same level as the pivot axis of the oscillating tube		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	For IPX4 appliances, the horizontal centre line of the appliance is aligned with the pivot axis of the oscillating tube, and		N/A
	for appliances normally used on the floor or table, the movement is limited to two times 90° for a period of 5 min, the support being placed at the level of the pivot axis of the oscillating tube		N/A
	Wall-mounted appliances, take into account the distance to the floor stated in the instructions		N/A
	Appliances normally fixed to a ceiling are mounted underneath a horizontal unperforated support, the pivot axis of the oscillating tube located at the level of the underside of the support, and		N/A
	for IPX4 appliances, the movement of the tube is limited to two times 90° from the vertical for a period of 5 min		N/A
	Appliances with type X attachment fitted with a flexible cord as described		N/A
	Detachable parts subjected to the relevant treatment with the main part		N/A
	However, if a part has to be removed for user maintenance and a tool is needed, this part is not removed		N/A
15.2	Spillage of liquid does not affect the electrical insulation		N/A
	Spillage solution comprising water containing approximately 1 % NaCl and 0,6 % rinsing agent		N/A
	Appliances with type X attachment fitted with a flexible cord as described		N/A
	Appliances incorporating an appliance inlet tested with or without a connector, whichever is most unfavourable		N/A
	Detachable parts are removed		N/A
	Overfilling test with additional amount of the solution, over a period of 1 min (l)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	The appliance withstands the electric strength test of 16.3		N/A
	No trace of water on insulation that can result in a reduction of clearances or creepage distances below values specified in clause 29		N/A
15.3	Appliances proof against humid conditions		P
	Checked by test Cab: Damp heat steady state in IEC 60068-2-78		P
	Detachable parts removed and subjected, if necessary, to the humidity test with the main part	No detachable parts	N/A
	Humidity test for 48 h in a humidity cabinet	Temp.: 25ºC, R.H.: 93%	P
	Reassembly of those parts that may have been removed		N/A
	The appliance withstands the tests of clause 16		P
16	**LEAKAGE CURRENT AND ELECTRIC STRENGTH**		**P**
16.1	Leakage current not excessive and electric strength adequate		P
	Protective impedance disconnected from live parts before carrying out the tests		P
	Tests carried out at room temperature and not connected to the supply		P
16.2	Single-phase appliances: test voltage 1,06 times rated voltage (V)	254.4V	P
	Three-phase appliances: test voltage 1,06 times rated voltage divided by √3 (V)		N/A
	Leakage current measurements	(see appended table)	P
	Limit values doubled if:		P
	- all controls have an off position in all poles, or		N/A
	- the appliance has no control other than a thermal cut-out, or		N/A
	- all thermostats, temperature limiters and energy regulators do not have an off position, or		N/A
	- the appliance has radio interference filters		P

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Clause	Requirement + Test	Result - Remark	Verdict
	With the radio interference filters disconnected, the leakage current do not exceed limits specified.....	(see appended table)	P
16.3	Electric strength tests according to table 7.....	(see appended table)	P
	Test voltage applied between the supply cord and inlet bushing and cord guard and cord anchorage as specified.....	(see appended table)	P
	No breakdown during the tests		N/A
17	**OVERLOAD PROTECTION OF TRANSFORMERS AND ASSOCIATED CIRCUITS**		**P**
	No excessive temperatures in transformer or associated circuits in event of short-circuits likely to occur in normal use.....	(see appended table)	P
	Appliance supplied with 1,06- or 0,94-times rated voltage under the most unfavourable short-circuit or overload likely to occur in normal use (V)	94V/254.4V Max. input: 46.22W / 0.310A	P
	Output terminals of battery chargers short-circuited (IEC 60335-2-29)		P
	Basic insulation is not short-circuited		P
	Temperature rise of insulation of the conductors of safety extra-low voltage circuits not exceeding the relevant value specified in table 3 by more than 15 K	Internal wire: Max. 22.3K	P
	Temperature of the winding not exceeding the value specified in table 8	Max. temperature of the winding: 81.3°C	P
	However, limits do not apply to fail-safe transformers complying with sub-clause 15.5 of IEC 61558-1		N/A
18	**ENDURANCE**		**N/A**
	Requirements and tests are specified in part 2 when necessary		N/A
19	**ABNORMAL OPERATION**		**P**
19.1	The risk of fire, mechanical damage or electric shock under abnormal or careless operation obviated		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Electronic circuits so designed and applied that a fault will not render the appliance unsafe	(see appended table)	P
	Appliances incorporating heating elements subjected to the tests of 19.2 and 19.3, and	No heating elements	N/A
	if the appliance also has a control that limit the temperature during clause 11 it is subjected to the test of 19.4, and	No such control	N/A
	if applicable, to the test of 19.5		N/A
	Appliances incorporating PTC heating elements are also subjected to the test of 19.6	No PTC heating elements	N/A
	Appliances incorporating motors subjected to the tests of 19.7 to 19.10, as applicable	No motor	N/A
	Appliances incorporating electronic circuits subjected to the tests of 19.11 and 19.12 and 19.101 to 19.103, as applicable (IEC 60335-2-29)		P
	Appliances incorporating electronic circuits subjected to the tests of 19.11 and 19.12, as applicable	No contactors or relays	N/A
	Appliances incorporating contactors or relays subjected to the test of 19.14, being carried out before the tests of 19.11		N/A
	Appliances incorporating voltage selector switches subjected to the test of 19.15		N/A
	Unless otherwise specified, the tests are continued until a non-self-resetting thermal cut-out operates, or	No voltage selector switches	N/A
	until steady conditions are established		N/A
	If a heating element or intentionally weak part becomes open-circuited, the relevant test is repeated on a second sample		P
19.2	Test of appliances with heating elements with restricted heat dissipation; test voltage (V), power input of 0,85 times rated power input (W).....	No heating element or intentionally weak part	N/A
19.3	Test of 19.2 repeated; test voltage (V), power input of 1,24 times rated power input (W).....		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
19.4	Test conditions as in clause 11, any control limiting the temperature during tests of clause 11 short-circuited		N/A
19.5	Test of 19.4 repeated on Class 0I and I appliances with tubular sheathed or embedded heating elements. No short-circuiting, but one end of the element connected to the sheath	No such component	N/A
	The test repeated with reversed polarity and the other end of the heating element connected to the sheath		N/A
	The test is not carried out on appliances intended to be permanently connected to fixed wiring and on appliances where an all-pole disconnection occurs during the test of 19.4		N/A
19.6	Appliances with PTC heating elements tested at rated voltage, establishing steady conditions	No PTC heating elements	N/A
	The working voltage of the PTC heating element is increased by 5% and the appliance is operated until steady conditions are re-established. The voltage is then increased in similar steps until 1,5 times working voltage or until the PTC heating element ruptures (V):		N/A
19.7	Stalling test by locking the rotor if the locked rotor torque is smaller than the full load torque, or	No rotor	N/A
	locking moving parts of other appliances		N/A
	Locked rotor, capacitors open-circuited one at a time		N/A
	Test repeated with capacitors short-circuited one at a time, unless		N/A
	the capacitor is of class S2 or S3 of IEC 60252-1		N/A
	Appliances with timer or programmer supplied with rated voltage for each of the tests, for a period equal to the maximum period allowed		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	An electronic timer or programmer that operates to ensure compliance with the test before the maximum period under the conditions of Clause 11 is reached, is a protective electronic circuit		N/A
	Other appliances supplied with rated voltage for a period as specified		N/A
	Winding temperatures not exceeding values specified in table 8	(see appended table)	N/A
19.8	Multi-phase motors operated at rated voltage with one phase disconnected	No motor	N/A
19.9	Running overload test on appliances incorporating motors intended to be remotely or automatically controlled or liable to be operated continuously	No motor	N/A
	Motor-operated and combined appliances for which 30.2.3 is applicable and that use overload protective devices relying on electronic circuits to protect the motor windings, are also subjected to the test		N/A
	Winding temperatures not exceeding values as specified	(see appended table)	N/A
19.10	Series motor operated at 1,3 times rated voltage for 1 min (V)		N/A
	During the test, parts not being ejected from the appliance		N/A
19.11	Electronic circuits, compliance checked by evaluation of the fault conditions specified in 19.11.2 for all circuits or parts of circuits, unless		P
	they comply with the conditions specified in 19.11.1		P
	Appliances incorporating an electronic circuit that relies upon a programmable component to function correctly, subjected to the test of 19.11.4.8, unless	No such component	N/A
	restarting does not result in a hazard		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Appliances having a device with an off position obtained by electronic disconnection, or a device placing the appliance in a stand-by mode, subjected to the tests of 19.11.4	No such switch	N/A
	If the safety of the appliance under any of the fault conditions depends on the operation of a miniature fuse-link complying with IEC 60127, the test of 19.12 is carried out		P
	During and after each test the following is checked:		P
	- the temperature of the windings do not exceed the values specified in table 8	No higher temperature	P
	- the appliance complies with the conditions specified in 19.13		P
	- any current flowing through protective impedance not exceeding the limits specified in 8.1.4		P
	If a conductor of a printed board becomes open-circuited, the appliance is considered to have withstood the particular test, provided both of the following conditions are met:		N/A
	- the base material of the printed circuit board withstands the test of Annex E		N/A
	- any loosened conductor does not reduce clearance or creepage distances between live parts and accessible metal parts below the values specified in clause 29	No open of conductor of a printed board	N/A
19.11.1	Fault conditions a) to g) in 19.11.2 are not applied to circuits or parts of circuits meeting both of the following conditions:		P
	- the electronic circuit is a low-power circuit, that is, the maximum power at low-power points does not exceed 15 W according to the tests specified		N/A
	- the protection against electric shock, fire hazard, mechanical hazard or dangerous malfunction of other parts of the appliance does not rely on the correct functioning of the electronic circuit		P
19.11.2	Fault conditions applied one at a time, the appliance operating under conditions specified in clause 11, but supplied at rated voltage, duration of the tests as specified:		P

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	a) short circuit of functional insulation if clearances or creepage distances are less than the values specified in clause 29		P
	b) open circuit at the terminals of any component	Evaluated	P
	c) short circuit of capacitors, unless	Short-circuit C1, C14	P
	they comply with IEC 60384-14		P
	d) short circuit of any two terminals of an electronic component, other than integrated circuits	Short-circuit BD1, D6, Q1, Q2, U4 pin 1-2, U4 pin 3-4	P
	This fault condition is not applied between the two circuits of an optocoupler		P
	e) failure of triacs in the diode mode		N/A
	f) failure of microprocessors and integrated circuits		P
	g) failure of an electronic power switching device		N/A
	Each low power circuit is short-circuited by connecting the low-power point to the pole of the supply source from which the measurements were made		N/A
19.11.3	If the appliance incorporates a protective electronic circuit that operates to ensure compliance with clause 19, the appliance is tested as specified		P
19.11.4	Appliances having a device with an off position obtained by electronic disconnection, or		N/A
	a device that can be placed in the stand-by mode,		N/A
	subjected to the tests of 19.11.4.1 to 19.11.4.7, the device being set in the off position or in the stand-by mode		N/A
	Appliances incorporating a protective electronic circuit subjected to the tests of 19.11.4.1 to 19.11.4.7, the tests being carried out after the protective electronic circuit has operated, except that		P
	appliances operated for 30 s or 5 min during the test of 19.7 are not subjected to the tests for electromagnetic phenomena		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	Surge protective devices disconnected, unless		P
	They incorporate spark gaps		N/A
19.11.4.1	The appliance is subjected to electrostatic discharges in accordance with IEC 61000-4-2, test level 4		P
19.11.4.2	The appliance is subjected to radiated fields in accordance with IEC 61000-4-3, at frequency ranges specified		P
19.11.4.3	The appliance is subjected to fast transient bursts in accordance with IEC 61000-4-4, test level 3 or 4 as specified		P
19.11.4.4	The power supply terminals of the appliance subjected to voltage surges in accordance with IEC 61000-4-5, test level 3 or 4 as specified		P
	An open circuit test voltage of 2 kV is applicable for the line-to-line coupling mode		P
	An open circuit test voltage of 4 kV is applicable for the line-to-earth coupling		P
	Earthed heating elements in class I appliances disconnected	No heating elements	N/A
19.11.4.5	The appliance is subjected to injected currents in accordance with IEC 61000-4-6, test level 3		P
19.11.4.6	Appliances having a rated current not exceeding 16 A are subjected to the Class 3 voltage dips and interruptions in accordance with IEC 61000-4-11		P
	Appliances having a rated current exceeding 16 A are subjected to the Class 3 voltage dips and interruptions in accordance with IEC 61000-4-34		N/A
19.11.4.7	The appliance is subjected to mains signals in accordance with IEC 61000-4-13, test level class 2		P
19.11.4.8	The appliance is supplied at rated voltage and operated under normal operation. After 60s the power supply is reduced to a level such that the appliance ceases to respond or parts controlled by the programmable component cease to operate	No programmable component	N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	The appliance continues to operate normally, or		N/A
	requires a manual operation to restart		N/A
19.12	If the safety of the appliance for any of the fault conditions specified in 19.11.2 depends on the operation of a miniature fuse-link complying with IEC 60127, the test is repeated, measuring the current flowing through the fuse-link; measured current (A); rated current of the fuse-link (A)	Measured current: 15A min. Rated fuse current: 3.15A (MOV1 short circuit, the max. current is 356A)	P
19.13	During the tests the appliance does not emit flames, molten metal, poisonous or ignitable gas in hazardous amounts		P
	Temperature rises not exceeding the values shown in table 9	(see appended table)	N/A
	During the tests, the values of Table 8 apply (IEC 60335-2-29)		P
	Compliance with clause 8 not impaired		P
	No rupture of the battery (IEC 60335-2-29)		P
	If the appliance can still be operated it complies with 20.2		N/A
	Insulation, other than of class III appliances or class III constructions that do not contain live parts, withstands the electric strength test of 16.3, the test voltage as specified in table 4:		P
	- basic insulation (V)	1000V	P
	- supplementary insulation (V)	1750V	P
	- reinforced insulation (V).....	3000V	P
	After operation or interruption of a control, clearances and creepage distances across the functional insulation withstand the electric strength test of 16.3, the test voltage being twice the working voltage		P
	The appliance does not undergo a dangerous malfunction, and		P
	no failure of protective electronic circuits, if the appliance is still operable		P

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	Appliances tested with an electronic switch in the off position, or in the stand-by mode:		N/A
	- do not become operational, or	No electronic switch	N/A
	- if they become operational, do not result in a dangerous malfunction during or after the tests of 19.11.4		N/A
	If the appliance contains lids or doors that are controlled by one or more interlocks, one of the interlocks may be released provided that:		N/A
	- the lid or door does not move automatically to an open position when the interlock is released, and		N/A
	- the appliance does not start after the cycle in which the interlock was released		N/A
19.14	Appliances operated under the conditions of clause 11, any contactor or relay contact operating under the conditions of clause 11 being short-circuited	No contact or relay.	N/A
	For a relay or contactor with more than one contact, all contacts are short-circuited at the same time		N/A
	A relay or contactor operating only to ensure the appliance is energized for normal use is not short-circuited		N/A
	If more than one relay or contactor operates in clause 11, they are short-circuited in turn		N/A
19.15	For appliances with a mains voltage selector switch, the switch is set to the lowest rated voltage position and the highest value of rated voltage is applied	No mains voltage selector switch	N/A
19.101	Battery chargers supplied at rated voltage and operated under normal operation, any control limiting the temperature during tests of clause 11 short-circuited (IEC 60335-2-29)	No control operates during the test of Clause 11	N/A
19.102	Reverse connection of battery chargers to a fully charged battery at rated voltage (IEC 60335-2-29)	Unit shut down immediately	P
	The capacity of the battery (IEC 60335-2-29)	6.7Ah (Max. capacitor specified by manufacturer)	P

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
19.103	Battery chargers intended to be used with a d.c. distribution board supplied at rated voltage and operated under normal operation, load increased as specified until protective device operates or short-circuit conditions are established (IEC 60335-2-29)	No d.c. distribution board	N/A
20	**STABILITY AND MECHANICAL HAZARDS**		**P**
20.1	Appliances having adequate stability		P
	Tilting test through an angle of 10°, appliance placed on an inclined plane/horizontal support, not connected to the supply mains; appliance does not overturn		P
	Tilting test repeated on appliances with heating elements, angle of inclination increased to 15°		N/A
	Possible heating test in overturned position; temperature rise does not exceed values shown in table 9		N/A
20.2	Moving parts adequately arranged or enclosed as to provide protection against personal injury	No moving part	N/A
	Protective enclosures, guards and similar parts are non-detachable, and		N/A
	have adequate mechanical strength		N/A
	Enclosures that can be opened by overriding an interlock are considered to be detachable parts		N/A
	Self-resetting thermal cut-outs and overcurrent protective devices not causing a hazard by unexpected closure		N/A
	Not possible to touch dangerous moving parts with the test probe described		N/A
21	**MECHANICAL STRENGTH**		**P**
21.1	Appliance has adequate mechanical strength and is constructed as to withstand rough handling		P

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	Checked by applying 3 blows to every point of the enclosure like to be weak, in accordance with test Ehb of IEC 60068-2-75, spring hammer test, with an impact energy of 1,0 J ± 0,05 J (IEC 60335-2-29)	(see appended table)	P
	The appliance shows no damage impairing compliance with this standard, and		P
	compliance with 8.1, 15.1 and clause 29 not impaired		P
	If doubt, supplementary or reinforced insulation subjected to the electric strength test of 16.3		N/A
	If necessary, repetition of groups of three blows on a new sample		N/A
21.2	Accessible parts of solid insulation having strength to prevent penetration by sharp implements		P
	Test not applicable if the thickness of supplementary insulation is at least 1 mm and reinforced insulation at least 2 mm		P
	The insulation is tested as specified, and does withstand the electric strength test of 16.3		N/A
21.101	Battery chargers, other than built-in battery chargers, having a mass not exceeding 5 kg, subjected to free-fall procedure of IEC 60068-2-31 (IEC 60335-2-29)	Dropped onto the concrete floor from a height of 1 m	P
	Battery chargers show no damage that could impair compliance with 8.1, 15.1.1, 16.3 and cl. 29 (IEC 60335-2-29)		P
21.102	Battery chargers for installing in caravans and similar vehicles withstand vibrations to which they may be subjected (IEC 60335-2-29)	Not for such use	N/A
	Vibration test as specified in IEC 60068-2-6 under conditions specified (IEC 60335-2-29)		N/A
	Battery chargers show no damage that could impair compliance with 8.1, 15.1.1, 16.3 and cl. 29 (IEC 60335-2-29)		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	Connections have not worked loose (IEC 60335-2-29)		N/A
22	**CONSTRUCTION**		**P**
22.1	Appliance marked with the first numeral of the IP system, relevant requirements of IEC 60529 are fulfilled	IP20	P
22.2	Stationary appliance: means to ensure all-pole disconnection from the supply being provided:		N/A
	- a supply cord fitted with a plug, or	Not stationary appliance	N/A
	- a switch complying with 24.3, or		N/A
	- a statement in the instruction sheet that a disconnection incorporated in the fixed wiring is to be provided, or		N/A
	- an appliance inlet		N/A
	Singe-pole switches and single-pole protective devices for the disconnection of heating elements in single-phase, permanently connected class 01 and class I appliances, connected to the phase conductor		N/A
22.3	Appliance provided with pins: no undue strain on socket-outlets	Not direct plug-in appliance	N/A
	Applied torque not exceeding 0,25 Nm		N/A
	Pull force of 50N to each pin after the appliance has being placed in the heating cabinet; when cooled to room temperature the pins are not displaced by more than 1mm		N/A
	Each pin subjected to a torque of 0.4Nm; the pins are not rotating, unless		N/A
	rotating does not impair compliance with this standard		N/A
22.4	Appliance for heating liquids and appliance causing undue vibration not provided with pins for insertion into socket-outlets	Not for heating liquids	N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
22.5	No risk of electric shock when touching pins, for appliances having a capacitor with rated capacitance equal to or greater than 0,1μF, the appliance being disconnected from the supply at the instant of voltage peak	X capacitor, 0.47μF	P
	Voltage not exceeding 34 V (V)	16V measured	P
	If compliance relies on the operation of an electronic circuit, the electromagnetic phenomena tests of 19.11.4.3 and 19.11.4.4 are applied	No such electronic circuit	N/A
	The discharge test is then repeated three times, voltage not exceeding 34 V (V).....		N/A
22.6	Electrical insulation not affected by condensing water or leaking liquid	No liquid	N/A
	Electrical insulation of Class II appliances not affected if a hose ruptures or seal leaks		N/A
	In case of doubt, test as described		N/A
22.7	Adequate safeguards against the risk of excessive pressure in appliances containing liquid or gases or having steam-producing devices		N/A
22.8	Electrical connections not subject to pulling during cleaning of compartments to which access can be gained without the aid of a tool, and that are likely to be cleaned in normal use		N/A
22.9	Insulation, internal wiring, windings, commutators and slip rings not exposed to oil, grease or similar substances, unless	No such substances used	N/A
	the substance has adequate insulating properties		N/A
22.10	Not possible to reset voltage-maintained non-self-resetting thermal cut-outs by the operation of an automatic switching device incorporated within the appliance, if:	No thermal cut-outs	N/A
	- a non-self-resetting thermal cut-out is required by the standard, and		N/A
	- a voltage maintained non-self-resetting thermal cut-out is used to meet it		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Non-self-resetting thermal motor protectors have a trip-free action, unless		N/A
	they are voltage maintained		N/A
	Reset buttons of non-self-resetting controls so located or protected that accidental resetting is unlikely		N/A
22.11	Reliable fixing of non-detachable parts that provide the necessary degree of protection against electric shock, moisture or contact with moving parts		P
	Obvious locked position of snap-in devices used for fixing such parts		N/A
	No deterioration of the fixing properties of snap-in devices used in parts that are likely to be removed during installation or servicing		N/A
	Tests as described		N/A
22.12	Handles, knobs etc. fixed in a reliable manner, if loosening result in a hazard	No handles and knobs	N/A
	Removing or fixing in wrong position of handles, knobs etc. indicating position of switches or similar components not possible, if resulting in a hazard		N/A
	A choking hazard does not apply to appliances for commercial use		N/A
	Axial force 15 N applied to parts, the shape being so that an axial pull is unlikely to be applied		N/A
	Axial force 30 N applied to parts, the shape being so that an axial pull is likely to be applied		N/A
	If the part is removed and can be contained within the small parts cylinder, it is considered to be a choking hazard		N/A
22.13	Unlikely that handles, when gripped as in normal use, make the operator’s hand touch parts having a temperature rise exceeding the value specified for handles which are held for short periods only	No handles	N/A
22.14	No ragged or sharp edges creating a hazard for the user in normal use, or during user maintenance		P

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Clause	Requirement + Test	Result - Remark	Verdict
	No exposed pointed ends of self-tapping screws or other fasteners, likely to be touched by the user in normal use or during user maintenance		P
22.15	Storage hooks and the like for flexible cords smooth and well rounded	No such hooks	N/A
22.16	Automatic cord reels cause no undue abrasion or damage to the sheath of the flexible cord, no breakage of conductors strands and no undue wear of contacts	No cord reels	N/A
	Cord reel tested with 6000 operations, as specified		N/A
	Electric strength test of 16.3, voltage of 1000 V applied		N/A
22.17	Spacers not removable from the outside by hand or by means of a screwdriver or a spanner	No spacers	N/A
22.18	Current-carrying parts and other metal parts resistant to corrosion	Output contacts	P
22.19	Driving belts not relied upon to provide the required level of insulation, unless	No driving belts	N/A
	constructed to prevent inappropriate replacement		N/A
22.20	Direct contact between live parts and thermal insulation effectively prevented, unless		P
	material used is non-corrosive, non-hygroscopic and non-combustible		P
22.21	Wood, cotton, silk, ordinary paper and fibrous or hygroscopic material not used as insulation, unless	No such substances used	P
	impregnated		N/A
	This requirement does not apply to magnesium oxide and mineral ceramic fibres used for the electrical insulation of heating elements		N/A
22.22	Appliances not containing asbestos		P
22.23	Oils containing polychlorinated biphenyl (PCB) not used	No oil used	P

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Clause	Requirement + Test	Result - Remark	Verdict
22.24	Bare heating elements, except in class III appliances or class III constructions that do not contain live parts, adequately supported	No heating elements	N/A
	In case of rupture, the heating conductor is unlikely to come in contact with accessible metal parts		N/A
22.25	Sagging heating conductors, except in class III appliances or class III constructions that do not contain live parts, cannot come into contact with accessible metal parts		N/A
22.26	The output circuit of a type 1 battery charger supplied through a safety isolating transformer and shall not be connected to accessible metal parts or an earthing terminal (IEC 60335-2-29:2016/AMD1:2019)		P
	The insulation between parts operating at safety extra-low voltage and live parts comply with the requirements for double insulation or reinforced insulation (IEC 60335-2-29:2016/AMD1:2019)		P
	The output circuit of a type 2 battery charger supplied through an isolating transformer and shall not be connected to accessible metal parts or an earthing terminal (IEC 60335-2-29:2016/AMD1:2019)		N/A
	The insulation between parts operating at safety extra-low voltage and live parts comply with the requirements for double insulation or reinforced insulation (IEC 60335-2-29:2016/AMD1:2019)		N/A
22.27	Parts connected by protective impedance separated by double or reinforced insulation	Two Y capacitors connected in series	P
22.28	Metal parts of Class II appliances conductively connected to gas pipes or in contact with water, separated from live parts by double or reinforced insulation		N/A
22.29	Class II appliances permanently connected to fixed wiring so constructed that the required degree of access to live parts is maintained after installation	Not for fixed wiring	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
22.30	Parts serving as supplementary or reinforced insulation fixed so that they cannot be removed without being seriously damaged, or		P
	so constructed that they cannot be replaced in an incorrect position, and so that if they are omitted, the appliance is rendered inoperable or manifestly incomplete		P
22.31	Neither clearances nor creepage distances over supplementary and reinforced insulation reduced below values specified in clause 29 as a result of wear		P
	Neither clearances nor creepage distances between live parts and accessible parts reduced below values for supplementary insulation if wires, screws etc. become loose		P
22.32	Supplementary and reinforced insulation constructed or protected against pollution so that clearances or creepage distances are not reduced below the values in clause 29		P
	Supplementary insulation of natural or synthetic rubber resistant to ageing, or arranged and dimensioned so that creepage distances are not reduced below values specified in 29.2		N/A
	Ceramic material not tightly sintered, similar materials or beads alone not used as supplementary or reinforced insulation	No ceramic or similar material or beads	N/A
	Ceramic and similar porous material in which heating conductors are embedded is considered to be basic insulation, not reinforced insulation	No heating conductor	N/A
	Oxygen bomb test at 70 °C for 96 h and 16 h at room temperature		N/A
22.33	Conductive liquids that are or may become accessible in normal use and conductive liquids that are in contact with unearthed accessible metal parts are not in direct contact with live parts, or	No conductive liquids	N/A
	unearthed metal parts separated from live parts by basic insulation only		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	Electrodes not used for heating liquids		N/A
	For class II constructions, conductive liquids that are or may become accessible in normal use and conductive liquids that are in contact with unearthed accessible metal parts, not in direct contact with basic or reinforced insulation, unless		N/A
	the reinforced insulation consists of at least 3 layers		N/A
	For class II constructions, conductive liquids which are in contact with live parts, not in direct contact with reinforced insulation, unless		N/A
	the reinforced insulation consists of at least 3 layers		N/A
	An air layer not used as basic or supplementary insulation in a double insulation system if likely to be bridged by leaking liquid		N/A
22.34	Shafts of operating knobs, handles, levers etc. not live, unless	No knobs, handles, levers	N/A
	the shaft is not accessible when the part is removed		N/A
22.35	For other than class III constructions, handles, levers and knobs, held or actuated in normal use, not becoming live in the event of a failure of basic insulation	No knobs, handles, levers	N/A
	Such parts being of metal, and their shafts or fixings are likely to become live in the event of a failure of basic insulation, are either adequately covered by insulation material or their accessible parts are separated from their shafts or fixings by supplementary insulation		N/A
	This requirement does not apply to handles, levers and knobs on stationary appliances and cordless appliances, other than those of electrical components, provided they are reliably connected to an earthing terminal or earthing contact, or separated from live parts by earthed metal		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Insulating material covering metal handles, levers and knobs withstand the electric strength test of 16.3 for supplementary insulation		N/A
22.36	For appliances other than class III, handles continuously held in the hand in normal use so constructed that when gripped as in normal use, the operators hand is not likely to touch metal parts, unless	No handles	N/A
	they are separated from live parts by double or reinforced insulation		N/A
22.37	Capacitors in Class II appliances not connected to accessible metal parts and their casings, if of metal, separated from accessible metal parts by supplementary insulation, unless		N/A
	the capacitors comply with 22.42		N/A
22.38	Capacitors not connected between the contacts of a thermal cut-out	No thermal cut-out	N/A
22.39	Lamp holders used only for the connection of lamps		N/A
22.40	Motor-operated appliances and combined appliances intended to be moved while in operation, or having accessible moving parts, fitted with a switch to control the motor. The actuating member of the switch being easily visible and accessible		N/A
	If the appliance cannot operate continuously, automatically or remotely without giving rise to a hazard, appliances for remote operation being fitted with a switch for stopping the operation. The actuating member of the switch being easily visible and accessible	Not for remote operation	N/A
22.41	No components, other than lamps, containing mercury		P
22.42	Protective impedance consisting of at least two separate components	Two Y-capacitors connected in series	P

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	Values specified in 8.1.4 not exceeded if any one of the components are short-circuited or open-circuited	One Y-capacitor short-circuited: max 0.296mA peak	P
	Resistors checked by the test of 14.1 a) in IEC 60065		N/A
	Capacitors checked by the tests for class Y capacitors in IEC 60384-14	Approved Y capacitors	P
22.43	Appliances adjustable for different voltages, accidental changing of the setting of the voltage unlikely to occur		N/A
22.44	Appliances not having an enclosure that is shaped or decorated like a toy		P
22.45	When air is used as reinforced insulation, clearances not reduced below the values specified in 29.1.3 due to deformation as a result of an external force applied to the enclosure		P
22.46	For programmable protective electronic circuits used to ensure compliance with the standard, the software contains measures to control the fault/error conditions in table R.1	No programmable protective electronic circuits	N/A
	Software that contains measures to control the fault/error conditions specified in table R.2 is to be specified in parts 2 for particular constructions or to address specific hazards		N/A
	These requirements are not applicable to software used for functional purpose or compliance with clause 11		N/A
22.47	Appliances connected to the water mains withstand the water pressure expected in normal use	Not for connecting to the water mains	N/A
	No leakage from any part, including any inlet water hose		N/A
22.48	Appliances connected to the water mains constructed to prevent backsiphonage of non-potable water	Not for connecting to the water mains	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
22.49	For remote operation, the duration of operation is to be set before the appliance can be started, unless	No remote operation function	N/A
	the appliance switches off automatically or can operate continuously without hazard		N/A
22.50	Controls incorporated in the appliance take priority over controls actuated by remote operation	No remote operation function	N/A
22.51	There is a control on the appliance manually adjusted to the setting for remote operation before the appliance can be operated in this mode	No remote operation function	N/A
	There is a visual indication showing that the appliance is adjusted for remote operation		N/A
	These requirements not necessary on appliances that can operate as follows, without giving rise to a hazard:		N/A
	- continuously, or		N/A
	- automatically, or		N/A
	- remotely		N/A
22.52	Socket-outlets on appliances accessible to the user in accordance with the socket-outlet system used in the country in which the appliance is sold	No socket-outlet on the appliance	N/A
22.53	Class II appliances and class III appliances that incorporate functionally earthed parts have at least double insulation or reinforced insulation between live parts and the functionally earthed parts	Class I	N/A
22.54	Button cells and batteries designated R1 not accessible without the aid of a tool, unless	No battery	N/A
	the cover of their compartment can only be opened after at least two independent movements have been applied simultaneously		N/A
22.55	Devices operated to stop the intended function of the appliance, if any, are be distinguished from other manual devices by means of shape, size, surface texture or position		N/A
	The requirement concerning position does not preclude use of a push on push off switch		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	An indication when the device has been operated is given by:		N/A
	– tactile feedback from the actuator or from the appliance, or		N/A
	– reduction in heat output; or		N/A
	– audible and visible feedback		N/A
22.56	Detachable power supply part provided with the part of class III construction		N/A
22.57	The properties of non-metallic materials do not degrade from exposure to UV-C radiation, as specified in Annex T		N/A
	This requirement does not apply to glass, ceramics or similar materials		N/A
22.101	Each circuit supplied from a d.c. distribution board incorporates an overload protective device (IEC 60335-2-29)	No such output conductor	N/A
22.102	Battery chargers for installing in caravans and similar vehicles constructed so that they can be securely fixed to a support (IEC 60335-2-29)	No d.c. distribution board	N/A
22.102	Keyhole slots, hooks and similar means, without any further means to prevent the battery charger from being inadvertently lifted off the support not considered to be securely fixed (IEC 60335-2-29)	Not for such use	N/A
23	**INTERNAL WIRING**		**P**
23.1	Wireways smooth and free from sharp edges		P
	Wires protected against contact with burrs, cooling fins etc.		P
	Wire holes in metal well-rounded or provided with bushings		N/A
	Wiring effectively prevented from coming into contact with moving parts	No moving parts	N/A
23.2	Beads etc. on live wires cannot change their position, and are not resting on sharp edges	No beads	N/A
	Beads inside flexible metal conduits contained within an insulating sleeve		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
23.3	Electrical connections and internal conductors movable relatively to each other not exposed to undue stress	No movable conductors	N/A
	Flexible metallic tubes not causing damage to insulation of conductors		N/A
	Open-coil springs not used		N/A
	Adequate insulating lining provided inside a coiled spring, the turns of which touch one another		N/A
	No damage after 10 000 flexings for conductors flexed during normal use, or		N/A
	100 flexings for conductors flexed during user maintenance		N/A
	Electric strength test of 16.3, 1000 V between live parts and accessible metal parts		N/A
	Not more than 10% of the strands of any conductor broken, and		N/A
	not more than 30% for wiring supplying circuits that consume no more than 15W		N/A
23.4	Bare internal wiring sufficiently rigid and fixed	No bare internal wiring	N/A
23.5	The insulation of internal wiring subjected to the supply mains voltage withstanding the electrical stress likely to occur in normal use		P
	Basic insulation electrically equivalent to the basic insulation of cords complying with IEC 60227 or IEC 60245, or		P
	no breakdown when a voltage of 2000 V is applied for 15 min between the conductor and metal foil wrapped around the insulation		P
	For class II construction, the requirements for supplementary insulation and reinforced insulation apply,		N/A
	except that the sheath of a cord complying with IEC 60227 or IEC 60245 may provide supplementary insulation.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	A single layer of internal wiring insulation does not provide reinforced insulation		P
23.6	Sleeving used as supplementary insulation on internal wiring retained in position by clamping at both ends, or	Glue used as supplementary fixed means	N/A
	be such that it can only be removed by breaking or cutting		N/A
23.7	The colour combination green/yellow only used for earthing conductors	Only appliance inlet provided	N/A
23.8	Aluminium wires not used for internal wiring	No aluminium wires	P
23.9	Stranded conductors not consolidated by soldering where they are subjected to contact pressure, unless	No stranded conductors	N/A
	the contact pressure is provided by spring terminals		N/A
23.10	The insulation and sheath of internal wiring, incorporated in external hoses for the connection of an appliance to the water mains, at least equivalent to that of light polyvinyl chloride sheathed flexible cord (60227 IEC 52)		N/A
24	**COMPONENTS**		**P**
24.1	Components comply with safety requirements in relevant IEC standards		P
	List of components.....	(see appended table)	P
	Motors not required to comply with IEC 60034-1, they are tested as part of the appliance	No motor	N/A
	Relays tested as part of the appliance, or	No relay	N/A
	alternatively acc. to IEC 60730-1, and meeting the additional requirements in IEC 60335-1		N/A
	The requirements of Clause 29 apply between live parts of components and accessible parts of the appliance		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Components can comply with the requirements for clearances and creepage distances for functional insulation in the relevant component standard		N/A
	30.2 of this standard apply to parts of non-metallic material in components including parts of non-metallic material supporting current-carrying connections	Bobbin of transformer	P
	Components that have not been previously tested to comply with the IEC standard for the relevant component are tested according to the requirements of 30.2	Bobbin	P
	Components that have been previously tested to comply with the resistance to fire requirements in the IEC standard for the relevant component need not be retested provided the specified conditions are met	PCB	P
	If these conditions are not satisfied, the component is tested as part of the appliance.		P
	Power electronic converter circuits not required to comply with IEC 62477-1, they are tested as part of the appliance		P
	If components have not been tested and found to comply with relevant IEC standard for the number of cycles specified, they are tested in accordance with 24.1.1 to 24.1.9		N/A
	For components mentioned in 24.1.1 to 24.1.9 no additional tests specified in the relevant component standard are necessary other than those specified in 24.1.1 to 24.1.9		P
	Components not tested and found to comply with relevant IEC standard and components not marked or not used in accordance with its marking, tested under the conditions occurring in the appliance		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Lampholders and starterholders that have not being tested and found to comply with the relevant IEC standard, tested as a part of the appliance and additionally according to the gauging and interchangeability requirements of the relevant IEC standard	No lampholder or starterholder	N/A
	No additional tests specified for nationally standardized plugs such as those detailed in IEC/TR 60083 or connectors complying with the standard sheets of IEC 60320-1 and IEC 60309		P
24.1.1	Capacitors likely to be permanently subjected to the supply voltage and used for radio interference suppression or for voltage dividing, comply with IEC 60384-14	Certified X and Y capacitor	P
	If the capacitors have to be tested, they are tested according to Annex F		N/A
24.1.2	Transformers in associated switch mode power supplies comply with Annex BB of IEC 61558-2-16		P
	Safety isolating transformers comply with IEC 61558-2-6		N/A
	If they have to be tested, they are tested according to Annex G		P
	The relevant standard for isolating transformers is IEC 61558-2-4 (IEC 60335-2-29:2016/AMD1:2019)		N/A
	If they have to be tested, they tested in accordance with Annex BB (IEC 60335-2-29:2016/AMD1:2019)		P
24.1.3	Switches comply with IEC 61058-1, the number of cycles of operation being at least 10 000	No switch	N/A
	If they have to be tested, they are tested according to Annex H		N/A
	If the switch operates a relay or contactor, the complete switching system is subjected to the test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	If the switch only operates a motor staring relay complying with IEC 60730-2-10 with the number of cycles of a least 10 000 as specified, the complete switching system need not be tested		N/A
24.1.4	Automatic controls comply with IEC 60730-1 with the relevant part 2. The number of cycles of operation being at least:		N/A
	- thermostats: 10 000		N/A
	- temperature limiters: 1 000		N/A
	- self-resetting thermal cut-outs: 300		N/A
	- voltage maintained non-self-resetting thermal cut-outs: 1 000		N/A
	- other non-self-resetting thermal cut-outs: 30		N/A
	- timers: 3 000		N/A
	- energy regulators: 10 000		N/A
	The number of cycles for controls operating during clause 11 need not be declared, if the appliance meets the requirements of this standard when they are short-circuited		N/A
	Thermal motor protectors are tested in combination with their motor under the conditions specified in Annex D		N/A
	For water valves containing live parts and that are incorporated in external hoses for connection of an appliance to the water mains, the degree of protection declared for subclause 6.5.2 of IEC 60730-2-8 is IPX7		N/A
	Thermal cut-outs of the capillary type comply with the requirements for type 2.K controls in IEC 60730-2-9		N/A
24.1.5	Appliance couplers comply with IEC 60320-1	Approved appliance couplers	P
	However, for class II appliances classified higher than IPX0, the appliance couplers comply with IEC 60320-2-3		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Interconnection couplers comply with IEC 60320-2-2		N/A
24.1.6	Small lamp holders similar to E10 lampholders comply with IEC 60238, the requirements for E10 lampholders being applicable	No lamp holders	N/A
24.1.7	For remote operation of the appliance via a telecommunication network, the relevant standard for the telecommunication interface circuitry in the appliance is IEC 62151	Not for remote operation	N/A
24.1.8	The relevant standard for thermal links is IEC 60691	No thermal links	N/A
	Thermal links not complying with IEC 60691 are considered to be an intentionally weak part for the purposes of Clause 19		N/A
24.1.9	Contactors and relays, other than motor starting relays, tested as part of the appliance	No contactors or relays	N/A
	They are also tested in accordance with Clause 17 of IEC 60730-1, the number of cycles of operations in 24.1.4 selected according to the contactor or relay function in the appliance		N/A
24.2	Appliances not fitted with:		P
	- switches, automatic controls or power supplies in flexible cords	No switch	P
	- devices causing the protective device in the fixed wiring to operate in the event of a fault in the appliance	No such device	P
	- thermal cut-outs that can be reset by soldering, unless	No thermal cut-out	P
	the solder has a melding point of at least 230 ˚C		N/A
24.3	Switches intended for all-pole disconnection of stationary appliances are directly connected to the supply terminals and have a contact separation in all poles, providing full disconnection under overvoltage category III conditions	No switch	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
24.4	Plugs and socket-outlets for extra-low voltage circuits and heating elements, not interchangeable with plugs and socket-outlets listed in IEC/TR 60083 or IEC 60906-1 or with connectors and appliance inlets complying with the standard sheets of IEC 60320-1	No plug and socket-outlets for extra-low voltage circuits	N/A
	The requirement also applicable to plugs, connectors, socket-outlets and appliance outlets in the battery charger output circuit (IEC 60335-2-29)		N/A
24.5	Capacitors in auxiliary windings of motors marked with their rated voltage and capacitance, and used accordingly	No motor	N/A
	Voltage across capacitors in series with a motor winding does not exceed 1,1 times rated voltage, when the appliance is supplied at 1,1 times rated voltage under minimum load		N/A
24.6	Working voltage of motors connected to the supply mains and having basic insulation that is inadequate for the rated voltage of the appliance, not exceeding 42 V	No motor	N/A
	In addition, the motors comply with the requirements of Annex I		N/A
24.7	Detachable hose-sets for connection of appliances to the water mains comply with IEC 61770	No hose-sets	N/A
	They are supplied with the appliance		N/A
	Appliances intended to be permanently connected to the water mains not connected by a detachable hose-set		N/A
24.8	Motor running capacitors in appliances for which 30.2.3 is applicable and that are permanently connected in series with a motor winding, not causing a hazard in event of a failure	No motor running capacitors	N/A
	One or more of the following conditions are to be met:		N/A
	- the capacitors are of class S2 or S3 according to IEC 60252-1		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- the capacitors are housed within a metallic or ceramic enclosure		N/A
	- the distance of separation of the outer surface to adjacent non-metallic parts exceeds 50 mm		N/A
	- adjacent non-metallic parts within 50 mm withstand the needle-flame test of Annex E		N/A
	- adjacent non-metallic parts within 50 mm classified as at least V-1 according to IEC 60695-11-10		N/A
25	**SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS**		**P**
25.1	Appliance not intended for permanent connection to fixed wiring, means for connection to the supply:		P
	- supply cord fitted with a plug, the current rating and voltage rating of the plug being not less than the corresponding ratings of its associated appliance		N/A
	- an appliance inlet having at least the same degree of protection against moisture as required for the appliance, or		P
	- pins for insertion into socket-outlets		N/A
25.2	Appliance not provided with more than one means of connection to the supply mains		P
	Stationary appliance for multiple supply may be provided with more than one means of connection, provided electric strength test of 1250 V for 1 min between each means of connection causes no breakdown	Portable appliance	N/A
25.3	Appliance intended to be permanently connected to fixed wiring provided with one of the following means for connection to the supply mains:		N/A
	- a set of terminals allowing the connection of a flexible cord	Not for permanently connecting to fixed wiring	N/A
	- a fitted supply cord		N/A
	- a set of supply leads accommodated in a suitable compartment		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- a set of terminals for the connection of cables of fixed wiring, cross-sectional areas specified in 26.6, and the appliance allows the connection of the supply conductors after the appliance has been fixed to its support		N/A
	- a set of terminals and cable entries, conduit entries, knock-outs or glands, allowing connection of appropriate types of cable or conduit, and the appliance allows the connection of the supply conductors after the appliance has been fixed to its support		N/A
	For a fixed appliance constructed so that parts can be removed to facilitate easy installation, this requirement is met if it is possible to connect the fixed wiring without difficulty after a part of the appliance has been fixed to its support		N/A
25.4	Cable and conduit entries, rated current of appliance not exceeding 16 A, dimension according to table 10 (mm):	Not for permanently connecting to fixed wiring	N/A
	Introduction of conduit or cable does not reduce clearances or creepage distances below values specified in clause 29		N/A
25.5	Method for assembling the supply cord and output flexible cord for battery chargers having a rated output voltage exceeding 42,4 V to the appliance: (IEC 60335-2-29)		N/A
	- type X attachment	No supply cord employed	N/A
	- type Y attachment		N/A
	- type Z attachment, if allowed in relevant part 2		N/A
	Type X attachment, other than those with a specially prepared cord, not used for flat twin tinsel cords		N/A
	For multi-phase appliances supplied with a supply cord and that are intended to be permanently connected to fixed wiring, the supply cord is assembled to the appliance by type Y attachment		N/A
25.6	Plugs fitted with only one flexible cord		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
25.7	Supply cords and output flexible cord for battery chargers having a rated output voltage exceeding 42,4 V, other than for class III appliances, being one of the following types: (IEC 60335-2-29)		N/A
	- rubber sheathed (at least 60245 IEC 53)	No supply cord employed	N/A
	- polychloroprene sheathed (at least 60245 IEC 57)		N/A
	- polyvinyl chloride sheathed. Not used if they are likely to touch metal parts having a temperature rise exceeding 75 K during the test of clause 11		N/A
	- light polyvinyl chloride sheathed cord (60227 IEC 52), for appliances not exceeding 3 kg		N/A
	- ordinary polyvinyl chloride sheathed cord (60227 IEC 53), for other appliances		N/A
	- heat resistant polyvinyl chloride sheathed. Not used for type X attachment other than specially prepared cords		N/A
	- heat-resistant light polyvinyl chloride sheathed cord (60227 IEC 56), for appliances not exceeding 3 kg		N/A
	- heat-resistant polyvinyl chloride sheathed cord (60227 IEC 57), for other appliances		N/A
	- halogen-free, low smoke, thermoplastic insulated and sheathed		N/A
	- light duty halogen-free low smoke flexible cable (62821 IEC 101) for circular cable and (62821 IEC 101f) for flat cable		N/A
	- ordinary duty halogen-free low smoke flexible cable (62821 IEC 102) for circular cable and (62821 IEC 102f) for flat cable		N/A
	Supply cords for class III appliances adequately insulated		N/A
	Test with 500 V for 2 min for supply cords of class III appliances that contain live parts		N/A
	Battery chargers for charging vehicle batteries not fitted with natural rubber sheathed supply cords (IEC 60335-2-29)		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	For battery chargers intended for use at low temperatures, the supply cord have properties not less than those specified for ordinary polychloroprene sheathed cords (code designation 60245 IEC 57) (IEC 60335-2-29)		N/A
25.8	Nominal cross-sectional area of supply cords and output flexible cord for battery chargers having a rated output voltage exceeding 42,4 V not less than table 11; rated current (A); cross-sectional area (mm²) (IEC 60335-2-29)		N/A
25.9	Supply cords not in contact with sharp points or edges		N/A
25.10	Supply cord of class I appliances have a green/yellow core for earthing		N/A
	In multi-phase appliances, the colour of the neutral conductor of the supply cord is blue	Only appliance inlet, no supply cord provided	N/A
	Where additional neutral conductors are provided in the supply cord:		N/A
	– other colours may be used for these additional neutral conductors;		N/A
	– all of the neutral conductors and line conductors are identified by marking using the alpha numeric notation specified in IEC 60445		N/A
	– the supply cord is fitted to the appliance		N/A
25.11	Conductors of supply cords not consolidated by soldering where they are subject to contact pressure, unless	Not subject to contact pressure	N/A
	the contact pressure is provided by spring terminals		N/A
25.12	Insulation of the supply cord not damaged when moulding the cord to part of the enclosure	Not for moulding	N/A
25.13	Inlet openings so constructed as to prevent damage to the supply cord	No supply cord	N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	If it is not evident that the supply cord can be introduced without risk of damage, a non-detachable lining or bushing complying with 29.3 for supplementary insulation provided		N/A
	If unsheathed supply cord, a similar additional bushing or lining is required, unless the appliance is		N/A
	class 0, or		N/A
	a class III appliance not containing live parts		N/A
25.14	Supply cords moved while in operation adequately protected against excessive flexing		N/A
	Flexing test, as described:		N/A
	- applied force (N)		N/A
	- number of flexings		N/A
	The test does not result in:		N/A
	- short-circuit between the conductors, such that the current exceeds a value of twice the rated current		N/A
	- breakage of more than 10% of the strands of any conductor		N/A
	- separation of the conductor from its terminal		N/A
	- loosening of any cord guard		N/A
	- damage to the cord or the cord guard		N/A
	- broken strands piercing the insulation and becoming accessible		N/A
25.15	For appliances with supply cord and appliances to be permanently connected to fixed wiring by a flexible cord and output flexible cord for battery chargers having a rated output voltage exceeding 42,4 V, conductors of the cord relieved from strain, twisting and abrasion by use of cord anchorage (IEC 60335-2-29)		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	The cord cannot be pushed into the appliance to such an extent that the cord or internal parts of the appliance can be damaged		N/A
	Pull and torque test of cord:		N/A
	- fixed appliances: pull 100 N; torque (not on automatic cord reel) (Nm)		N/A
	- other appliances: values shown in table 12: mass (kg); pull (N); torque (not on automatic cord reel) (Nm)		N/A
	Cord not damaged and max. 2 mm displacement of the cord		N/A
25.16	Cord anchorages for type X attachments constructed and located so that:		N/A
	- replacement of the cord is easily possible		N/A
	- it is clear how the relief from strain and the prevention of twisting are obtained		N/A
	- they are suitable for different types of supply cord		N/A
	- cord cannot touch the clamping screws of cord anchorage if these screws are accessible, unless		N/A
	they are separated from accessible metal parts by supplementary insulation		N/A
	- the cord is not clamped by a metal screw which bears directly on the cord		N/A
	- at least one part of the cord anchorage securely fixed to the appliance, unless		N/A
	it is part of a specially prepared cord		N/A
	- screws which have to be operated when replacing the cord do not fix any other component, unless		N/A
	the appliance becomes inoperative or incomplete or the parts cannot be removed without a tool		N/A
	- if labyrinths can be bypassed the test of 25.15 is nevertheless withstood		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- for class 0, 0I and I appliances they are of insulating material or are provided with an insulating lining, unless		N/A
	failure of the insulation of the cord does not make accessible metal parts live		N/A
	- for class II appliances they are of insulating material, or		N/A
	if of metal, they are insulated from accessible metal parts by supplementary insulation		N/A
	After the test of 25.15, under the conditions specified, the conductors have not moved by more than 1 mm in the terminals		N/A
25.17	Adequate cord anchorages for type Y and Z attachment, test with the cord supplied with the appliance		N/A
25.18	Cord anchorages only accessible with the aid of a tool, or		N/A
	Constructed so that the cord can only be fitted with the aid of a tool		N/A
25.19	Type X attachment, glands not used as cord anchorage in portable appliances		N/A
	Tying the cord into a knot or tying the cord with string not used		N/A
25.20	The conductors of the supply cord for type Y and Z attachment insulated from accessible metal parts		N/A
25.21	Space for supply cord for type X attachment or for connection of fixed wiring constructed:		N/A
	- to permit checking of conductors with respect to correct positioning and connection before fitting any cover		N/A
	- so there is no risk of damage to the conductors or their insulation when fitting the cover		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	- for portable appliances, so that the uninsulated end of a conductor, if it becomes free from the terminal, prevented from contact with accessible metal parts		N/A
	2 N test to the conductor for portable appliances; no contact with accessible metal parts		N/A
25.22	Appliance inlets:		P
	- live parts not accessible during insertion or removal	Approved appliance inlet	P
	Requirement not applicable to appliance inlets complying with IEC 60320-1		P
	- connector can be inserted without difficulty		P
	- the appliance is not supported by the connector		P
	- not for cold conditions if temp. rise of external metal parts exceeds 75 K during clause 11, unless		N/A
	the supply cord is unlikely to touch such metal parts		N/A
25.23	Interconnection cords comply with the requirements for the supply cord, except that:		N/A
	- the cross-sectional area of the conductors is determined on the basis of the maximum current during clause 11		N/A
	- the thickness of the insulation may be reduced		N/A
	- for class I or class II appliance with class III construction, the cross sectional areas of the conductors need not comply with 25.8 if specified conditions are met		N/A
	If necessary, electric strength test of 16.3		N/A
25.24	Interconnection cords not detachable without the aid of a tool if compliance with this standard is impaired when they are disconnected		N/A
25.25	Dimensions of pins that are inserted into socket-outlets compatible with the dimensions of the relevant socket-outlet.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Dimensions of pins and engagement face in accordance with the dimensions of the relevant plug in IEC/TR 60083		N/A
26	**TERMINALS FOR EXTERNAL CONDUCTORS**		**N/A**
26.1	Appliances provided with terminals or equally effective devices for connection of external conductors	No terminal	N/A
	Terminals only accessible after removal of a non-detachable cover, except		N/A
	for class III appliances that do not contain live parts		N/A
	Earthing terminals may be accessible if a tool is required to make the connections and means are provided to clamp the wire independently from its connection		N/A
26.2	Appliances with type X attachment and appliances for the connection of cables of fixed wiring provided with terminals in which connections are made by means of screws, nuts or similar devices, unless		N/A
	the connections are soldered		N/A
	Screws and nuts not used to fix any other component, except		N/A
	internal conductors, if so arranged that they are unlikely to be displaced when fitting the supply conductors		N/A
	If soldered connections used, the conductor so positioned or fixed that reliance is not placed on soldering alone, unless		N/A
	barriers provided so that neither clearances nor creepage distances between live parts and other metal parts reduced below the values for supplementary insulation if the conductor becomes free at the soldered joint		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
26.3	Terminals for type X attachment and for connection of cables of fixed wiring so constructed that the conductor is clamped between metal surfaces with sufficient contact pressure but without damaging the conductor		N/A
	Terminals fixed so that when the clamping means is tightened or loosened:		N/A
	- the terminal does not become loose		N/A
	- internal wiring is not subjected to stress		N/A
	- neither clearances nor creepage distances are reduced below the values in clause 29		N/A
	Compliance checked by inspection and by the test of subclause 9.6 of IEC 60999-1, the torque applied being equal to two-thirds of the torque specified (Nm)		N/A
	No deep or sharp indentations of the conductors		N/A
26.4	Terminals for type X attachment, except those having a specially prepared cord and those for the connection of cables of fixed wiring, no special preparation of conductors such as by soldering, use of cable lugs, eyelets or similar, and		N/A
	so constructed or placed that conductors prevented from slipping out when clamping screws or nuts are tightened		N/A
26.5	Terminals for type X attachment so located or shielded that if a wire of a stranded conductor escapes, no risk of accidental connection to other parts that result in a hazard		N/A
	Stranded conductor test, 8 mm insulation removed		N/A
	No contact between live parts and accessible metal parts and,		N/A
	for class II constructions, between live parts and metal parts separated from accessible metal parts by supplementary insulation only		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	Requirement not apply to the terminals of the output circuit having a no-load voltage not exceeding 42,4 V (IEC 60335-2-29)		N/A
26.6	Terminals for type X attachment and for connection of cables of fixed wiring suitable for connection of conductors with cross-sectional area according to table 13; rated current (A); nominal cross-sectional area (mm²)		N/A
	If a specially prepared cord is used, terminals need only be suitable for that cord		N/A
26.7	Terminals for type X attachment, except in class III appliances not containing live parts, accessible after removal of a cover or part of the enclosure		N/A
26.8	Terminals for the connection of fixed wiring, including the earthing terminal, located close to each other		N/A
26.9	Terminals of the pillar type constructed and located as specified		N/A
26.10	Terminals with screw clamping and screwless terminals not used for flat twin tinsel cords, unless		N/A
	conductors ends fitted with means suitable for screw terminals		N/A
	Pull test of 5 N to the connection		N/A
26.11	For type Y and Z attachment, soldered, welded, crimped or similar connections may be used		N/A
	For Class II appliances, the conductor so positioned or fixed that reliance is not placed on soldering, welding or crimping alone		N/A
	If soldering, welding or crimping alone used, barriers provided so that clearances and creepage distances between live parts and other metal parts are not reduced below the values for supplementary insulation if the conductor becomes free		N/A
27	**PROVISION FOR EARTHING**		**P**

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
27.1	Accessible metal parts of Class 0I and I appliances permanently and reliably connected to an earthing terminal or earthing contact of the appliance inlet	Class I	P
	Earthing terminals and earthing contacts not connected to the neutral terminal		P
	Class 0, II and III appliances have no provision for protective earthing		P
	Class II appliances and class III appliances can incorporate an earth for functional purposes		P
	Safety extra-low voltage circuits not earthed, unless		P
	protective extra-low voltage circuits		N/A
27.2	Clamping means of earthing terminals adequately secured against accidental loosening	Input quick connector with hook	P
	Terminals for the connection of external equipotential bonding conductors allow connection of conductors of 2,5 to 6 mm^2, and		P
	- do not provide earthing continuity between different parts of the appliance, and		P
	- conductors cannot be loosened without the aid of a tool		N/A
	Requirements not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes		N/A
27.3	For a detachable part having an earth connection and being plugged into another part of the appliance, the earth connection is made before and separated after current-carrying connections when removing the part	Approved appliance inlet employed.	P
	For appliances with supply cords, current-carrying conductors become taut before earthing conductor, if the cord slips out of the cord anchorage	No supply cord provided	N/A
	Requirements not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes	Class I	P

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Clause	Requirement + Test	Result - Remark	Verdict
27.4	No risk of corrosion resulting from contact between parts of the earthing terminal and the copper of the earthing conductor or other metal		P
	Parts providing earthing continuity, other than parts of a metal frame or enclosure, have adequate resistance to corrosion		P
	If of steel, these parts provided with an electroplated coating with a thickness at least 5 µm	No earthed steel	N/A
	Adequate protection against rusting of parts of coated or uncoated steel, only intended to provide or transmit contact pressure		P
	In the body of the earthing terminal is a part of a frame or enclosure of aluminium or aluminium alloys, precautions taken to avoid risk of corrosion	No such construction	N/A
	Requirements not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes		N/A
27.5	Low resistance of connection between earthing terminal and earthed metal parts	No metal parts	N/A
	This requirement does not apply to connections providing earthing continuity in the protective extra-low voltage circuit, provided the clearances of basic insulation are based on the rated voltage of the appliance		N/A
	Requirements not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes		N/A
	Resistance not exceeding 0,1 Ω at the specified low-resistance test (Ω)		N/A
27.6	The printed conductors of printed circuit boards not used to provide earthing continuity in hand-held appliances.	Not hand-held appliances	N/A
	They may be used to provide earthing continuity in other appliances if at least two tracks are used with independent soldering points and the appliance complies with 27.5 for each circuit	Not for earthing continuity	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Requirements not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes		N/A
28	**SCREWS AND CONNECTIONS**		**P**
28.1	Fixings, electrical connections and connections providing earthing continuity withstand mechanical stresses	For fixing MOSFET, PCB and enclosure	P
	Screws not of soft metal liable to creep, such as zinc or aluminium		P
	Diameter of screws of insulating material min. 3 mm	No screws of insulating material	N/A
	Screws of insulating material not used for any electrical connections or connections providing earthing continuity	No screws of insulating material	N/A
	Screws used for electrical connections or connections providing earthing continuity screwed into metal	No such screws	N/A
	Screws not of insulating material if their replacement by a metal screw can impair supplementary or reinforced insulation	No screws of insulating material	N/A
	For type X attachment, screws to be removed for replacement of supply cord or for user maintenance, not of insulating material if their replacement by a metal screw impairs basic insulation		N/A
	For screws and nuts; torque-test as specified in table 14	(see appended table)	P
28.2	Electrical connections and connections providing earthing continuity constructed so that contact pressure is not transmitted through non-ceramic insulating material liable to shrink or distort, unless	No such screws	N/A
	there is resiliency in the metallic parts to compensate for shrinkage or distortion of the insulating material		N/A
	This requirement does not apply to electrical connections in circuits of appliances for which:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	• 30.2.2 is applicable and that carry a current not exceeding 0,5 A		N/A
	• 30.2.3 is applicable and that carry a current not exceeding 0,2 A		N/A
28.3	Space-threaded (sheet metal) screws only used for electrical connections if they clamp the parts together		N/A
	Thread-cutting (self-tapping) screws and thread rolling screws only used for electrical connections if they generate a full form standard machine screw thread		N/A
	Thread-cutting (self-tapping) screws not used if they are likely to be operated by the user or installer		N/A
	Thread-cutting, thread rolling and space threaded screws may be used in connections providing earthing continuity provided it is not necessary to disturb the connection:		N/A
	- in normal use,		N/A
	- during user maintenance,		N/A
	- when replacing a supply cord having a type X attachment, or		N/A
	- during installation		N/A
	At least two screws being used for each connection providing earthing continuity, unless		N/A
	the screw forms a thread having a length of at least half the diameter of the screw		N/A
28.4	Screws and nuts that make mechanical connection secured against loosening if they also make electrical connections or connections providing earthing continuity		N/A
	This requirement does not apply to screws in the earthing circuit if at least two screws are used, or		N/A
	if an alternative earthing circuit is provided		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Rivets for electrical connections or connections providing earthing continuity secured against loosening if the connections are subjected to torsion		N/A
29	**CLEARANCES, CREEPAGE DISTANCES AND SOLID INSULATION**		**P**
	Clearances, creepage distances and solid insulation withstand electrical stress		P
	For coatings used on printed circuits boards to protect the microenvironment (Type 1) or to provide basic insulation (Type 2), Annex J applies ...	No coating	N/A
	The microenvironment is pollution degree 1 under type 1 protection		N/A
	For type 2 protection, the spacing between the conductors before the protection is applied is not less than the values specified in Table 1 of IEC 60664-3		N/A
	These values apply to functional, basic, supplementary and reinforced insulation.....		N/A
29.1	Clearances not less than the values specified in table 16, taking into account the rated impulse voltage for the overvoltage categories of table 15, unless.....	(see appended table) Altitude 5000m is considered.	P
	for basic insulation and functional insulation they comply with the impulse voltage test of clause 14		N/A
	However, if the distances are affected by wear, distortion, movement of the parts or during assembly, the clearances for rated impulse voltages of 1500V and above are increased by 0,5 mm and the impulse voltage test is not applicable		N/A
	For appliances intended for use at altitudes exceeding 2 000 m, the clearances in Table 16 is increased according to the relevant multiplier values in Table A.2 of IEC 60664-1	Up to 5000m	P
	Impulse voltage test is not applicable:		N/A
	- when the microenvironment is pollution degree 3, or		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	- for basic insulation of class 0 and class 01 appliances, or		N/A
	- to appliances intended for use at altitudes exceeding 2 000 m	Up to 5000m	P
	Appliances are in overvoltage category II		P
	A force of 2 N is applied to bare conductors, other than heating elements		P
	A force of 30 N is applied to accessible surfaces		P
29.1.1	Clearances of basic insulation withstand the overvoltages, taking into account the rated impulse voltage		P
	The values of table 16 or the impulse voltage test of clause 14 are applicable	(see appended table)	P
	Clearance at the terminals of tubular sheathed heating elements may be reduced to 1,0 mm if the microenvironment is pollution degree 1		N/A
	Lacquered conductors of windings considered to be bare conductors		P
29.1.2	Clearances of supplementary insulation not less than those specified for basic insulation in table 16 ..	(see appended table)	P
29.1.3	Clearances of reinforced insulation not less than those specified for basic insulation in table 16, using the next higher step for rated impulse voltage .	(see appended table)	P
	For double insulation, with no intermediate conductive part between basic and supplementary insulation, clearances are measured between live parts and the accessible surface, and the insulation system is treated as reinforced insulation		P
29.1.4	Clearances for functional insulation are the largest values determined from:		P
	- table 16 based on the rated impulse voltage.....	(see appended table)	P
	- table F.7a in IEC 60664-1, frequency not exceeding 30 kHz		N/A
	- clause 4 of IEC 60664-4, frequency exceeding 30 kHz	65.6 kHz	P

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	If values of table 16 are largest, the impulse voltage test of clause 14 may be applied instead, unless	1.5 mm is the largest	P
	the microenvironment is pollution degree 3, or		N/A
	the distances can be affected by wear, distortion, movement of the parts or during assembly		N/A
	However, clearances are not specified if the appliance complies with clause 19 with the functional insulation short-circuited	The components and circuits after current fuse	P
	Lacquered conductors of windings considered to be bare conductors	Magnet wires is treated as bare conductors	P
	However, clearances at crossover points are not measured		P
	Clearance between surfaces of PTC heating elements may be reduced to 1mm	No PTC heating elements	N/A
29.1.5	Appliances having higher working voltages than rated voltage, clearances for basic insulation are the largest values determined from:		P
	- table 16 based on the rated impulse voltage.....		P
	- table F.7a in IEC 60664-1, frequency not exceeding 30 kHz		N/A
	- clause 4 of IEC 60664-4, frequency exceeding 30 kHz	65.6kHz	P
	If clearances for basic insulation are selected from Table F.7a of IEC 60664-1 or Clause 4 of IEC 60664-4, the clearances of supplementary insulation are not less than those specified for basic insulation		P
	If clearances for basic insulation are selected from Table F.7a of IEC 60664-1, the clearances of reinforced insulation dimensioned as specified in Table F.7a are to withstand 160% of the withstand voltage required for basic insulation		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	If clearances for basic insulation are selected from Clause 4 of IEC 60664-4, the clearances of reinforced insulation are twice the value required for basic insulation		N/A
	If the secondary winding of a step-down transformer is earthed, or if there is an earthed screen between the primary and secondary windings, clearances of basic insulation on the secondary side not less than those specified in table 16, but using the next lower step for rated impulse voltage		N/A
	Circuits supplied with a voltage lower than rated voltage, clearances of functional insulation are based on the working voltage used as the rated voltage in table 15		N/A
29.2	Creepage distances not less than those appropriate for the working voltage, taking into account the material group and the pollution degree.....	(see appended table)	P
	Pollution degree 2 applies, unless		P
	- precautions taken to protect the insulation; pollution degree 1		N/A
	- insulation subjected to conductive pollution; pollution degree 3		N/A
	- battery chargers for outdoor use, the microenvironment is pollution degree 3 unless the insulation is enclosed or located so that it is unlikely to be exposed to pollution during normal use of the appliance (IEC 60335-2-29)	For indoor use	N/A
	A force of 2 N is applied to bare conductors, other than heating elements		P
	A force of 30 N is applied to accessible surfaces		P
	In a double insulation system, the working voltage for both the basic and supplementary insulation is taken as the working voltage across the complete double insulation system		P

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
29.2.1	Creepage distances of basic insulation not less than specified in table 17	(see appended table)	P
	However, if the working voltage is periodic and has a frequency exceeding 30 kHz, the creepage distances are also determined from table 2 of IEC 60664-4, these values being used if exceeding the values in table 17	Upeak: 500V 65.6KHz, 0.183mm according table 2 of IEC60664-4, not exceeding the values in table 17	N/A
	Except for pollution degree 1, corresponding creepage distance not less than the minimum specified for the clearance in table 16, if the clearance has been checked according to the test of clause 14.....	Creepage distance is bigger than clearance distance	P
29.2.2	Creepage distances of supplementary insulation at least those specified for basic insulation in table 17, or	(see appended table)	P
	Table 2 of IEC 60664-4, as applicable.....	65.6KHz, 0.183mm according table 2 of IEC60664-4, not exceeding the values in table 17	N/A
29.2.3	Creepage distances of reinforced insulation at least double those specified for basic insulation in table 17, or	(see appended table)	P
	Table 2 of IEC 60664-4, as applicable.....	65.6KHz, 0.183mm according table 2 of IEC60664-4, not exceeding the values in table 17	N/A
29.2.4	Creepage distances of functional insulation not less than specified in table 18.....	(see appended table)	P
	However, if the working voltage is periodic and has a frequency exceeding 30 kHz, the creepage distances are also determined from table 2 of IEC 60664-4, these values being used if exceeding the values in table 18	65.6KHz, 0.183mm according table 2 of IEC60664-4, not exceeding the values in table 17	N/A
	Creepage distances may be reduced if the appliance complies with clause 19 with the functional insulation short-circuited		P

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
29.3	Supplementary and reinforced insulation have adequate thickness, or a sufficient number of layers, to withstand the electrical stresses		P
	Compliance checked:		P
	- by measurement, in accordance with 29.3.1, or		P
	- by an electric strength test in accordance with 29.3.2, or		N/A
	- for insulation, other than single layer internal wiring insulation, by an assessment of the thermal quality of the material combined with an electric strength test, in accordance with 29.3.3, and		P
	for accessible parts of reinforced insulation consisting of a single layer, by measurement in accordance with 29.3.4, or		N/A
	- by an assessment of the thermal quality of the material according to 29.3.3 combined with an electric strength test in accordance with 23.5, for each single layer internal wiring insulation touching each other, or		N/A
	- as specified in subclause 6.3 of IEC 60664-4 for insulation that is subjected to any periodic voltage having a frequency exceeding 30 kHz		N/A
29.3.1	Supplementary insulation have a thickness of at least 1 mm		P
	Reinforced insulation have a thickness of at least 2 mm		P
29.3.2	Each layer of material withstand the electric strength test of 16.3 for supplementary insulation		P
	Supplementary insulation consist of at least 2 layers		P
	Reinforced insulation consist of at least 3 layers		P
29.3.3	The insulation is subjected to the dry heat test Bb of IEC 60068-2-2, followed by		N/A
	the electric strength test of 16.3		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	If the temperature rise during the tests of clause 19 does not exceed the value specified in table 3, the test of IEC 60068-2-2 is not carried out		P
29.3.4	Thickness of accessible parts of reinforced insulation consisting of a single layer not less than specified in table 19		N/A
30	**RESISTANCE TO HEAT AND FIRE**		**P**
30.1	External parts of non-metallic material,	Enclosure, appliance inlet and appliance outlet	P
	parts supporting live parts, and	Appliance inlet, appliance outlet, PCB and bobbin	P
	parts of thermoplastic material providing supplementary or reinforced insulation	Enclosure	P
	sufficiently resistant to heat		P
	Ball-pressure test according to IEC 60695-10-2		P
	External parts tested at 40 °C plus the maximum temperature rise determined during the test of clause 11, or at 75 °C, whichever is the higher; temperature (°C)	(see appended table 30.1) Enclosure	P
	Parts supporting live parts tested at 40°C plus the maximum temperature rise determined during the test of clause 11, or at 125 °C, whichever is the higher; temperature (°C)	(see appended table 30.1) Appliance inlet, appliance outlet, PCB and bobbin	P
	Parts of thermoplastic material providing supplementary or reinforced insulation tested at 25 °C plus the maximum temperature rise determined during clause 19, if higher; temperature (°C).....	No temperature higher than clause 11	N/A
30.2	Parts of non-metallic material resistant to ignition and spread of fire		P
	This requirement does not apply to:		P
	parts having a mass not exceeding 0,5 g, provided the cumulative effect is unlikely to propagate flames that originate inside the appliance by propagating flames from one part to another, or		P

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	decorative trims, knobs and other parts unlikely to be ignited or to propagate flames that originate inside the appliance		N/A
	Compliance checked by the test of 30.2.1, and in addition:		P
	- for attended appliances, 30.2.2 applies		N/A
	- for unattended appliances, 30.2.3 applies		P
	For appliances for remote operation, 30.2.3 applies	Not for remote operation	N/A
	For base material of printed circuit boards, 30.2.4 applies		P
30.2.1	Parts of non-metallic material subjected to the glow-wire test of IEC 60695-2-11 at 550°C	(see appended table 30.2) Enclosure: 750°C, no ignition.	P
	However, test not carried out if the material is classified as having a glow-wire flammability index according to IEC 60695-2-12 of at least 550 °C, or		N/A
	the material is classified at least HB40 according to IEC 60695-11-10		N/A
	Parts for which the glow-wire test cannot be carried out need to meet the requirements in ISO 9772 for material classified HBF		N/A
30.2.2	Appliances operated while attended, parts of non-metallic material supporting current-carrying connections, and		N/A
	parts of non-metallic material within a distance of 3mm of such connections,		N/A
	subjected to the glow-wire test of IEC 60695-2-11 with appropriate severity level:	(see appended table 30.2)	N/A
	- 750 °C, for connections carrying a current exceeding 0,5 A during normal operation		N/A
	- 650 °C, for other connections		N/A
	Glow-wire applied to an interposed shielding material, if relevant		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	The glow-wire test not carried out on parts of material classified as having a glow-wire flammability index according to IEC 60695-2-12 of at least:		N/A
	- 750 °C, for connections carrying a current exceeding 0,5 A during normal operation		N/A
	- 650 °C, for other connections		N/A
	The glow-wire test is also not carried out on small parts. These parts are to:		N/A
	- comprise material having a glow-wire flammability index of at least 750 °C, or 650 °C as appropriate, or		N/A
	- comply with the needle-flame test of Annex E, or	(see appended table 30.2/30.2.4)	N/A
	- comprise material classified as V-0 or V-1 according to IEC 60695-11-10.....		N/A
	Glow-wire test not applicable to conditions as specified:		N/A
30.2.3	Appliances operated while unattended, tested as specified in 30.2.3.1 and 30.2.3.2		P
	The tests are not applicable to conditions as specified:	Connections on small components on printed circuit boards	P
30.2.3.1	Parts of non-metallic material supporting connections carrying a current exceeding 0,2 A during normal operation, and	Appliance inlet, appliance outlet, bobbin	P
	parts of non-metallic material, other than small parts, within a distance of 3 mm,		P
	subjected to the glow-wire test of IEC 60695-2-11 with a test severity of 850 °C	(see appended table 30.2) Appliance inlet, appliance outlet and bobbin: 850 °C: no ignition.	P
	Glow-wire applied to an interposed shielding material, if relevant		P
	The glow-wire test is not carried out on parts of material classified as having a glow-wire flammability index according to IEC 60695-2-12 of at least 850 °C		P

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Clause	Requirement + Test	Result - Remark	Verdict
30.2.3.2	Parts of non-metallic material supporting connections, and	Appliance inlet, appliance outlet, bobbin	P
	parts of non-metallic material within a distance of 3mm,		N/A
	subjected to the glow-wire test of IEC 60695-2-11 with appropriate severity level:	(see appended table 30.2)	P
	- 750 °C, for connections carrying a current exceeding 0,2 A during normal operation	Appliance inlet, appliance outlet and bobbin: 750 °C: no ignition.	P
	- 650 °C, for other connections		N/A
	Glow-wire applied to an interposed shielding material, if relevant		N/A
	However, the glow-wire test of 750 °C or 650 °C as appropriate, is not carried out on parts of material fulfilling both or either of the following classifications:		N/A
	- a glow-wire ignition temperature according to IEC 60695-2-13 of at least:		N/A
	- 775 °C, for connections carrying a current exceeding 0,2 A during normal operation		N/A
	- 675 °C, for other connections		N/A
	- a glow-wire flammability index according to IEC 60695-2-12 of at least:		N/A
	- 750 °C, for connections carrying a current exceeding 0,2 A during normal operation		N/A
	- 650 °C, for other connections		N/A
	The glow-wire test is also not carried out on small parts. These parts are to:		N/A
	- comprise material having a glow-wire ignition temperature of at least 775 °C or 675 °C as appropriate, or		N/A
	- comprise material having a glow-wire flammability index of at least 750 °C or 650 °C as appropriate, or		N/A
	- comply with the needle-flame test of Annex E, or		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- comprise material classified as V-0 or V-1 according to IEC 60695-11-10		N/A
	The consequential needle-flame test of Annex E applied to non-metallic parts that encroach within the vertical cylinder placed above the centre of the connection zone and on top of the non-metallic parts supporting current-carrying connections, and parts of non-metallic material within a distance of 3 mm of such connections if these parts are those:		N/A
	- parts that withstood the glow-wire test of IEC 60695-2-11 of 750 °C or 650 °C as appropriate, but produce a flame that persist longer than 2 s, or		N/A
	- parts that comprised material having a glow-wire flammability index of at least 750 °C or 650 °C as appropriate, or		N/A
	- small parts, that comprised material having a glow-wire flammability index of at least 750 °C or 650 °C as appropriate, or		N/A
	- small parts for which the needle-flame test of Annex E was applied, or		N/A
	- small parts for which a material classification of V-0 or V-1 was applied		N/A
	However, the consequential needle-flame test is not carried out on non-metallic parts, including small parts, within the cylinder that are:		P
	- parts having a glow-wire ignition temperature of at least 775 °C or 675 °C as appropriate, or		N/A
	- parts comprising material classified as V-0 or V-1 according to IEC 60695-11-10, or	PCB: V-0	P
	- parts shielded by a flame barrier that meets the needle-flame test of Annex E or that comprises material classified as V-0 or V-1 according to IEC 60695-11-10		N/A
30.2.4	Base material of printed circuit boards subjected to the needle-flame test of Annex E	(see appended table 30.2/30.2.4)	N/A
	Test not applicable to conditions as specified	V-0	N/A
31	**RESISTANCE TO RUSTING**		**P**

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Clause	Requirement + Test	Result - Remark	Verdict
	Relevant ferrous parts adequately protected against rusting	Pins of connectors galvanized.	P
	Tests specified in part 2 when necessary		N/A
32	**RADIATION, TOXICITY AND SIMILAR HAZARDS**		**P**
	Appliance does not emit harmful radiation or present a toxic or similar hazard due to their operation in normal use		P
	Compliance is checked by the limits or tests specified in part 2, if relevant	Tested according EN62233, <10%	P
A	**ANNEX A (INFORMATIVE)** **ROUTINE TESTS**		**N/A**
A.2	Electric strength test (IEC 60335-2-29):		N/A
	An electric strength test is carried out between the input and output circuits, the test voltage being:		N/A
	- 2 000 V, for battery chargers having a rated voltage not exceeding 150 V		N/A
	- 2 500 V, for other battery chargers		N/A
B	**ANNEX B (NORMATIVE)** **APPLIANCES POWERED BY RECHARGEABLE BATTERIES THAT ARE RECHARGED IN THE APPLIANCE**		**N/A**
	The following modifications to this standard are applicable for appliances powered by batteries that are recharged in the appliance		N/A
	Three forms of construction covered:		N/A
	a) Appliance supplied directly from the supply mains or a renewable energy source, the battery charging circuitry and other supply unit circuitry incorporated within the appliance		N/A
	b) The part of the appliance incorporating the battery is supplied from the supply mains or a renewable energy source, via a detachable supply unit. The battery charging circuitry is incorporated within the part of the appliance containing the battery		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	c) The part of the appliance incorporating the battery is supplied from the supply mains or a renewable energy source, via a detachable supply unit. The battery charging circuitry is incorporated within the detachable supply unit		N/A
3.1.9	Appliance operated under the following conditions:		N/A
	- the appliance, supplied by its fully charged battery, operated as specified in relevant part 2		N/A
	- the battery is charged, the battery being initially discharged to such an extent that the appliance cannot operate		N/A
	-if possible, the appliance is supplied from the supply mains through its battery charger, the battery being initially discharged to such an extent that the appliance cannot operate. The appliance is operated as specified in relevant part 2		N/A
	- if the appliance incorporates inductive coupling between two parts that are detachable from each other, the appliance is supplied from the supply mains with the detachable part removed		N/A
3.6.2	Part to be removed in order to discard the battery is not considered to be detachable		N/A
5.B.101	Appliances supplied from the supply mains tested as specified for motor-operated appliances		N/A
7.1	Battery compartment for batteries intended to be replaced by the user, marked with battery voltage (V) and polarity of the terminals.....		N/A
	The positive terminal indicated by symbol IEC 60417-5005 and the negative terminal by symbol IEC 60417-5006		N/A
	Appliances intending to be supplied from a detachable supply unit marked with symbol IEC 60417-6181 and its type reference along with symbol ISO 7000-0790 (2004-01), or		N/A
	use only with <model designation> supply unit		N/A
7.6	Additional symbols		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
7.12	The instructions give information regarding charging		N/A
	Instructions for appliances incorporating batteries intended to be replaced by the user include required information		N/A
	Instructions for appliances containing non user-replaceable batteries state the substance of the following:		~~N/A~~
	This appliance contains batteries that are only replaceable by skilled persons		~~N/A~~
	Instructions for appliances containing non-replaceable batteries shall state the substance of the following:		~~N/A~~
	This appliance contains batteries that are non-replaceable		~~N/A~~
	For appliances intending to be supplied from a detachable supply unit for the purposes of recharging the battery, the type reference of the detachable supply unit is stated along with the following:		N/A
	WARNING: For the purposes of recharging the battery, only use the detachable supply unit provided with this appliance		N/A
	If the symbol for detachable supply unit is used, its meaning is explained		N/A
7.15	Markings placed on the part of the appliance connected to the supply mains		N/A
	The type reference of the detachable supply unit is placed in close proximity to the symbol		N/A
8.2	Appliances having batteries that according to the instruction may be replaced by the user need only have basic insulation between live parts and the inner surface of the battery compartment		N/A
	If the appliance can be operated without batteries, double or reinforced insulation required		N/A
11.7	The battery is charged for the period stated in the instructions or 24 h.....		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
11.8	Temperature rise of the battery surface does not exceed the limit in the battery manufacturer's specification; measured (K); limit (K)		N/A
	If no limit specified, the temperature rise does not exceed 20 K; measured (K)		N/A
19.1	Appliances subjected to tests of 19.B.101, 19.B.102 and 19.B.103		N/A
19.10	Not applicable		N/A
19.B.101	Appliances supplied at rated voltage for 168 h, the battery being continually charged		N/A
19.B.102	For appliances having batteries that can be removed without the aid of a tool, short-circuit of the terminals of the battery, the battery being fully charged,		N/A
19.B.103	Appliances having batteries replaceable by the user supplied at rated voltage under normal operation with the battery removed or in any position allowed by the construction		N/A
19.13	The battery does not rupture or ignite		N/A
21.B.101	Appliances having pins for insertion into socket-outlets have adequate mechanical strength		N/A
	Part of the appliance incorporating the pins subjected to the free fall test, procedure 2, of IEC 60068-2-31, the number of falls being:		N/A
	- 100, if the mass of the part does not exceed 250 g (g):		N/A
	- 50, if the mass of the part exceeds 250 g		N/A
	After the test, the requirements of 8.1, 15.1.1, 16.3 and clause 29 are met		N/A
22.3	Appliances having pins for insertion into socket-outlets tested as fully assembled as possible		N/A
25.13	An additional lining or bushing not required for interconnection cords in class III appliances or class III constructions operating at safety extra-low voltage not containing live parts		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
30.2	For parts of the appliance connected to the supply mains during the charging period, 30.2.3 applies		N/A
	For other parts, 30.2.2 applies		N/A
C	**ANNEX C (NORMATIVE)** **AGEING TEST ON MOTORS**		**N/A**
	Tests, as described, carried out when doubt with regard to the temperature classification of the insulation of a motor winding		N/A
	Test conditions as specified		N/A
D	**ANNEX D (NORMATIVE)** **THERMAL MOTOR PROTECTORS**		**N/A**
	Applicable to appliances having motors that incorporate thermal motor protectors necessary for compliance with the standard		N/A
	Test conditions as specified		N/A
E	**ANNEX E (NORMATIVE)** **NEEDLE-FLAME TEST**		**N/A**
	Needle-flame test carried out in accordance with IEC 60695-11-5, with the following modifications:		N/A
7	Severities		N/A
	The duration of application of the test flame is 30 s ± 1 s		N/A
9	Test procedure		N/A
9.1	The specimen so arranged that the flame can be applied to a vertical or horizontal edge as shown in the examples of Figure 1		N/A
9.2	The first paragraph does not apply		N/A
	If possible, the flame is applied at least 10 mm from a corner		N/A
9.3	The test is carried out on one specimen		N/A
	If the specimen does not withstand the test, the test may be repeated on two additional specimens, both withstanding the test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
11	Evaluation of test results		N/A
	The duration of burning not exceeding 30 s		N/A
	However, for printed circuit boards, the duration of burning not exceeding 15 s		N/A
F	**ANNEX F (NORMATIVE)** **CAPACITORS**		**N/A**
	Capacitors likely to be permanently subjected to the supply voltage, and used for radio interference suppression or voltage dividing, comply with the following clauses of IEC 60384-14, with the following modifications:		N/A
1.5	Terms and definitions		N/A
1.5.3	Class X capacitors tested according to subclass X2		N/A
1.5.4	This subclause is applicable		N/A
1.6	Marking		N/A
	Items a) and b) are applicable		N/A
3.4	Approval testing		N/A
3.4.3.2	Table 3 is applicable as described		N/A
4.1	Visual examination and check of dimensions		N/A
	This subclause is applicable		N/A
4.2	Electrical tests		N/A
4.2.1	This subclause is applicable		N/A
4.2.5	This subclause is applicable		N/A
4.2.5.2	Only table 11 is applicable		N/A
	Values for test A apply		N/A
	However, for capacitors in heating appliances the values for test B or C apply		N/A
4.12	Damp heat, steady state		N/A
	This subclause is applicable		N/A
	Only insulation resistance and voltage proof are checked		N/A
4.13	Impulse voltage		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	This subclause is applicable		N/A
4.14	Endurance		N/A
	Subclauses 4.14.1, 4.14.3, 4.14.4 and 4.14.7 are applicable		N/A
4.14.7	Only insulation resistance and voltage proof are checked		N/A
	No visible damage		N/A
4.17	Passive flammability test		N/A
	This subclause is applicable		N/A
4.18	Active flammability test		N/A
	This subclause is applicable		N/A
G	**ANNEX G (NORMATIVE)** **SAFETY ISOLATING TRANSFORMERS**		**N/A**
	The following modifications to this standard are applicable for safety isolating transformers:		N/A
7	Marking and instructions		N/A
7.1	Transformers for specific use marked with:		N/A
	-name, trademark or identification mark of the manufacturer or responsible vendor		N/A
	-model or type reference.....		N/A
17	Overload protection of transformers and associated circuits		N/A
	Fail-safe transformers comply with subclause 15.5 of IEC 61558-1		N/A
22	Construction		N/A
	Subclauses 19.1 and 19.1.2 of IEC 61558-2-6 are applicable		N/A
29	Clearances, creepage distances and solid insulation		N/A
29.1, 29.2, 29.3	The distances specified in items 2a, 2c and 3 in table 13 of IEC 61558-1 apply		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	For insulated winding wires complying with subclause 19.12.3 of IEC 61558-1 there are no requirements for clearances or creepage distances		N/A
	For windings providing reinforced insulation, the distance specified in item 2c of table 13 of IEC 61558-1 is not assessed		N/A
	For safety isolating transformers subjected to periodic voltages with a frequency exceeding 30 kHz, the clearances, creepage distances and solid insulation values specified in IEC 60664-4 are applicable, if greater than the values specified in items 2a, 2c and 3 in table 13 of IEC 61558-1		N/A
H	**ANNEX H (NORMATIVE)** **SWITCHES**		**N/A**
	Switches comply with the following clauses of IEC 61058-1, as modified below:		N/A
	The tests of IEC 61058-1 carried out under the conditions occurring in the appliance		N/A
	Before being tested, switches are operated 20 times without load		N/A
8	Marking and documentation		N/A
	Switches are not required to be marked		N/A
	However, a switch that can be tested separately from the appliance marked with the manufacturer's name or trade mark and the type reference		N/A
13	Mechanism		N/A
	The tests may be carried out on a separate sample		N/A
15	Insulation resistance and dielectric strength		N/A
15.1	Not applicable		N/A
15.2	Not applicable		N/A
15.3	Applicable for full disconnection and micro-disconnection		N/A
17	Endurance		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Compliance is checked on three separate appliances or switches		N/A
	For 17.2.4.4, the number of cycles declared according to 7.1.4 is 10 000, unless		N/A
	otherwise specified in 24.1.3 of the relevant part 2 of IEC 60335		N/A
	Switches for operation under no load and which can be operated only by a tool, and		N/A
	switches operated by hand that are interlocked so that they cannot be operated under load,		N/A
	are not subjected to the tests		N/A
	However, switches without this interlock are subjected to the test of 17.2.4.4 for 100 cycles of operation		N/A
	Subclauses 17.2.2 and 17.2.5.2 not applicable		N/A
	The ambient temperature during the test is that occurring in the appliance during the test of Clause 11 in IEC 60335-1		N/A
	The temperature rise of the terminals not more than 30 K above the temperature rise measured in clause 11 of IEC 60335-1 (K)		N/A
20	Clearances, creepage distances, solid insulation and coatings of rigid printed board assemblies		N/A
	Clause 20 is applicable to clearances across full disconnection and micro-disconnection		N/A
	It is also applicable to creepage distances for functional insulation, across full disconnection and micro-disconnection, as stated in Table 24		N/A
I	**ANNEX I (NORMATIVE)** **MOTORS HAVING BASIC INSULATION THAT IS INADEQUATE FOR THE RATED VOLTAGE OF THE APPLIANCE**		N/A
	The following modifications to this standard are applicable for motors having basic insulation that is inadequate for the rated voltage of the appliance:		N/A
8	Protection against access to live parts		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
8.1	Metal parts of the motor are considered to be bare live parts		N/A
11	Heating		N/A
11.3	The temperature rise of the body of the motor is determined instead of the temperature rise of the windings		N/A
11.8	The temperature rise of the body of the motor, where in contact with insulating material, not exceeding values in table 3 for the relevant insulating material		N/A
16	Leakage current and electric strength		N/A
16.3	Insulation between live parts of the motor and its other metal parts is not subjected to the test		N/A
19	Abnormal operation		N/A
19.1	The tests of 19.7 to 19.9 are not carried out		N/A
19.I.101	Appliance operated at rated voltage with each of the following fault conditions:		N/A
	- short circuit of the terminals of the motor, including any capacitor incorporated in the motor circuit		N/A
	- short circuit of each diode of the rectifier		N/A
	- open circuit of the supply to the motor		N/A
	- open circuit of any parallel resistor, the motor being in operation		N/A
	Only one fault simulated at a time, the tests carried out consecutively		N/A
22	Construction		N/A
22.I.101	For class I appliances incorporating a motor supplied by a rectifier circuit, the d.c. circuit being insulated from accessible parts of the appliance by double or reinforced insulation		N/A
	Compliance checked by the tests specified for double and reinforced insulation		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
J	**ANNEX J (NORMATIVE)** **COATED PRINTED CIRCUIT BOARDS**		**N/A**
	Testing of protective coatings of printed circuit boards carried out in accordance with IEC 60664-3 with the following modifications:		N/A
5.7	Conditioning of the test specimens		N/A
	When production samples are used, three samples of the printed circuit board are tested		N/A
5.7.1	Cold		N/A
	The test is carried out at -25 °C		N/A
5.7.3	Rapid change of temperature		N/A
	Severity 1 is specified		N/A
5.9	Additional tests		N/A
	This subclause is not applicable		N/A
K	**ANNEX K (NORMATIVE)** **OVERVOLTAGE CATEGORIES**		**P**
	The information on overvoltage categories is extracted from IEC 60664-1		P
	Overvoltage category is a numeral defining a transient overvoltage condition		P
	Equipment of overvoltage category IV is for use at the origin of the installation		N/A
	Equipment of overvoltage category III is equipment in fixed installations and for cases where the reliability and the availability of the equipment is subject to special requirements		N/A
	Equipment of overvoltage category II is energy consuming equipment to be supplied from the fixed installation		P
	If such equipment is subjected to special requirements with regard to reliability and availability, overvoltage category III applies		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Equipment of overvoltage category I is equipment for connection to circuits in which measures are taken to limit transient overvoltages to an appropriate low level		N/A
L	**ANNEX L (INFORMATIVE)** **GUIDANCE FOR THE MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES**		**P**
	Information for the determination of clearances and creepage distances		P
M	**ANNEX M (NORMATIVE)** **POLLUTION DEGREE**		**P**
	The information on pollution degrees is extracted from IEC 60664-1		P
	Pollution		P
	The microenvironment determines the effect of pollution on the insulation, taking into account the macroenvironment		P
	Means may be provided to reduce pollution at the insulation by effective enclosures or similar		P
	Minimum clearances specified where pollution may be present in the microenvironment		P
	Degrees of pollution in the microenvironment		P
	For evaluating creepage distances, the following degrees of pollution in the microenvironment are established:		P
	- pollution degree 1: no pollution or only dry, non-conductive pollution occurs. The pollution has no influence		N/A
	- pollution degree 2: only non-conductive pollution occurs, except that occasionally a temporary conductivity caused by condensation is to be expected		P
	- pollution degree 3: conductive pollution occurs or dry non-conductive pollution occurs that becomes conductive due to condensation that is to be expected		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- pollution degree 4: the pollution generates persistent conductivity caused by conductive dust or by rain or snow		N/A
N	**ANNEX N (NORMATIVE)** **PROOF TRACKING TEST**		**P**
	The proof tracking test is carried out in accordance with IEC 60112 with the following modifications:		P
7	Test apparatus		P
7.3	Test solutions		P
	Test solution A is used		P
10	Determination of proof tracking index (PTI)		P
10.1	Procedure		P
	The proof voltage is 100V, 175V, 400V or 600V	175V	P
	The test is carried out on five specimens		P
	In case of doubt, additional test with proof voltage reduced by 25V, the number of drops increased to 100		N/A
10.2	Report		N/A
	The report states if the PTI value was based on a test using 100 drops with a test voltage of (PTI-25) V		N/A
O	**ANNEX O (INFORMATIVE)** **SELECTION AND SEQUENCE OF THE TESTS OF CLAUSE 30**		**P**
	Description of tests for determination of resistance to heat and fire		P
P	**ANNEX P (INFORMATIVE)** **GUIDANCE FOR THE APPLICATION OF THIS STANDARD TO APPLIANCES USED IN TROPICAL CLIMATES**		**P**
	Modifications applicable for class 0 and 01 appliances having a rated voltage exceeding 150V, intended to be used in countries having a tropical climate and that are marked with symbol IEC 60417-6332		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Modifications may also be applied to class 1 appliances having a rated voltage exceeding 150V, intended to be used in countries having a tropical climate and that are marked with symbol IEC 60417-6332, if liable to be connected to a supply mains that excludes the protective earthing conductor		P
5.7	The ambient temperature for the tests of clauses 11 and 13 is 40 +3/0 °C		P
7.1	The appliance marked with symbol IEC 60417-6332	See page 4	P
7.12	The instructions state that the appliance is to be supplied through a residual current device (RCD) having a rated residual operating current not exceeding 30 mA		P
	The instructions state that the appliance is considered to be suitable for use in countries having a tropical climate, but may also be used in other countries	See manual for detail	P
	If symbol IEC 60417-6332 is used, its meaning is explained	See manual for detail	P
11.8	The values of Table 3 are reduced by 15 K		P
13.2	The leakage current for class I appliances not exceeding 0,5 mA		P
15.3	The value of t is 37 °C		P
16.2	The leakage current for class I appliances not exceeding 0,5 mA (mA):		P
19.13	The leakage current test of 16.2 is applied in addition to the electric strength test of 16.3		P
Q	**ANNEX Q (INFORMATIVE)** **SEQUENCE OF TESTS FOR THE EVALUATION OF ELECTRONIC CIRCUITS**		**N/A**
	Description of tests for appliances incorporating electronic circuits		N/A
R	**ANNEX R (NORMATIVE)** **SOFTWARE EVALUATION**		**N/A**
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2 validated in accordance with the requirements of this annex		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
R.1	Programmable electronic circuits using software		N/A
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2 constructed so that the software does not impair compliance with the requirements of this standard		N/A
R.2	Requirements for the architecture		N/A
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2 use measures to control and avoid software-related faults/errors in safety-related data and safety-related segments of the software		N/A
R.2.1.1	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.2 have one of the following structures:		N/A
	- single channel with periodic self-test and monitoring		N/A
	- dual channel (homogenous) with comparison		N/A
	- dual channel (diverse) with comparison		N/A
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.1 have one of the following structures:		N/A
	- single channel with functional test		N/A
	- single channel with periodic self-test		N/A
	- dual channel without comparison		N/A
R.2.2	Measures to control faults/errors		N/A
R.2.2.1	When redundant memory with comparison is provided on two areas of the same component, the data in one area is stored in a different format from that in the other area		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
R.2.2.2	Programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.2 and that use dual channel structures with comparison, have additional fault/error detection means for any fault/errors not detected by the comparison		N/A
R.2.2.3	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2, means are provided for the recognition and control of errors in transmissions to external safety-related data paths		N/A
R.2.2.4	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2, the programmable electronic circuits incorporate measures to address the fault/errors in safety-related segments and data indicated in table R.1 and R.2 as appropriate		N/A
R.2.2.5	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2, detection of a fault/error occur before compliance with clause 19 is impaired		N/A
R.2.2.6	The software is referenced to relevant parts of the operating sequence and the associated hardware functions		N/A
R.2.2.7	Labels used for memory locations are unique		N/A
R.2.2.8	The software is protected from user alteration of safety-related segments and data		N/A
R.2.2.9	Software and safety-related hardware under its control is initialized and terminates before compliance with clause 19 is impaired		N/A
R.3	Measures to avoid errors		N/A
R.3.1	General		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2, the following measures to avoid systematic fault in the software are applied		N/A
	Software that incorporates measures used to control the fault/error conditions specified in table R.2 is inherently acceptable for software required to control the fault/error conditions specified in table R.1		N/A
R.3.2	Specification		N/A
R.3.2.1	Software safety requirements:	Software Id:	N/A
	The specification of the software safety requirements includes the descriptions listed		N/A
R.3.2.2	Software architecture		N/A
R.3.2.2.1	The specification of the software architecture includes the aspects listed - techniques and measures to control software faults/errors (refer to R.2.2); - interactions between hardware and software; - partitioning into modules and their allocation to the specified safety functions; - hierarchy and call structure of the modules (control flow); - interrupt handling; - data flow and restrictions on data access; - architecture and storage of data; - time-based dependencies of sequences and data	Document ref. No:	N/A
R.3.2.2.2	The architecture specification is validated against the specification of the software safety requirements by static analysis		N/A
R.3.2.3	Module design and coding		N/A
R.3.2.3.1	Based on the architecture design, software is suitably refined into modules		N/A
	Software module design and coding is implemented in a way that is traceable to the software architecture and requirements		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
R.3.2.3.2	Software code is structured		N/A
R.3.2.3.3	Coded software is validated against the module specification by static analysis		N/A
	The module specification is validated against the architecture specification by static analysis		N/A
R.3.3.3	Software validation		N/A
	The software is validated with reference to the requirements of the software safety requirements specification		N/A
	Compliance is checked by simulation of:		N/A
	- input signals present during normal operation		N/A
	- anticipated occurrences		N/A
	- undesired conditions requiring system action		N/A

TABLE R.1 [e] – GENERAL FAULT/ERROR CONDITIONS						
Component [a]	Fault/error	Acceptable measures [b, c]	Definitions	Document reference for applied measure	Document reference for applied test	Verdict
1 CPU 1.1 Registers	Stuck at	Functional test, or periodic self-test using either: - static memory test, or - word protection with single bit redundancy	H.2.16.5 H.2.16.6 H.2.19.6 H.2.19.8.2			N/A
1.2 VOID						N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE R.1 [e] – GENERAL FAULT/ERROR CONDITIONS						
Component [a]	Fault/error	Acceptable measures [b, c]	Definitions	Document reference for applied measure	Document reference for applied test	Verdict
1.3 Programme counter	Stuck at	Functional test, or Periodic self-test, or Independent time-slot monitoring, or Logical monitoring of the programme sequence	H.2.16.5 H.2.16.6 H.2.18.10.4 H.2.18.10.2			N/A
2 Interrupt handling and execution	No interrupt or too frequent interrupt	Functional test, or time-slot monitoring	H.2.16.5 H.2.18.10.4			N/A
3 Clock	Wrong frequency (for quartz synchronized clock: harmonics/ sub-harmonics only)	Frequency monitoring, or time slot monitoring	H.2.18.10.1 H.2.18.10.4			N/A
4. Memory 4.1 Invariable memory	All single bit faults	Periodic modified checksum, or multiple checksum, or word protection with single bit redundancy	H.2.19.3.1 H.2.19.3.2 H.2.19.8.2			N/A
4.2 Variable memory	DC fault	Periodic static memory test, or word protection with single bit redundancy	H.2.19.6 H.2.19.8.2			N/A

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Clause	Requirement + Test	Result - Remark	Verdict

TABLE R.1 [e] – GENERAL FAULT/ERROR CONDITIONS

Component [a]	Fault/error	Acceptable measures [b, c]	Definitions	Document reference for applied measure	Document reference for applied test	Verdict
4.3 Addressing (relevant to variable and invariable memory)	Stuck at	Word protection with single bit redundancy including the address	H.2.19.8.2			N/A
5 Internal data path	Stuck at	Word protection with single bit redundancy	H.2.19.8.2			N/A
5.1 VOID						N/A
5.2 Addressing	Wrong address	Word protection with single bit redundancy including the address	H.2.19.8.2			N/A
6 External communication	Hamming distance 3	Word protection with multi-bit redundancy, or CRC – single work, or Transfer redundancy, or Protocol test	H.2.19.8.1 H.2.19.4.1 H.2.18.2.2 H.2.18.14			N/A
6.1 VOID						N/A
6.2 VOID						N/A

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Clause	Requirement + Test	Result - Remark	Verdict

TABLE R.1 [e] – GENERAL FAULT/ERROR CONDITIONS						
Component [a]	Fault/error	Acceptable measures [b, c]	Definitions	Document reference for applied measure	Document reference for applied test	Verdict
6.3 Timing	Wrong point in time Wrong sequence	Time-slot monitoring, or scheduled transmission Time-slot and logical monitoring, or comparison of redundant communication channels by either: - reciprocal comparison - independent hardware comparator Logical monitoring, or time-slot monitoring, or Scheduled transmission	H.2.18.10.4 H.2.18.18 H.2.18.10.3 H.2.18.15 H.2.18.3 H.2.18.10.2 H.2.18.10.4 H.2.18.18			N/A
7 Input/output periphery	Fault conditions specified in 19.11.2	Plausibility check	H.2.18.13			N/A
7.1 VOID						N/A
7.2 Analog I/O 7.2.1 A/D and D/A-converter	Fault conditions specified in 19.11.2	Plausibility check	H.2.18.13			N/A
7.2.2 Analog multiplexer	Wrong addressing	Plausibility check	H.2.18.13			N/A
8 VOID						N/A

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Clause	Requirement + Test	Result - Remark	Verdict

TABLE R.1 [e] – GENERAL FAULT/ERROR CONDITIONS						
Component [a]	Fault/error	Acceptable measures [b, c]	Definitions	Document reference for applied measure	Document reference for applied test	Verdict
9 Custom chips [d] e.g. ASIC, GAL, gate array	Any output outside the static and dynamic functional specification	Periodic self-test	H.2.16.6			N/A
NOTE A Stuck-at fault model denotes a fault model representing an open circuit or a non-varying signal level. A DC fault model denotes a stuck-at fault model incorporating short circuit between signal lines.						
[a)] For fault/error assessment, some components are divided into their sub-functions. [b)] For each sub-function in the table, the Table R.2 measure will cover the software fault/error. [c)] Where more than one measure is given for a sub-function, these are alternatives. [d)] To be divided as necessary by the manufacturer into sub-functions. [e)] Table R.1 is applied according to the requirements of R.1 to R.2.2.9 inclusive.						

S	**ANNEX S (NORMATIVE)** **BATTERY OPERATED APPLIANCES POWERED BY BATTERIES THAT ARE NON-RECHARGEABLE OR NOT RECHARGED IN THE APPLIANCE**		**N/A**
	The following modifications to this standard are applicable for battery-operated appliances where the batteries are either non-rechargeable (primary batteries), or		N/A
	rechargeable batteries (secondary batteries) that are not recharged in the appliance		N/A
5.8.1	If the supply terminals for the connection of the battery have no indication of polarity, the more unfavourable polarity is applied		N/A
5.S.101	Appliances intended for use with a battery box are tested with the battery box supplied with the appliance or with the battery box recommended in the instructions		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
5.S.102	Appliances are tested as motor-operated appliances.		N/A
7.1	Appliances marked with the battery voltage (V) and the polarity of the terminals, unless..... .....:		N/A
	the polarity is irrelevant		N/A
	Appliances also marked with:		N/A
	– name, trade mark or identification mark of the manufacturer or responsible vendor..... .....:		N/A
	– model or type reference..... .....:		N/A
	– IP number according to degree of protection against ingress of water, other than IPX0... .....:		N/A
	– type reference of battery or batteries..... .....:		N/A
	If relevant, the positive terminal is indicated by the symbol IEC 60417-5005 and the negative terminal by the symbol IEC 60417-5006		N/A
	If appliances use more than one battery, they are marked to indicate correct polarity connection of the batteries		N/A
7.6	Additional symbols		N/A
7.12	The instructions contain the following, as applicable:		N/A
	– the types of batteries that may be used... .....:		N/A
	– how to remove and insert the batteries		N/A
	– non-rechargeable batteries are not to be recharged		N/A
	– rechargeable batteries are to be removed from the appliance before being charged		N/A
	– different types of batteries or new and used batteries are not to be mixed		N/A
	– batteries are to be inserted with the correct polarity		N/A
	– exhausted batteries are to be removed from the appliance and safely disposed of		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	– if the appliance is to be stored unused for a long period, the batteries are removed		N/A
	– the supply terminals are not to be short-circuited		N/A
11.5	Appliances are supplied with the most unfavourable supply voltage between		N/A
	– 0,55 and 1,0 times the battery voltage, if the appliance can be used with non-rechargeable batteries		N/A
	– 0,75 and 1,0 times battery voltage, if the appliance is designed for use with rechargeable batteries only		N/A
	The values specified in Table S.101 for the internal resistance per cell of the battery is taken into account		N/A
19.1	The tests are carried out with the battery fully charged unless otherwise specified		N/A
19.13	The battery does not rupture or ignite		N/A
19.S.101	Appliances are supplied with the voltage specified in 11.5. The supply terminals having an indication of polarity are connected to the opposite polarity, unless		N/A
	such a connection is unlikely to occur due to the construction of the appliance		N/A
19.S.102	For appliances with provision for multiple batteries, one or more of the batteries are reversed and the appliance is operated, if reversal of batteries is allowed by the construction		N/A
25.5	The flexible leads or flexible cord used to connect an external battery or battery box in is connected to the appliance by a type X attachment		N/A
25.13	This requirement is not applicable to the flexible leads or flexible cord connecting external batteries or a battery box with an appliance		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
25.S.101	Appliances have suitable means for connection of the battery. If the type of battery is marked on the appliance, the means of connection is suitable for this type of battery		N/A
26.5	Terminal devices in an appliance for the connection of the flexible leads or flexible cord connecting an external battery or battery box are so located or shielded that there is no risk of accidental connection between supply terminals		N/A
30.2.3.2	There is no battery in the area of the vertical cylinder used for the consequential needle flame test, unless		N/A
	the battery is shielded by a barrier that meets the needle flame test of Annex E, or		N/A
	that comprises material classified as V-0 or V-1 according to IEC 60695-11-10		N/A
T	**ANNEX T (NORMATIVE)** **UV-C RADIATION EFFECT ON NON-METALLIC MATERIALS**		**N/A**
	Requirements for non-metallic materials subject to direct or reflected UV-C radiation exposure and whose mechanical and electrical properties are relied upon for compliance with the		N/A
	Does not apply to glass, ceramic and similar materials		N/A
	Tested as specified in ISO 4892-1 and ISO 4892-2, with the following modifications:		N/A
	Modifications to ISO 4892-1:		N/A
5.1.6	The UV-C emitter is a low pressure mercury lamp with a quartz envelope having a continuous spectral irradiance of 10 W/m2 at 254 nm		N/A
	Subclause 5.1.6.1 and Table 1 are not applicable		N/A
5.2.4	The black-panel temperature shall be 63 °C +/- 3 °C		N/A
5.3.1	Humidification of the chamber air is specified in part 2 when necessary		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
9	This clause is not applicable		N/A
	Modifications to ISO 4892-2:		N/A
7.1	At least three test specimens are tested		N/A
	Ten samples of internal wiring is tested		N/A
7.2	The specimens are attached to the specimen holders such that they are not subject to any stress		N/A
7.3	Apparatus prepared as specified		N/A
	The test specimens and, if used, the irradiance-measuring instrument are exposed for 1 000 h		N/A
7.4	If used, a radiometer is mounted and calibrated such that it measures the irradiance at the exposed surface of the test specimen		N/A
7.5	Material properties and test methods for parts providing mechanical support or impact resistance as specified in Table T.1		N/A
	Material properties and test method for electrical insulation of internal wiring as specified in Table T.2		N/A
8	This clause is not applicable		N/A
AA	**ANNEX AA (NORMATIVE)** **BATTERY CHARGERS FOR USE BY CHILDREN (IEC 60335-2-29)**		**N/A**
	Battery chargers intended to be used by children at least eight years old without supervision comply with this standard but as modified by this annex		N/A
	The battery charger have a d.c. output at SELV not exceeding 30 V and a rated output not exceeding 50 VA		N/A
5.201	When batteries used, the generally available rechargeable batteries giving the most unfavourable conditions used		N/A
6.1	Battery chargers suitable for outdoor use class III		N/A
	Other battery chargers class II or class III		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
6.2	Battery chargers suitable for outdoor use at least IPX7		N/A
6.201	Enclosures classified at least IP3X with regard to protection against ingress of solid foreign objects		N/A
7.1	Symbol 5957 of IEC 60417 or text “For indoor use only” for battery chargers for indoor use		N/A
	IP number		N/A
	Smiling face symbol together with 8+		N/A
7.6	Correct symbols used		N/A
7.12	Instructions for safe use contains:		—
	- Warning to only allow children at least 8 years old to use battery charger		N/A
	- Sufficient instructions for safe use of battery charger by a child		N/A
	- Explanation that battery charger is not a toy		N/A
	- Instruction for child not to try and recharge non-rechargeable batteries		N/A
	- Warning to examine battery charger regularly for damage		N/A
	- Warning in case battery charger is damaged		N/A
	Instruction for Class III battery charger to be supplied from transformer for toys		N/A
7.14	Height of symbol marked on the appliance at least 10 mm		N/A
	Height of lettering at least 3 mm		N/A
8.1.1	Use of test probe B of IEC 61032: no contact with live parts or metal parts separated from live parts by basic insulation only, even after use of a tool to remove parts of enclosure		N/A
10.101	The output voltage not exceed 42,4 V peak		N/A
11.8	Temperature rises of parts that can be touched by test probe 18 of IEC 61032	(see appended table)	N/A
	- 25 K, if of metal		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- 35 K, if of other material		N/A
17	Temperature rises of parts that can be touched by test probe 18 of IEC 61032	(see appended table)	N/A
	- 45 K, if of metal		N/A
	- 55 K, if of other material		N/A
19.13	Temperature rises of parts that can be touched by test probe 18 of IEC 61032	(see appended table)	N/A
	- 45 K, if of metal		N/A
	- 55 K, if of other material		N/A
21.201	Impact test Eha of IEC 60068-2-75, with impact energy of 2 J		N/A
	For rectangular shaped battery chargers, the four sides and four edges are subjected to an impact		N/A
	For other battery chargers, the enclosure is subjected to eight impacts equally spaced over the periphery		N/A
	Free fall test Ed, Procedure 1 of IEC 60068-2-32, from the height of 500 mm		N/A
	Battery charger not damaged to such extend that compliance is impaired, live parts shall not become accessible		N/A
22.201	Battery charger with only one rated voltage or rated voltage range		N/A
	Battery charger not incorporate means for manually adjusting output voltage		N/A
22.202	Battery chargers constructed so that reverse charging is prevented, regardless of the state of charge of the battery		N/A
	This applies even if the battery is inserted with the wrong polarity		N/A
24.201	Transformer for toys tested in accordance with sub-clauses 7.2, 20.5.1 and 20.101 and clause 15 of standard IEC 61558-2-7		N/A
25.1	Battery charger not provided with an appliance inlet		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
25.5	Battery charger provided with type Y or type Z attachment		N/A
BB	**ANNEX BB (NORMATIVE)** **ISOLATING TRANSFORMERS (IEC 60335-2-29:2016/AMD1:2019)**		**N/A**
7.1	Isolating transformers for specific use marked with:		—
	– name, trademark or identification mark of the manufacturer or responsible vendor		N/A
	– model or type reference		N/A
	Fail-safe transformers comply with Subclause 15.5 of IEC 61558-1		N/A
	This test carried out on three transformers		N/A
22	Subclauses 19.1 and 19.1.2 of IEC 61558-2-4:2009 applicable		N/A
29.1, 29.2 and 29.3	The distances specified in items 2a, 2c and 3 in Table 13 of IEC 61558-1 apply		N/A
	For insulated winding wires complying with Subclause 19.12.3 of IEC 61558-1, there are no requirements for clearances or creepage distances		N/A
	In addition, for windings providing reinforced insulation, the distance specified in item 2c of Table 13 of IEC 61558-1 is not assessed		N/A
	For isolating transformers subjected to periodic voltages with a frequency exceeding 30 kHz, the clearances, creepage distances and solid insulation values specified in IEC 60664-4 are applicable, if these values are greater than the values specified in items 2a, 2c and 3 in Table 13 of IEC 61558-1		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

10.1	TABLE: Input Power Deviation				N/A
Input deviation of/at:	**P rated (W)**	**P measured (W)**	**Δ P**	**Required Δ P**	**Remark**
Supplementary information:					

10.2	TABLE: Input Current Deviation				P
Current deviation of/at:	**I rated (A)**	**I measured (A)**	**Δ I**	**Required Δ I**	**Remark**
GT-93600SHG3050	1.5	0.555 / 0.291	-63.0 / -80.6	+20	-
Supplementary information: Figures shown above are corresponding to rated supply voltage of 100 Va.c. and 240 Va.c. respectively.					

10.102	TABLE: Output Current Deviation					P
Current deviation of/at:	**U_o rated (V)**	**I_o rated (A)**	**I_o measured (A)**	**ΔI_o (%)**	**Required ΔI_o (%)**	**Remark**
GT-93600SHG3050	12.6	4.0	3.66 / 3.72	-8.5 / -7.0	+/-10	--
GT-93600SHG3050	9	4.0	3.88 / 3.90	-3.0 / -2.5	+/-10	--
Figures shown above are corresponding to rated supply voltage of 100 Va.c. and 240 Va.c. respectively.						

11.8	TABLE: Heating Test		P
	Test voltage (V) .....:	94V/ 254.4V	—
	Ambient (°C) .....:	21	—

Thermocouple Locations	Max. temperature rise measured, Δ T (K)	Max. temperature rise limit, Δ T (K)
Internal input wire	14/ 9	30 (T80)
Varistor MOV1	21/ 9	35 (T85)
LF1 winding	32/ 30	60 (Class 130)
X-Capacitor	34/ 32	50 (T100)

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Clause	Requirement + Test	Result - Remark	Verdict

11.8	**TABLE: Heating Test**		**P**
	Test voltage (V) .....:	94V/ 254.4V	—
	Ambient (°C) .....:	21	—

Thermocouple Locations	**Max. temperature rise measured, Δ T (K)**	**Max. temperature rise limit, Δ T (K)**
LF2 winding	39/ 36	60 (Class 130)
PCB	48/ 45	80 (T130)
T1 winding	35/ 18	60 (Class 130)
E-Capacitor	29/ 16	55 (T105)
Y-Capacitor	24/ 15	75 (T125)
Enclosure inside	18/ 12	For ball pressure
Enclosure outside	17/ 11	35
Opto-coupler	30/ 28	50 (T100)
Appliance inlet	18/ 19	20
Appliance outlet	16/ 15	20
Test corner	11/ 10	40

Supplementary information: The maximum ambient temperature is 50°C.

Test was repeated for three times as the temperature of LF3 winding and external enclosure was close to limited value.

Appliance outlet load with 8.5A.

11.8	**TABLE: Heating Test, resistance method**		**N/A**
	Test voltage (V) .....:		—
	Ambient, t_1 (°C) .....:		—
	Ambient, t_2 (°C) .....:		—

Temperature rise of winding	**R_1 (Ω)**	**R_2 (Ω)**	**ΔT (K)**	**Max. ΔT (K)**	**Insulation class**

Supplementary information:

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Clause	Requirement + Test	Result - Remark	Verdict

13.2	**TABLE: Leakage Current**		P
	Heating appliances: 1,15 x rated input (W) ..... :	N/A	—
	Motor-operated and combined appliances: 1,06 x rated voltage (V)..... :	106 / 254.4	—

Leakage current between:	**I (mA)**	**Max. allowed I (mA)**
Live parts and output circuits	Max. 0.02 peak	0.75 mA peak

Supplementary information: Protective impedance and radio interference filters are disconnected before carrying out the tests.

13.3	**TABLE: Dielectric Strength**	**P**

Test voltage applied between:	**Test potential applied (V)**	**Breakdown / flashover (Yes/No)**
Live parts and live parts to the mid point of two Y capacitors	1000	No
Live parts and live parts to the earth pin	1000	No
Basic insulation and accessible metal parts (or metal foil)	1750	No
The earth pin and accessible metal parts (or metal foil)	1750	No
Live parts and output circuit	3000	No

Supplementary information:

14	**TABLE: Transient overvoltages**	N/A

Clearance between:	**Cl (mm)**	**Required Cl (mm)**	**Rated impulse voltage (V)**	**Impulse test voltage (V)**	**Flashover (Yes/No)**

Supplementary information:

16.2	**TABLE: Leakage Current**		P
	Single phase appliances: 1,06 x rated voltage (V) ..... :	106 / 254.4	—

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Clause	Requirement + Test	Result - Remark	Verdict

	Three phase appliances 1,06 x rated voltage divided by √3 (V) ..... :	N/A	—

Leakage current between:	**I (mA)**	**Max. allowed I (mA)**
Live parts and output circuits	Max. 0.02	0.75
Supplementary information: Protective impedance and radio interference filters are disconnected before carrying out the tests.		

16.3	**TABLE: Dielectric Strength**		**P**
Test voltage applied between:		**Test potential applied (V)**	**Breakdown / flashover (Yes/No)**
Live parts and live parts to the mid point of two Y capacitors		1250	No
Live parts and live parts to the earth pin		1250	No
Basic insulation and accessible metal parts (or metal foil)		1750	No
The earth pin and accessible metal parts (or metal foil)		1750	No
Live parts and output circuit		3000	No
Supplementary information:			

17	**TABLE: Overload Protection, resistance method**					N/A
	Test voltage (V) ..... :					—
	Ambient, t_1 (°C)..... :					—
	Ambient, t_2 (°C)..... :					—
Temperature of winding:	**R_1 (Ω)**	**R_2 (Ω)**	**Δ T (K)**	**T (°C)**	**Max. T (°C)**	
Supplementary information:						

19	**Abnormal Operation Conditions**	**P**
Operational characteristics	**YES/NO**	**Operational conditions**
Are there electronic circuits to control the appliance operation?	NO	

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Clause	Requirement + Test	Result - Remark	Verdict

Are there “off” or “stand-by” position?	NO	
The unintended operation of the appliance results in dangerous malfunction?	NO	

Sub-clause	Operating conditions description	Test results description	PEC description	EMP 19.11.4	Software type required	19.11.3 PEC	Final result
19.2	N.A	N.A	N.A	N.A	N.A	N.A	N.A
19.3	N.A	N.A	N.A	N.A	N.A	N.A	N.A
19.4	N.A	N.A	N.A	N.A	N.A	N.A	N.A
19.5	N.A	N.A	N.A	N.A	N.A	N.A	N.A
19.6	N.A	N.A	N.A	N.A	N.A	N.A	N.A
19.7	N.A	N.A	N.A	N.A	N.A	N.A	N.A
19.8	N.A	N.A	N.A	N.A	N.A	N.A	N.A
19.9	N.A	N.A	N.A	N.A	N.A	N.A	N.A
19.10	N.A	N.A	N.A	N.A	N.A	N.A	N.A
19.11.2	Full load	Fuse or electronic circuit protection	PC1 and other components	Pass	N.A	YES	Pass
19.11.4.8	N.A	N.A	N.A	N.A	N.A	N.A	N.A
19.101	N.A	N.A	N.A	N.A	N.A	N.A	N.A
19.102	N.A	N.A	N.A	N.A	N.A	N.A	N.A
19.103	N.A	N.A	N.A	N.A	N.A	N.A	N.A
Supplementary information:							

19.7	**TABLE: Abnormal Operation, locked rotor/moving parts**		N/A
	Test voltage (V) .....:		**—**
	Ambient, t_1 (°C).....:		**—**
	Ambient, t_2 (°C).....:		**—**

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Temperature of winding:	**R_1 (Ω)**	**R_2 (Ω)**	**Δ T (K)**	**T (°C)**	**Max. T (°C)**
Supplementary information:					

19.9	**TABLE: Abnormal Operation, running overload**		N/A
	Test voltage (V) ..... :		—
	Ambient, t_1 (°C)..... :		—
	Ambient, t_2 (°C)..... :		—

Temperature of winding:	**R_1 (Ω)**	**R_2 (Ω)**	**Δ T (K)**	**T (°C)**	**Max. T (°C)**
Supplementary information:					

19.11.2	**TABLE: Fault Conditions**	P
Fault condition performed:	**Observation:**	
C1 short circuit	Fuse opened immediately, no hazard.	
C14 short circuit	Unit shutdown immediately, no hazard.	
BD1 short circuit	Fuse opened immediately, no hazard.	
Q1 short circuit	Fuse opened immediately, no hazard.	
Q2 short circuit	Fuse opened immediately, no hazard.	
Pin 1-2 of U1 short circuit	Unit shutdown immediately, no hazard.	
Pin 3-4 of U4 short circuit	Unit shutdown immediately, no hazard.	
Supplementary information:		

19.13	**TABLE: Abnormal Operation, temperature rises**	N/A
Thermocouple locations:	**Max. temperature rise measured, Δ T (K)**	**Max. temperature rise limit, Δ T (K)**
Supplementary information: No higher temperature		

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Clause	Requirement + Test	Result - Remark	Verdict

21.1	TABLE: Impact Resistance		P
Impacts per surface	**Surface tested**	**Impact energy (Nm)**	**Comments**
3 Times	Enclosure	1	Pass
Supplementary information:			

24.1	TABLE: Critical components information				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
PCB	Guangde Boya Xinxing Electronic Technology Co Ltd	BY-1	Min. 1.6 mm thickness, min. V-0, 130°C	IEC 60335-2-29	Tested with appliance
Alt. use	SHUANG MING INDUSTRY CO LTD	T015V0, T005V0 (UL E78017)	Min. 1.6 mm thickness, min. V-0, 130°C	IEC 60335-2-29	Tested within appliance
Alt. use	SHANGHAI H-FAST ELECTRONICS CO LTD	211001 (UL E337862)	Min. 1.6 mm thickness, min. V-0, 130°C	IEC 60335-2-29	Tested within appliance
Alt. use	Interchangeable	—	Min. 1.6 mm thickness, min. V-0, 130°C	IEC 60335-2-29	—
- Description:	Interchangeability based on specified dimensions due to mounting (including connections) and specified rating, need pass Ball Pressure Test and Glow Wire Test.				
Fuse (F1)	Conquer Electronics Co., Ltd.	MST series	T3.15A, 250V, Rated breaking capacity 100A.	IEC 60127-1 IEC 60127-3	VDE 40017118
Alt. use	Dongguan Better Electronics Technology Co., Ltd.	334 - Serie(s)	T3.15A, 250V, Rated breaking capacity 50A.	IEC 60127-1 IEC 60127-3	VDE 40025428
Alt. use	Conquer Electronics Co., Ltd.	PTU	T3.15A, 250V, Rated breaking capacity 50A.	IEC 60127-1 IEC 60127-3	VDE 40001462

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict

24.1	TABLE: Critical components information				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Alt. use	Ever Island Electric Co., Ltd. And Walter Electric	2010	T3.15A, 250V, Rated breaking capacity 130A.	IEC 60127-1 IEC 60127-3	VDE 40018781
Alt. use	Bel Fuse Ltd.	RST-Serie(s)	T3.15A, 250V, Rated breaking capacity 100A.	IEC 60127-1 IEC 60127-3	VDE 40011144
Alt. use	Cooper Bussmann LLC	SS-5	T3.15A, 250V, Rated breaking capacity 35A.	IEC 60127-1 IEC 60127-3	VDE 40015513
Alt. use	Walter Electronic Co. Ltd.	ICP-Series	T3.15A, 250V, Rated breaking capacity 50A.	IEC 60127-1 IEC 60127-3	VDE 40012824
Alt. use	Dongguan Better	932	T3.15A, 250V, Rated breaking capacity 100A.	IEC 60127-1 IEC 60127-3	VDE 40033369
Alt. use	Hollyland	5ET	T3.15A, 250V, Rated breaking capacity 50A.	IEC 60127-1 IEC 60127-3	VDE 40015669
Alt. use	Hollyland	32S-020H	T3.15A, 250V, Rated breaking capacity 50A.	IEC 60127-1 IEC 60127-3	VDE 40011830
Alt. use	Conquer Electronics Co., Ltd.	MET series	T3.15A, 250V, Rated breaking capacity 50A.	IEC 60127-1 IEC 60127-3	VDE 40017157
Alt. use	Shenzhen Lanson Electronics Co. Ltd.	SMT	T3.15A, 250V, Rated breaking capacity 50A.	IEC 60127-1 IEC 60127-3	VDE 40012592
Alt. use	Zhongshan Lanbao Electrical Appliances Co., Ltd.	RTI-10 Serie(s)	T3.15A, 250V, Rated breaking capacity 50A.	IEC 60127-1 IEC 60127-3	VDE 40017009

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Clause	Requirement + Test	Result - Remark	Verdict

24.1	TABLE: Critical components information				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Fuse (F3)	Conquer Electronics Co., Ltd.	UBM, UBM-A	T5A, 250VAC	IEC 60127-1 IEC 60127-2	VDE 40008021
Alt. use	Littelfuse Inc.	216	T5A, 250VAC	IEC 60127-1 IEC 60127-2	VDE 40013834
Alt. use	Walter Electronic Co. Ltd.	FSC-Serie(s)	T5A, 250VAC	IEC 60127-1 IEC 60127-2	VDE 40016860
Fuse (Used near AC outlet)	Dongguan Better Electronics Technology Co., Ltd	932	T6.3A, 250V	IEC 60127-1 IEC 60127-3	VDE 40033369
Alt. use	Littelfuse, Inc.	392	T6.3A, 250V	IEC 60127-1 IEC 60127-3	VDE 126983
Alt. use	Walter Electronic Co. Ltd.	FSC-Serie(s)	T6.3A, 250V	IEC 60127-1 IEC 60127-3	VDE 40016860
Alt. use	Ever Island Electric Co., Ltd. And Walter Electric	2010	T6.3A, 250V	IEC 60127-1 IEC 60127-3	VDE 40018781
Alt. use	Bel Fuse Ltd.	RST-Serie(s)	T6.3A, 250V	IEC 60127-1 IEC 60127-3	VDE 40028321
Alt. use	Conquer Electronics Co., Ltd.	MST	T6.3A, 250V	IEC 60127-1 IEC 60127-3	VDE 40017118
X capacitor (CX1) (optional)	Cheng Tung Industrial Co., Ltd.	CTX	Max 0.47µF, Min. 250V, 110°C X1 or X2	IEC/EN 60384-14	VDE 40022642
Alt. use	Tenta Electric Industrial Co. Ltd.	MEX	Max 0.47µF, Min.250V,100°C X1 or X2	IEC/EN 60384-14	VDE 119119

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict

24.1	TABLE: Critical components information				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Alt. use	JOEY ELECTRONICS (DONG GUAN) CO LTD	MPX	Max 0.47µF, Min.250V,110°C X1 or X2	IEC/EN 60384-14	VDE 40032481
Alt. use	Ultra Tech Xiphi Enterprise Co. Ltd.	HQX	Max 0.47µF, Min.250V,110°C X1 or X2	IEC/EN 60384-14	VDE 40015608
Alt. use	Xiangtai Electronic (Shenzhen) Co., Ltd.	MKP	Max 0.47µF, Min.250V,100°C X1 or X2	IEC/EN 60384-14	VDE 40036065
Alt. use	Xiangtai Electronic (Shenzhen) Co., Ltd.	MPX	Max 0.47µF, Min.250V,100°C X1 or X2	IEC/EN 60384-14	VDE 40036065
Alt. use	Carli Electronics Co., Ltd.	MPX	Max 0.47µF, Min.250V,100°C X1 or X2	IEC/EN 60384-14	VDE 40008520
Alt. use	Dain Electronics Co., Ltd.	MEX	Max 0.47µF, Min.250V,100°C X1 or X2	IEC/EN 60384-14	VDE 40018798
Alt. use	Dain Electronics Co., Ltd.	MPX	Max 0.47µF, Min.250V,100°C X1 or X2	IEC/EN 60384-14	VDE 40018798
Alt. use	Dain Electronics Co., Ltd.	NPX	Max 0.47µF, Min.250V,100°C X1 or X2	IEC/EN 60384-14	VDE 40018798
Alt. use	Yuon Yu Electronics Co. Ltd.	MPX	Max 0.47µF, Min.250V,100°C X1 or X2	IEC/EN 60384-14	VDE 40032392

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Clause	Requirement + Test	Result - Remark	Verdict

24.1	TABLE: Critical components information				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Alt. use	Sinhua Electronics (Huzhou) Co., Ltd.	MPX	Max 0.47µF, Min.250V,110°C X1 or X2	IEC/EN 60384-14	VDE 40014686
Alt. use	Jiangsu Xinghua Huayu Electronics Co., Ltd.	MPX - Series	Max 0.47µF, Min.250V,100°C X1 or X2	IEC/EN 60384-14	VDE 40022417
Y capacitor (CY1A, CY1B) (optional)	TDK Corporation	CD	Y1, AC250V, max 2200pF, 25/125/21/B	IEC/EN 60384-14	VDE 40029780
Alt. use	Success Electronics Co., Ltd.	SE	Y1, AC250V, max 2200pF, 30/125/56/C	IEC/EN 60384-14	VDE 40037211
Alt. use	Success Electronics Co., Ltd.	SB	Y1, AC250V, max 2200pF, 30/125/56/C	IEC/EN 60384-14	VDE 40037221
Alt. use	Murata Mfg. Co., Ltd.	KX	Y1, AC250V, max 2200pF, 25/125/21/B	IEC/EN 60384-14	VDE 40002831
Alt. use	Walsin Technology Corp.	AH	Y1, AC250V, max 2200pF, 25/125/21/C	IEC/EN 60384-14	VDE 40001804
Alt. use	Haohua Electronic Co.	CT 7	Y1, AC250V, max 2200pF, 30/125/56/C	IEC/EN 60384-14	VDE 40003902
Alt. use	Xiangtai Electronic (Shenzhen) Co., Ltd.	YO-series	Y1, AC250V, max 2200pF, 30/125/56/C	IEC/EN 60384-14	VDE 40036880
Alt. use	JUHONG ELECTRONICS LTD	JB- series	Y1, AC250V, max 2200pF, 30/125/56/C	IEC/EN 60384-14	VDE 40035339

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Clause	Requirement + Test	Result - Remark	Verdict

24.1	TABLE: Critical components information				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Alt. use	JYA-NAY Co., Ltd.	JN	Y1, AC250V, max 2200pF, 30/125/56/C	IEC/EN 60384-14	VDE 40001831
Alt. use	Jyh Chung Electronic Co., Ltd.	JD	Y1, AC250V, max 2200pF, 30/125/56/C	IEC/EN 60384-14	VDE 137027
Alt. use	WELSON INDUSTRIAL CO LT D	WD	Y1, AC250V, max 2200pF, 30/125/56/C	IEC/EN 60384-14	VDE 40016157
Appliance inlet (C14 type)	Zhejiang LECI Electronics Co., Ltd.	DB-14	10A, 250Vac	IEC/EN 60320-1	VDE 40032137
Alt. use	Rich Bay Co., Ltd.	R-301SN	10A, 250Vac	IEC/EN 60320-1	VDE 40030228
Alt. use	Sun Fair Electric Wire & Cable (HK)Co. Ltd.	S-03	10A, 250Vac	IEC/EN 60320-1	VDE 40034447
Alt. use	TECX-UNIONS Technology Corporation	TU-301-S, TU-301-SP	10A, 250Vac	IEC/EN 60320-1	ENEC 00647
Alt. use	Rong Feng Industrial Co., Ltd.	SS-120	10A, 250Vac	IEC/EN 60320-1	VDE 40028101
Alt. use	Inalways Corporation	0711	10A, 250Vac	IEC/EN 60320-1	ENEC 2010084
Alt. use	Zhe Jiang Bei Er jia	ST-A01-003J	10A, 250Vac	IEC/EN 60320-1	VDE 40013388

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Clause	Requirement + Test	Result - Remark	Verdict

24.1	TABLE: Critical components information				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Appliance outlet	Rich Bay Co., Ltd.	R-302A2	10A, 250Vac	IEC/EN 60320-1 IEC/EN 60320-2-2	VDE 40029318
Earthing wire	KUNSHAN NEW ZHICHENG ELECTRONICS TECHNOLOGIES CO LTD	1015, 1007, 1185 (UL E237831)	Min. 20 AWG, Min. 300V, Min. 80°C	IEC/EN 60335-2-29	Tested with appliance
Alt. use	ZHUANG SHAN CHUAN ELECTRICAL PRODUCTS (KUNSHAN) CO LTD	1015, 1007, 1185 (UL E333601)	Min. 20 AWG, Min. 300V, Min. 80°C	IEC/EN 60335-2-29	Tested with appliance
Alt. use	DONGGUAN CHUANTAI WIRE PRODUCTS CO LTD	1015, 1007, 1185 (UL E315628)	Min. 20 AWG, Min. 300V, Min. 80°C	IEC/EN 60335-2-29	Tested with appliance
Alt. use	YONG HAO ELECTRICAL INDUSTRY CO LTD	1015, 1007, 1185 (UL E240426)	Min. 20 AWG, Min. 300V, Min. 80°C	IEC/EN 60335-2-29	Tested with appliance
Alt. use	DONGGUAN GUNEETAL WIRE & CABLE CO LTD	1015, 1007, 1185 (UL E204204)	Min. 20 AWG, Min. 300V, Min. 80°C	IEC/EN 60335-2-29	Tested with appliance
Alt. use	SHENG YU ENTERPRISE CO LTD	1015, 1007, 1185 (UL E219726)	Min. 20 AWG, Min. 300V, Min. 80°C	IEC/EN 60335-2-29	Tested with appliance
Alt. use	KUNSHAN XINGHONGMEN G ELECTRONIC CO LTD	1015, 1007, 1185 (UL E315421)	Min. 20 AWG, Min. 300V, Min. 80°C	IEC/EN 60335-2-29	Tested with appliance

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Clause	Requirement + Test	Result - Remark	Verdict

24.1	TABLE: Critical components information				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Alt. use	SUZHOU YEMAO ELECTRONIC CO LTD	1015, 1007, 1185 (UL E353532)	Min. 20 AWG, Min. 300V, Min. 80°C	IEC/EN 60335-2-29	Tested with appliance
Internal input cord	SUZHOU YEMAO ELECTRONIC CO LTD	1007 (UL E353532)	Min. 18AWG, min. 300Vac, min. 80°C	IEC/EN 60335-2-29 UL 758	Tested with appliance
Alt. use	Interchangeable	Interchangeable	Min. 18AWG, min. 300Vac, min. 80°C	IEC/EN 60335-2-29 UL 758	UL approved
Internal AC connection cord	SUZHOU DIOUDE ELECTRONICS CO LTD	SVT (UL E336192)	Min. 18AWG, min. 300Vac, min. 80°C Jacketed cord	IEC/EN 60335-2-29	Tested with appliance
Internal secondary wire	SUZHOU YEMAO ELECTRONIC CO LTD	1007 (UL E353532)	Min. 24AWG, min. 300Vac, min. 80°C	IEC/EN 60335-2-29 UL 758	Tested with appliance
Alt. use	Interchangeable	Interchangeable	Min. 24AWG, min. 300Vac, min. 80°C	IEC/EN 60335-2-29 UL 758	UL approved
Heat-shrinkable tubing (Around C14)	SHENZHEN WOER HEAT-SHRINKABLE MATERIAL CO LTD	RSFR, RSFR-H, RSFR-HPF (UL E203950)	600V, 125 °C	IEC/EN 60335-2-29	Tested with appliance
Alt. use	QIFURUI ELECTRONICS CO	QFR-h (UL E225897)	600V, 125°C	IEC/EN 60335-2-29	Tested with appliance

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Clause	Requirement + Test	Result - Remark	Verdict

24.1	TABLE: Critical components information				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Alt. use	DONGGUAN SALIPT CO LTD	SALIPT S-901-300 SALIPT S-901-600 (UL E209436)	Min. 300V, 125°C	IEC/EN 60335-2-29	Tested with appliance
Alt. use	GUANGZHOU KAIHENG ENTERPRISE GROUP	K-2 (+), K-2 (CB) (UL E214175)	Min. 300V, 125°C	IEC/EN 60335-2-29	Tested with appliance
Alt. use	CHANGYUAN ELECTRONICS (SHENZHEN) CO LTD	CB-HFT (UL E180908)	Min. 300V, 125°C	IEC/EN 60335-2-29	Tested with appliance
Transformer (T1)	GlobTek / BOAM / HAOPUWEI	TF062	Class B, with critical component listed below	IEC/EN 60335-2-29	Tested with appliance
- Insulation system used in T1	GlobTek	GTX-130-TM	Class 130 (B)	IEC/EN 60335-2-29	Tested with appliance
Alt. use	Haopuwei	ZT-130	Class 130 (B)	IEC/EN 60335-2-29	Tested with appliance
Alt. use	BOAM	BOAM-01, B1	Class 130 (B)	IEC/EN 60335-2-29	Tested with appliance
- Magnet wire	PACIFIC ELECTRIC WIRE & CABLE (SHENZHEN) CO LTD	UEWN/U (UL E201757)	MW28-C, 130°C	IEC/EN 60335-2-29	Tested with appliance
-Alt. use	ZHENG YI ELECTRICAL MATERIAL LTD CO	xUEW, QA-x/130 (UL E316891)	MW75-C, 130 °C	IEC/EN 60335-2-29	Tested with appliance

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Clause	Requirement + Test	Result - Remark	Verdict

24.1	TABLE: Critical components information				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
-Alt. use	BOLUO COUNTY XIN LONG ELECTRICIAN DATA CO LTD	2UEW –F (UL E229423)	MW 79-C, 155°C	IEC/EN 60335-2-29	Tested with appliance
-Alt. use	PACIFIC ELECTRIC WIRE & CABLE (SHENZHEN) CO LTD	UEWS/U (UL E201757)	MW75-C, 130°C	IEC/EN 60335-2-29	Tested with appliance
-Alt. use	JUNG SHING WIRE CO LTD	UEW-4 (UL E174837)	MW75C, 130°C	IEC/EN 60335-2-29	Tested with appliance
-Alt. use	JUNG SHING WIRE CO LTD	UEY-2 (UL E174837)	MW28-C, 130°C	IEC/EN 60335-2-29	Tested with appliance
-Alt. use	JIANGSU HONGLIU MAGNET WIRE TECHNOLOGY CO LTD	2UEW/130 (UL E335065)	MW75-C, 130°C	IEC/EN 60335-2-29	Tested with appliance
-Alt. use	CHANGZHOU DAYANG WIRE & CABLE CO LTD	2UEW/130 (UL E158909)	MW75-C, 130°C	IEC/EN 60335-2-29	Tested with appliance
-Alt. use	WUXI JUFENG COMPOUND LINE CO LTD	2UEWB (UL E206882)	MW75#, 130°C	IEC/EN 60335-2-29	Tested with appliance
-Alt. use	JIANGSU DARTONG M & E CO LTD	UEW (UL E237377)	MW 75-C, 130°C	IEC/EN 60335-2-29	Tested with appliance
-Alt. use	SHANDONG SAINT ELECTRIC CO LTD	UEW/130 (UL E194410)	MW75#, 130°C	IEC/EN 60335-2-29	Tested with appliance

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Clause	Requirement + Test	Result - Remark	Verdict

24.1	TABLE: Critical components information				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
-Alt. use	ZHEJIANG LANGLI ELECTRIC EQUIPMENTS CO LTD	UEW (UL E222214)	MW 79#, 130°C	IEC/EN 60335-2-29	Tested with appliance
-Alt. use	NINGBO JINTIAN NEW MATERIAL CO LTD	2UEW (UL E227047)	MW 75-C, 130°C	IEC/EN 60335-2-29	Tested with appliance
-Triple-insulated wire (Secondary)	Furukawa Electric Co., Ltd.	TEX-E	Max. 600Vrms, Max. 1000Vp, 130°C, Reinforced insulation, Insulation class B	EN 60950-1 EN 61558-2-16	VDE 006735
- Alt. use	TOTOKU INC	TIW-2X$+	Max. 250Vrms, Max. 1400Vp, Reinforced insulation, Insulation class B	EN 60950-1 EN 61558-2-16	VDE 40051990
- Alt. use	HOI LUEN ELECTRICAL MFR CO LTD	THL-F-xx, THL-F-SB-xx	Max. 600Vrms, Max. 1410Vp, 130°C, Reinforced insulation, Insulation class B	EN 60950-1 EN 61558-2-16	VDE 40020365
- Alt. use	Great Leoflon Industrial Co., Ltd.	TRW(B) Serie(s)	Max. 600Vrms, Max. 1000Vp, 130°C, Reinforced insulation, Insulation class B	EN 60950-1 EN 61558-2-16	VDE 136581
-Bobbin	CHANG CHUN PLASTICS CO LTD	T375J T375HF (UL E59481)	V-0, 150°C, thickness 0.45 mm min.	IEC/EN 60335-2-29	Tested with appliance
- Alt. use	CHANG CHUN PLASTICS CO LTD	4130 (UL E59481)	V-0, 140°C, thickness 0.74 mm min.	IEC/EN 60335-2-29	Tested with appliance

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Clause	Requirement + Test	Result - Remark	Verdict

24.1	TABLE: Critical components information				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
- Alt. use	SUMITOMO BAKELITE CO LTD	PM-9820 (UL E41429)	V-0, 150°C, thickness 0.45 mm min.	IEC/EN 60335-2-29	Tested with appliance
- Alt. use	HITACHI CHEMICAL CO LTD	CP-J-8800 (UL E42956)	V-0, 150°C, thickness 0.45 mm min.	IEC/EN 60335-2-29	Tested with appliance
-Insulating tape	3M COMPANY ELECTRICAL MARKETS DIV (EMD)	1350F-1 1350T-1 44 (UL E17385)	Min.130°C	IEC/EN 60335-2-29	Tested with appliance
- Alt. use	BONDTEC PACIFIC CO LTD	370S(b) (UL E175868)	Min.130°C	IEC/EN 60335-2-29	Tested with appliance UL E175868
- Alt. use	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	PZ , CT , WF (UL E165111)	Min.130°C	IEC/EN 60335-2-29	Tested with appliance
- Alt. use	JINGJIANG JINGYI ADHESIVE PRODUCT CO LTD	JY25-A(b) (UL E246950)	Min.130°C	IEC/EN 60335-2-29	Tested with appliance
- Alt. use	CHANG SHU LIANG YI TAPE INDUSTRY CO LTD	LY-XX(a)(b) (UL E246820)	Min.130°C	IEC/EN 60335-2-29	Tested with appliance
-PTFE tubing	GREAT HOLDING INDUSTRIAL CO LTD	TFT / TFS (UL E156256)	Min. 300V, 200°C	IEC/EN 60335-2-29	Tested with appliance

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict

24.1	TABLE: Critical components information				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
-Alt. use	DONGGUAN CITY CHANGJIE METALS & PLASTIC PRODUCTS CO LTD	CJ-TT-T (UL E338209)	300V, 200°C	IEC/EN 60335-2-29	Tested with appliance
-Alt. use	SHENZHEN WOER HEAT-SHRINKABLE MATERIAL CO LTD	WF (UL E203950)	600V, 200°C	IEC/EN 60335-2-29	Tested with appliance
-Alt. use	CHANGYUAN ELECTRONICS (SHENZHEN) CO LTD	CB-TT-T / CB-TT-S (UL E180908)	Min. 300V, 200°C	IEC/EN 60335-2-29	Tested with appliance
Varistor MOV1 (Optional)	Thinking Electronic Industrial Co., Ltd.	TVR10471K	Max. Continuous voltage: min 300Vac(rms), 85°C	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE 005944
Alt. use	Thinking Electronic Industrial Co., Ltd.	TVR14471K	Max. Continuous voltage: min 300Vac(rms), 85°C	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE 005944
Alt. use	Thinking Electronic Industrial Co., Ltd.	TVR14511K	Max. Continuous voltage: min 320Vac(rms), 85°C	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE 005944
Alt. use	Thinking Electronic Industrial Co., Ltd.	TVR10511K	Max. Continuous voltage: min 320Vac(rms), 85°C	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE 005944

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict

24.1	TABLE: Critical components information				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Alt. use	CENTRA SCIENCE CORP	CNR-10D471K, CNR-10V471K	Max. Continuous voltage: min 300Vac(rms), 105°C	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE 40008220
Alt. use	CENTRA SCIENCE CORP	CNR-14D471K, CNR-14V471K	Max. Continuous voltage: min 300Vac(rms), 105°C	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE 40008220
Alt. use	CENTRA SCIENCE CORP	CNR-14D511K, CNR-14V511K	Max. Continuous voltage: min 320Vac(rms), 105°C	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE 40008220
Alt. use	CENTRA SCIENCE CORP	CNR-14D511K, CNR-14V511K	Max. Continuous voltage: min 320Vac(rms), 105°C	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE 40008220
Alt. use	SUCCESS ELECTRONICS CO LTD	SVR10D471K SVR14D471K	Max. Continuous voltage: min 300Vac(rms), 105°C	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE 40030401
Alt. use	SUCCESS ELECTRONICS CO LTD	SVR10D511K SVR14D511K	Max. Continuous voltage: min 320Vac(rms), 105°C	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE 40030401
Alt. use	WALSIN TECHNOLOGY CORP	VZ10D471K	Max. Continuous voltage: min 300Vac(rms), 85°C	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE 005932
Alt. use	WALSIN TECHNOLOGY CORP	VZ14D471K	Max. Continuous voltage: min 300Vac(rms), 85°C	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE 005932

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict

24.1	TABLE: Critical components information				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Alt. use	Lien Shun Electronics Co., Ltd.	10D471K	Max. Continuous voltage: min 300Vac(rms), 105°C	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE 40005858
Alt. use	Lien Shun Electronics Co., Ltd.	14D471K	Max. Continuous voltage: min 300Vac(rms), 105°C	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE 40005858
Alt. use	CERAMATE TECHNICAL CO LTD	GNR10D471K GNR14D471K	Max. Continuous voltage: min 300Vac(rms), 105°C	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE 40031745
Alt. use	CERAMATE TECHNICAL CO LTD	GNR14D511K	Max. Continuous voltage: min 320Vac(rms), 105°C	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE 40031745
Alt. use	BRIGHTKING (SHENZHEN) CO LTD	14D471K	Max. Continuous voltage: min 300Vac(rms), 105°C	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE 40027827
Alt. use	BRIGHTKING (SHENZHEN) CO LTD	10D471K	Max. Continuous voltage: min 300Vac(rms), 105°C	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE 40027827
Alt. use	JOYIN CO LTD	JVT10N471K JVT14N471K	Max. Continuous voltage: min 300Vac(rms), 125°C	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE 005937
Alt. use	JOYIN CO LTD	JVT10N511K JVT14N511K	Max. Continuous voltage: min 320Vac(rms), 125°C	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE 005937

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict

24.1	TABLE: Critical components information				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Opto-coupler U4	Everlight Electronics Co., Ltd.	EL817	Dti=0.5mm Int. , dcr=6.0mm EXT.dcr=7.7mm, thermal cycling test,110°C	IEC/EN 60747-5-2	VDE 132249
Alt. use	COSMO Electronics Corporation	K1010 / KP1010	Dti=0.6mm Int. , dcr=4.0mm EXT.dcr=5.0mm, thermal cycling test,115°C	IEC/EN 60747-5-2	VDE 101347
Alt. use	Lite-On Technology Corporation	LTV-817	Dti=0.8mm Int. , EXT.dcr=7.8mm, thermal cycling test,110°C	IEC/EN 60747-5-2	VDE 40015428
Alt. use	Bright Led Electronics Corp.	BPC-817 A/B/C/D/L BPC-817 M BPC-817 S	Dti=0.4mm EXT.dcr=7.0mm, thermal cycling test,100°C	IEC/EN 60747-5-2	VDE 40007240
Enclosure (all parts)	SABIC INNOVATIVE PLASTICS B V	SE1X, SE1 (UL E45329)	PPE+PS, Min. V-1, Min. thickness: 2.0mm, 105°C	IEC/EN 60335-2-29	Tested with appliance
Alt. use	SABIC INNOVATIVE PLASTICS B V	SE100 (UL E45329)	PPE+PS, V-0, Min. thickness: 2.0mm, 80°C	IEC/EN 60335-2-29	Tested with appliance
Alt. use	SABIC INNOVATIVE PLASTICS B V	C2950 (UL E45329)	PC/ABS, Min. V-0, Min. thickness: 2.0mm, 75°C	IEC/EN 60335-2-29	Tested with appliance

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict

24.1	TABLE: Critical components information				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Alt. use	SABIC INNOVATIVE PLASTICS B V	CX7211 EXCY0098 (UL E45329)	PC/ABS, Min. V-1, Min. thickness: 2.0mm, 90°C	IEC/EN 60335-2-29	Tested with appliance
Alt. use	SABIC INNOVATIVE PLASTICS B V	945 (UL E45329)	PC, Min. V-1, Min. thickness: 2.0mm, 120°C	IEC/EN 60335-2-29	Tested with appliance
Alt. use	SABIC INNOVATIVE PLASTICS B V	HF500R (UL E45329)	PC, V-0, Min. thickness: 2.0mm, 125°C	IEC/EN 60335-2-29	Tested with appliance
Alt. use	SABIC JAPAN L L C	SE1X, SE1 (UL E207780)	PPE+PS, Min. V-1, Min. thickness: 2.0mm, 105°C	IEC/EN 60335-2-29	Tested with appliance
Alt. use	SABIC JAPAN L L C	C2950 (UL E207780)	PC/ABS, Min. V-0, Min. thickness: 2.0mm, 75°C	IEC/EN 60335-2-29	Tested with appliance
Alt. use	SABIC JAPAN L L C	CX7211 (UL E207780)	PC/ABS, Min. V-1, Min. thickness: 2.0mm, 90°C	IEC/EN 60335-2-29	Tested with appliance
Alt. use	SABIC JAPAN L L C	945 (UL E207780)	PC, Min. V-1, Min. thickness: 2.0mm, 120°C	IEC/EN 60335-2-29	Tested with appliance
Alt. use	SABIC JAPAN L L C	HF500R (UL E207780)	PC, V-0, Min. thickness: 2.0mm, 125°C	IEC/EN 60335-2-29	Tested with appliance
Alt. use	TEIJIN CHEMICALS LTD	LN-1250P LN-1250G (UL E50075)	PC, Min. V-0, Min. thickness: 2.0mm, 115°C	IEC/EN 60335-2-29	Tested with appliance
Alt. use	CHI MEI CORPORATION	PA-765A (UL E56070)	ABS, Min. V-0, Min. thickness: 2.0mm, 80°C	IEC/EN 60335-2-29	Tested with appliance

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict

24.1	TABLE: Critical components information				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Alt. use	CHI MEI CORPORATION	PC-540 (UL E56070)	PC/ABS, Min. V-0, Min. thickness: 2.0mm, 80°C	IEC/EN 60335-2-29	Tested with appliance
Alt. use	COVESTRO DEUTSCHLAND AG [PC RESINS]	6485 (UL E41613)	PC/ABS, Min. V-0, Min. thickness: 2.0mm, 115°C	IEC/EN 60335-2-29	Tested with appliance
Supplementary information: [1)] Provided evidence ensures the agreed level of compliance. See OD-CB2039.					

28.1	TABLE: Threaded Part Torque Test		P
Threaded part identification	**Diameter of thread (mm)**	**Column number (I, II, or III)**	**Applied torque (Nm)**
For fixing MOSFET	2.90	II	0.5
For fixing enclosure	2.90	II	0.5
For fixing PCB	2.90	II	0.5
Supplementary information:			

29.1/29.2	TABLE: Clearance And Creepage Distance Measurements					P
clearance cl and creepage distance dcr at/of:	**Up (V)**	**U r.m.s. (V)**	**Required cl (mm)**	**cl (mm)**	**required dcr (mm)**	**dcr (mm)**
Input and output	340	240	3.0	6.2	5.0	6.2
Input to body	500	240	3.0	6.2	5.0	6.2
Between hazardous live part and mid-point of two Y-capacitors	340	170	1.5	4.0	2.5	4.0
Between mid-point of two Y-capacitors and output	340	170	1.5	4.0	2.5	4.0
Between L and N before fuse	340	240	1.5	3.0	2.0	3.0
Supplementary information:						

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Clause	Requirement + Test	Result - Remark	Verdict

29.3	**TABLE: Distance Through Insulation Measurements**				**P**
Distance through insulation di at/of:		**U r.m.s. (V)**	**Test voltage (V)**	**Required di (mm)**	**di (mm)**
Enclosure		240	-	2.0	2.0
Supplementary information:					

30.1	**TABLE: Ball Pressure Test of Thermoplastics**		**P**
Allowed impression diameter (mm) .....:		2.0	—
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)
Enclosure	SABIC/ SE1X	89	0.6
Enclosure	SABIC/ SE1	89	0.8
Enclosure	SABIC/ SE100	89	0.5
Enclosure	SABIC/ HF500R	89	0.5
Enclosure	SABIC/ CX7211	89	0.6
Enclosure	SABIC/ EXCY0098	89	0.8
Enclosure	SABIC/ C2950	89	0.8
Enclosure	SABIC/ 945	89	0.7
Enclosure	TEIJIN/LN-1250P	89	0.7
Enclosure	TEIJIN/LN-1250G	89	0.8
Enclosure	CHI MEI / PA-765A	89	0.8
Enclosure	CHI MEI / PC-540	89	0.7
Enclosure	COVESTRO DEUTSCHLAND AG [PC RESINS]/6485	89	0.5
Bobbin	CHANG CHUN/T375J	125	0.6

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Clause	Requirement + Test	Result - Remark	Verdict

30.1	**TABLE: Ball Pressure Test of Thermoplastics**		**P**
Allowed impression diameter (mm) .....:		2.0	—
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)
Bobbin	CHANG CHUN/T375HF	125	0.5
Bobbin	CHANG CHUN/4130	125	0.8
Bobbin	SUMITOMO/9820	125	0.6
Bobbin	HITACHI/CP-J-8800	125	0.6
PCB	Boya/ BY-1	125	0.6
PCB	SHUANG MING/ T015V0	125	0.6
PCB	SHUANG MING /T005V0	125	0.5
Supplementary information:			

30.2	**TABLE: Resistance to heat and fire - Glow wire tests**							**P**
Object/ Part No./ Material	**Manufacturer / trademark**	**Glow wire test (GWT); (°C)**						**Verdict**
		550	**650**		**750**		**850**	
			t_e (s)	**t_i (s)**	**t_e (s)**	**t_i (s)**		
Enclosure	SABIC/ SE1X	-	-	-	NI	NI	-	P
Enclosure	SABIC/ SE1	-	-	-	NI	NI	-	P
Enclosure	SABIC/ SE100	-	-	-	NI	NI	-	P
Enclosure	SABIC/ HF500R	-	-	-	NI	NI	-	P
Enclosure	SABIC/ CX7211	-	-	-	NI	NI	-	P
Enclosure	SABIC/ EXCY0098	-	-	-	NI	NI	-	P

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Clause	Requirement + Test	Result - Remark	Verdict

Enclosure	SABIC/ C2950	-	-	-	NI	NI	-	P
Enclosure	SABIC/ 945	-	-	-	NI	NI	-	P
Enclosure	TEIJIN/LN-1250P	-	-	-	NI	NI	-	P
Enclosure	TEIJIN/LN-1250G	-	-	-	NI	NI	-	P
Enclosure	CHI MEI / PA-765A	-	-	-	NI	NI	-	P
Enclosure	CHI MEI / PC-540	-	-	-	NI	NI	-	P
Enclosure	COVESTRO DEUTSCHLAND AG [PC RESINS]/6485	-	-	-	NI	NI	-	P
Bobbin	CHANG CHUN/T375J	-	-	-	NI	NI	NI	P
Bobbin	CHANG CHUN/T375HF	-	-	-	NI	NI	NI	P
Bobbin	CHANG CHUN/4130	-	-	-	NI	NI	NI	P
Bobbin	SUMITOMO/9820	-	-	-	NI	NI	NI	P
Bobbin	HITACHI/CP-J-8800	-	-	-	NI	NI	NI	P
PCB	Boya/BY1	-	-	-	NI	NI	NI	P
PCB	WALEX/T5	-	-	-	NI	NI	NI	P
PCB	SHUANG MING/ T015V0	-	-	-	NI	NI	NI	P
PCB	SHUANG MING /T005V0	-	-	-	NI	NI	NI	P

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Clause	Requirement + Test	Result - Remark	Verdict

PCB	H-FAST/211001	-	-	-	NI	NI	NI	P
Appliance inlet	Zhejiang LECI / DB-14	-	-	-	NI	NI	NI	P
Appliance inlet	Rich Bay / R-301SN	-	-	-	NI	NI	NI	P
Appliance inlet	Sun Fair / S-03	-	-	-	NI	NI	NI	P
Appliance inlet	TECX-UNIONS / TU-301-S, TU-301-SP	-	-	-	NI	NI	NI	P
Appliance inlet	Rong Feng / SS-120	-	-	-	NI	NI	NI	P
Appliance inlet	Inalways / 0711	-	-	-	NI	NI	NI	P
Appliance inlet	Bei Er jia / ST-A01-003J	-	-	-	NI	NI	NI	P
Appliance outlet	Rich Bay / R-302A2	-	-	-	NI	NI	NI	P
Object/ Part No./ Material	**Manufacturer / trademark**	**Glow-wire flammability index (GWFI), °C**				**GW ignition temp. (GWIT), °C**		**Verdict**
		550	**650**	**750**	**850**	**675**	**775**	

The test specimen passed the glow wire test (GWT) with no ignition [$(t_e - t_i) \leq 2s$] (Yes/No) :	-
If no, then surrounding parts passed the needle-flame test of annex E (Yes/No) .....:	-
The test specimen passed the test by virtue of most of the flaming material being withdrawn with the glow-wire (Yes/No)?.....:	Yes
Ignition of the specified layer placed underneath the test specimen (Yes/No) .....:	No

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Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information:

550 °C GWT not relevant (or applicable) to parts of material classified at least HB40 or if relevant HBF
The GWIT pre-selection option, the 850 °C GWFI pre-selection option, and the 850 °C GWT are not relevant (or applicable) for attended appliances.

NI: No ignition

30.2/30.2.4	**TABLE: Needle- flame test (NFT)**				**N/A**
Object/ Part No./ Material	**Manufacturer/ trademark**	**Duration of application of test flame (t_a); (s)**	**Ignition of specified layer Yes/No**	**Duration of burning (t_b); (s)**	**Verdict**

Supplementary information:

NFT not relevant (or applicable) for Parts of material classified as V-0 or V-1
NFT not relevant (or applicable) for Base material of PCBs classified as V-0 or if relevant VTM-0

Appendix 1: National differences for Australia and New Zealand

IEC60335_2_29M ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
ATTACHMENT TO TEST REPORT IEC 60335-2-29 AUSTRALIA/NEW ZEALAND NATIONAL DIFFERENCES **HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY – PART 2-29: PARTICULAR REQUIREMENTS FOR BATTERY CHARGERS**			
Differences according to .....:	AS/NZS 60335.2.29:2017 + A1:2020 AS/NZS 60335.1:2020+A1:2021		
TRF template used: .....:	IECEE OD-2020-F3:2022, Ed. 1.2		
Attachment Form No. .....: **Attachment Originator**.....: **Master Attachment** .....:	AU_NZ_ND_IEC60335_2_29M NZ Electrotechnical Committee/Standards New Zealand Date 2023-11-03		
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	National Differences		-
3	**TERMS AND DEFINITIONS**		-
	Insert the following definition:		-
AZ.3.1.201	Outlet load (AS/NZS 60335.1:2020)		-
	maximum allowed load that may be connected to appliance outlets and socket outlets accessible to the user (AS/NZS 60335.1:2020)		-
	Note to entry 1 A USB outlet is not considered to be an appliance outlet (AS/NZS 60335.1:2020)		-
5	**GENERAL CONDITIONS FOR THE TESTS**		P
5.2	Insert the following variation:		-
	If the tests of AZ.22.201 need to be performed they are carried out on separate appliances, the number of appliances is that required by AS/NZS 3112. (AS/NZS 60335.1:2020)		N/A
5.8.1	Replace the test condition by the following variation:		-
	Appliances for a.c. only are tested with a.c. at 50 Hz, and those for a.c. and d.c. are tested at a.c. 50 Hz or d.c., whichever is the more unfavourable supply. (AS/NZS 60335.1:2020)		P

IEC60335_2_29M ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
6	**CLASSIFICATION**		P
6.1	Replace the first paragraph of the requirement by the following variation:		-
	Appliances shall be of one of the following classes with respect to protection against electric shock: class I, class II, class III. (AS/NZS 60335.1:2020)		P
7	**MARKING AND INSTRUCTIONS**		P
7.1	After the first paragraph of the requirement insert the following variation:		-
	Battery chargers shall be marked with the types of battery that are intended to be charged by the battery charger. (AS/NZS 60335.2.29:2017/A1:2020)	Charging 10.8V Lin-ion battery pack type R59585	P
	For appliance outlets and socket outlets accessible to the user that are incorporated in appliances connected to the supply mains; and		P
	- that operate at rated voltage;		P
	the appliances shall be marked with their maximum outlet load in Watts. (AS/NZS 60335.1:2020)		P
	Max. Outlet load (W)……:	The outlet load max. 1.5kW.	P
7.13	Replace the requirement with the following variation:		-
	Instructions and other text required by this standard are written in English. (AS/NZS 60335.1:2020)		P
7.14	Insert the following variation:		-
	The marking concerning the types of battery that are intended to be charged by the battery charger shall be visible when the battery charger is being used, as in normal use. The lettering shall have a height of not less than 3 mm. (AS/NZS 60335.2.29:2017/A1:2020)		P
	Height of lettering (mm)……:	3mm	P
7.15	After the last paragraph of the requirement insert the following variation:		-
	The marking of the maximum outlet load shall be close to the appliance outlet or socket outlet. (AS/NZS 60335.1:2020)	Max. 6.3A, Max. 1.5kW	P
10	**POWER INPUT AND CURRENT**		P
10.1	After the last paragraph of the test specification insert the following variation:		-
	Appliance outlets and socket outlets accessible to the user that are incorporated in appliances connected to the supply mains; and		P
	that operate at rated voltage;		P

IEC60335_2_29M ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	are not loaded during the test, however their contribution to the power input is considered to be the marked outlet load per appliance outlet or socket-outlet. (AS/NZS 60335.1:2020)		P
11	**HEATING**		P
11.7	After the first paragraph of the test specification insert the following variation:		-
	Appliance outlets and socket outlets accessible to the user are loaded with a resistive load that gives the marked outlet load in watts. (AS/NZS 60335.1:2020)	Load 1.5kW	P
11.8	After the first paragraph of the test specification insert the following variation:		-
	The pins of plug connectors inserted into appliance outlets accessible to the user and plugs inserted into socket outlets accessible to the user shall have a temperature rise not exceeding 45 K. (AS/NZS 60335.1:2020)		P
	Temperature rise (K)……...……:	Max. 19.0K	P
19	**ABNORMAL OPERATION**		P
19.13	After the seventh paragraph of the test specification insert the following variation:		-
	During and after the tests the no-load output voltage of an accessible safety extra-low voltage outlet or connector shall not have increased by more than 3 V or 10% of its no-load output voltage in normal use, whichever is higher. (AS/NZS 60335.1:2020)		P
	Voltage normal use (V)……...:	12.6V	P
	Voltage abnormal operation (V)……:	12.6V	P
	Deviation (%)……:	0	P
	During and after the tests the no-load output voltage of a USB outlet shall not increase by more than 3 V or 10% of its no-load output voltage in normal use, whichever is higher. (AS/NZS 60335.1:2020)	No USB outlet	N/A
	Voltage normal use (V)……...:		N/A
	Voltage abnormal operation (V)……:		N/A
	Deviation (%)……:		N/A
22	**CONSTRUCTION**		P
22.2	After the first paragraph of the requirement insert the following variation:		-

IEC60335_2_29M ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	For stationary appliances permanently connected to the fixed wiring, compliance with this requirement is considered to be met if the instruction concerning disconnection incorporated in the fixed wiring is in accordance with AS/NZS 3000. (AS/NZS 60335.1:2020)	Not stationary appliances	N/A
22.3	Replace the text with the following variation:		-
	VOID (AS/NZS 60335.1:2020)		N/A
22.33	Delete the last sentence of the first paragraph of the requirement and introduce it as a new first paragraph of the requirement. (AS/NZS 60335.1:2020)		N/A
AZ.22.201	Appliances having integral pins for insertion into socket outlets shall comply with the appropriate requirements of AS/NZS 3112. (AS/NZS 60335.1:2020)	Not direct plug-in type	N/A
	Compliance is checked as specified in Annex J of AS/NZS 3112 (AS/NZS 60335.1:2020)		N/A
AZ.22.202	Appliance outlets and socket outlets accessible to the user that are incorporated in appliances connected to the supply mains; and	Appliance outlets used	P
	that operate at rated voltage		P
	shall be single-phase and have a current rating not exceeding 16 A. (AS/NZS 60335.1:2020)	Max. 6.3A	P
	The socket outlets shall comply with AS/NZS 3112; (AS/NZS 60335.1:2020)		N/A
	accept a 3-pin, flat-pin plug as described in figure 2.1(a1) of AS/NZS 3112. (AS/NZS 60335.1:2020)		N/A
	The appliance outlets and socket outlets shall be protected by one of the following protection devices that has a current rating not exceeding the current rating of the appliance outlet or socket-outlet: (AS/NZS 60335.1:2020)		P
	- a circuit breaker for equipment complying with IEC 60934; (AS/NZS 60335.1:2020)		N/A
	- a manually resettable trip-free or cycling trip-free overcurrent protection device; (AS/NZS 60335.1:2020)		N/A
	- a non-user replaceable fuse-link. (AS/NZS 60335.1:2020)	Non-user replaceable fuse used	P

IEC60335_2_29M ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	Current of outlet (A)……..:	Max. 6.3A	P
	Current of protection device (A)……..:	6.3A	P
	The protection device shall be placed behind a non-detachable cover. The actuating member of the circuit breaker and the manually resettable protection device may be accessible. (AS/NZS 60335.1:2020)		P
	The current rating of the appliance outlets and socket outlets is obtained from the marked outlet load in watts divided by the rated voltage. (AS/NZS 60335.1:2020)		N/A
	Load of outlet (W)……..……..:	Max. 1.5kW	P
	Rated voltage (V)……..:	100-240VAC	P
	Current of outlet (A)……..:	Max. 6.3A	P
	Compliance is checked by inspection and for a manually resettable trip-free or cycling trip-free overcurrent protection device by the following tests: (AS/NZS 60335.1:2020)	Non-user replaceable fuse used	N/A
	The device shall be operated at rated voltage at 136% of its current rating, in an ambient temperature of 23°C ± 2°C in a draught-free environment. (AS/NZS 60335.1:2020)		N/A
	Rated voltage (V)……..:		N/A
	Current of outlet (A)……..:		N/A
	Test current (A)……..……..:		N/A
	Ambient temperature (°C)…..…..……..:		N/A
	The device shall operate to interrupt the current within 2 h. (AS/NZS 60335.1:2020)		N/A
	Overload condition existed for (_h,_min, _sec)…..:		N/A
	The device shall be operated at rated voltage at 600% of its current rating in an ambient temperature of 23°C ± 2°C in a draught-free environment (AS/NZS 60335.1:2020)		N/A
	Rated voltage (V)……..:		N/A
	Current of outlet (A)……..:		N/A
	Test current (A)……..……..:		N/A
	Ambient temperature (°C)…..…..……..:		N/A
	The device shall operate to interrupt the current within 5 s. (AS/NZS 60335.1:2020)		N/A

IEC60335_2_29M ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	Overload condition existed for (sec)……....:		N/A
	Immediately following the overcurrent tests, the test of clause 16.3 shall be applied, and the device shall comply with the specified requirements of the test. (AS/NZS 60335.1:2020)		N/A
	The device shall comply with the ball pressure test of 30.1 carried out at 160 °C. (AS/NZS 60335.1:2020)		N/A
	Plastic material type……:		N/A
	Impression diameter (mm)……..……..:		N/A
	The device shall comply with the glow-wire test of 30.2.3.1 with a test severity of 960 °C. (AS/NZS 60335.1:2020)		N/A
	Plastic material type…….……:		N/A
	Time of ignition (sec)…….…….……:		N/A
	Time of extinguish (sec)…….……:		N/A
	Specified layer placed underneath the test specimen does not ignite. …….……..:		N/A
24	**COMPONENTS**		P
24.1	Insert the following variation before NOTE 1:		-
	NOTE 201 The relevant IEC standard can be replaced with the relevant Australia/New Zealand standard where applicable. (AS/NZS 60335.1:2020)		P
25	**SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS**		N/A
25.1	Insert the following variation:		-
	Supply cords for single-phase portable appliances intended for direct connection to the supply mains, shall be fitted with an appropriate plug complying with AS/NZS 3112. (AS/NZS 60335.1:2020)		N/A
Table 11	In footnote *a insert* the following variation		-
	However, they cannot be used in class I appliances. (AS/NZS 60335.1:2020)		N/A
	Special national conditions (if any)		P
	Australia		P
5	**GENERAL CONDITIONS FOR THE TESTS**		P
AZ.5.201	For appliances, other than class III appliances, that are intended for connections to the supply mains (AS/NZS 60335.1:2020/A1:2021)	100-240VAC marked	N/A

IEC60335_2_29M ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	– for single phase appliances, if marked with a rated voltage of either “230V” or “240V” test: (AS/NZS 60335.1:2020/A1:2021)		N/A
	• at the multiplication factor (of less than 1) × 230 V; and (AS/NZS 60335.1:2020/A1:2021)		N/A
	• at the multiplication factor (of greater than 1) × 240 V; (AS/NZS 60335.1:2020/A1:2021)		N/A
	– for multi-phase appliances, if marked with a rated voltage of either “400V” or “415V” test: (AS/NZS 60335.1:2020/A1:2021)		N/A
	• at the multiplication factor (of less than 1) × 400 V; and (AS/NZS 60335.1:2020/A1:2021)		N/A
	• at the multiplication factor (of greater than 1) × 415 V; (AS/NZS 60335.1:2020/A1:2021)		N/A
	If marked with a rated voltage range then test: • at the multiplication factor (of less than 1) × the lower extremity of the rated voltage range; and (AS/NZS 60335.1:2020/A1:2021)		N/A
	• at the multiplication factor (of greater than 1) × the higher extremity of the rated voltage range; or (AS/NZS 60335.1:2020/A1:2021)		N/A
	• at the worst case voltage within the rated voltage range (AS/NZS 60335.1:2020/A1:2021)		N/A
7.1	After the first paragraph of the requirement insert the following variation:		-
	Appliances intended for connection to the supply mains, other than class III appliances, shall be marked with:		P
	– a rated voltage of at least: 230 V for single-phase appliances; 400 V for multi-phase appliances; or (AS/NZS 60335.1:2020/A1:2021)		N/A
	– a rated voltage range that includes: 230 V for single-phase appliances; 400 V for multi-phase appliances. (AS/NZS 60335.1:2020/A1:2021)	100-240VAC for single - phase	P
24	**COMPONENTS**		N/A

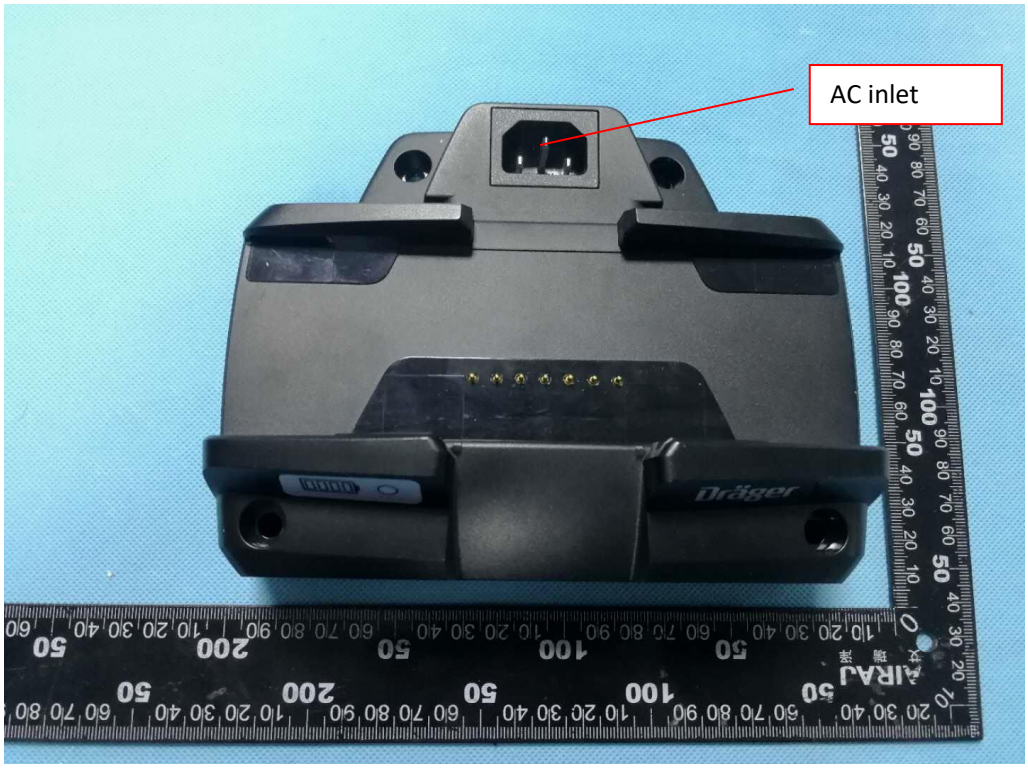
IEC60335_2_29M ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
24.1.7	Telecommunication interface circuitry must comply with the Telecom Labelling Notice issued under the Telecommunications Act instead of IEC 62151 (AS/NZS 60335.1:2020)		N/A
	New Zealand		P
7.1	After the first paragraph of the requirement insert the following variation:		-
	Appliances intended for connection to the supply mains, other than class III appliances, shall be marked with:		P
	– a rated voltage of: 230 V for single-phase appliances; 400 V for multi-phase appliances; or (AS/NZS 60335.1:2020/A1:2021)		N/A
	– a rated voltage range that includes: 230 V for single-phase appliances; 400 V for multi-phase appliances. (AS/NZS 60335.1:2020/A1:2021)	100-240VAC for single - phase	P

Appendix 2: Photos of the product

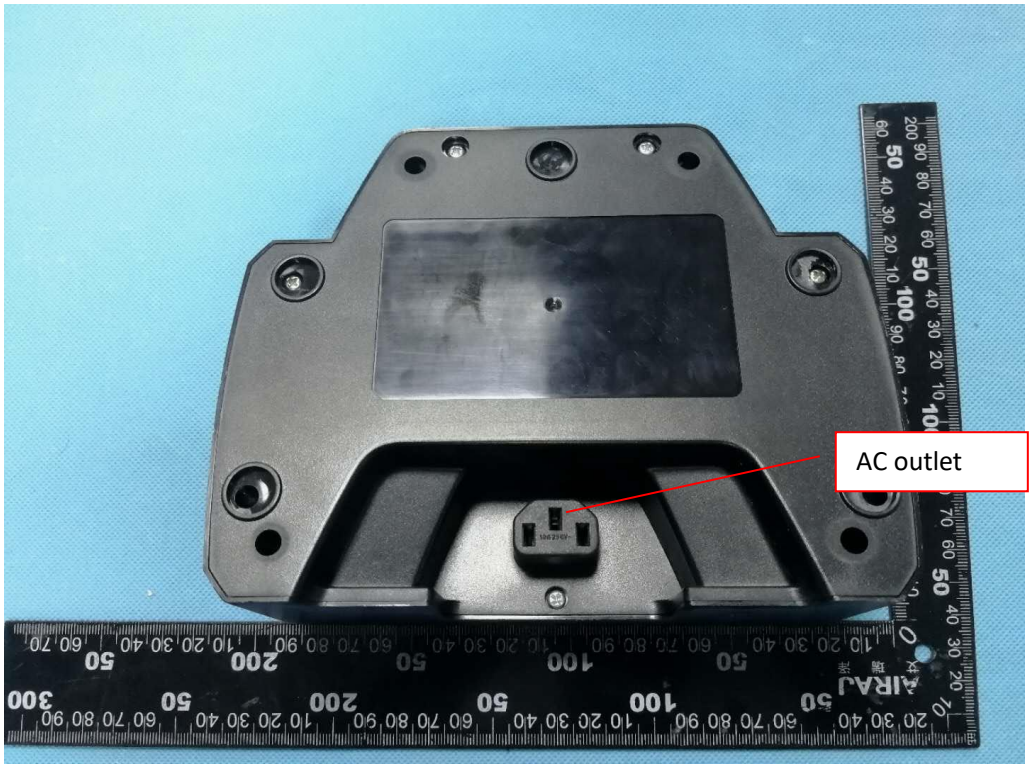
Overall view

Overall view with battery

Overall view

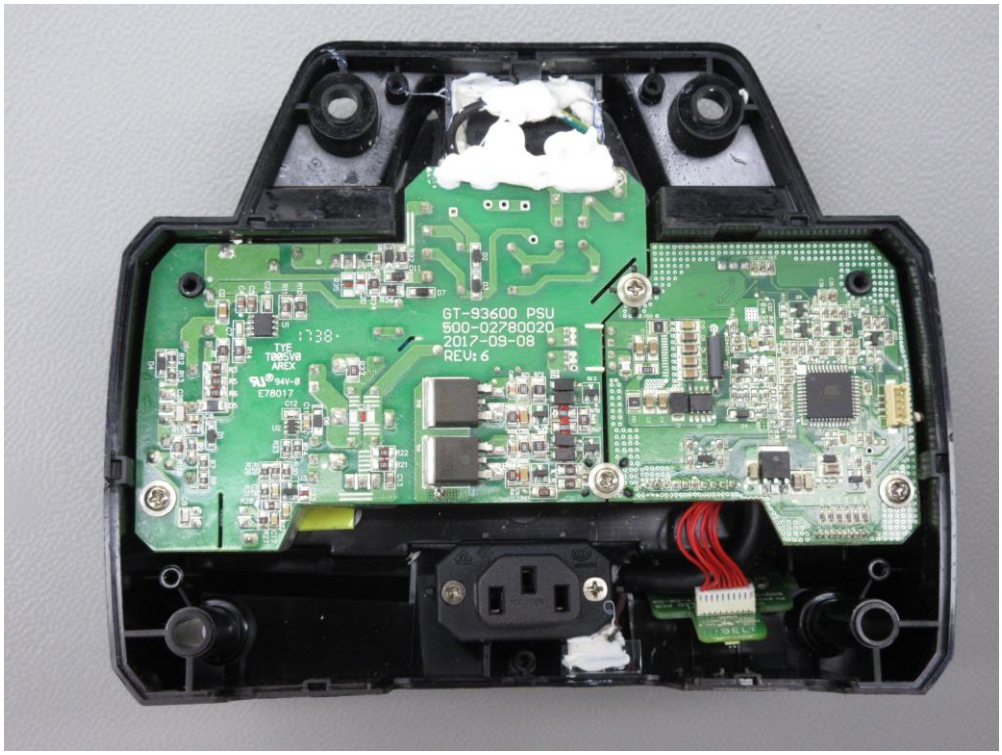


Overall view

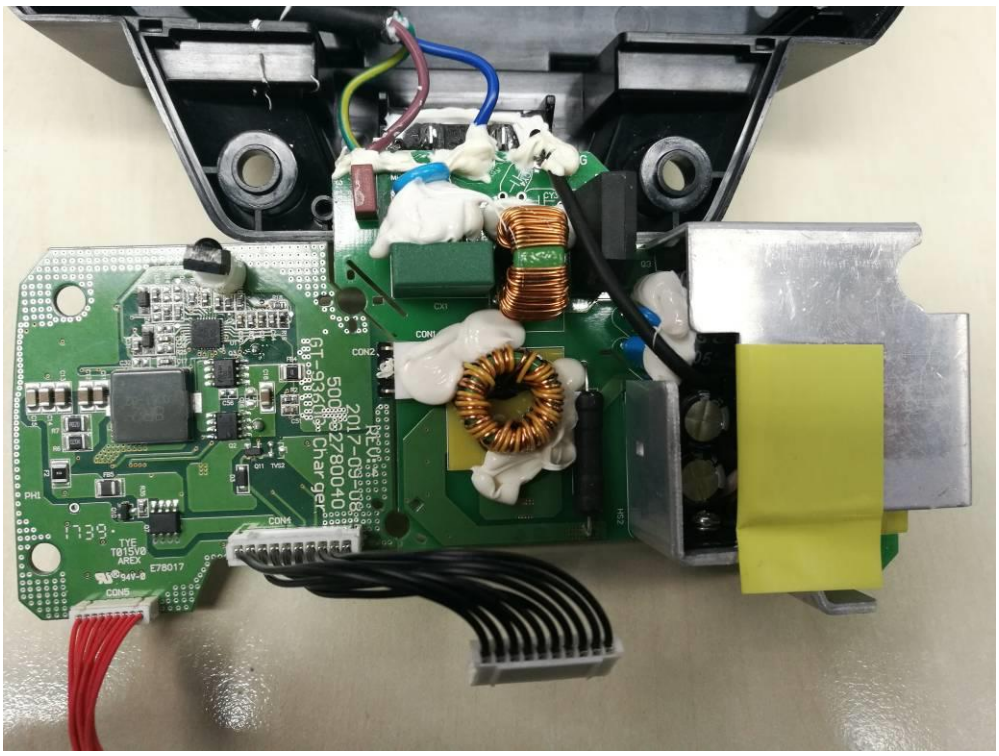


Internal view

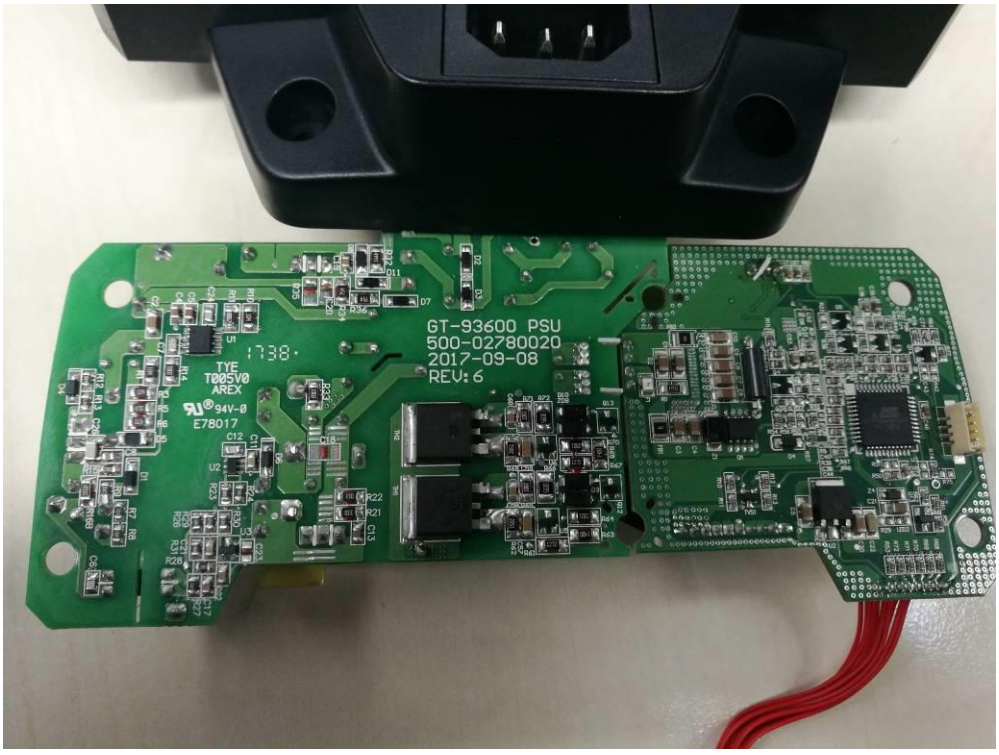
Internal view



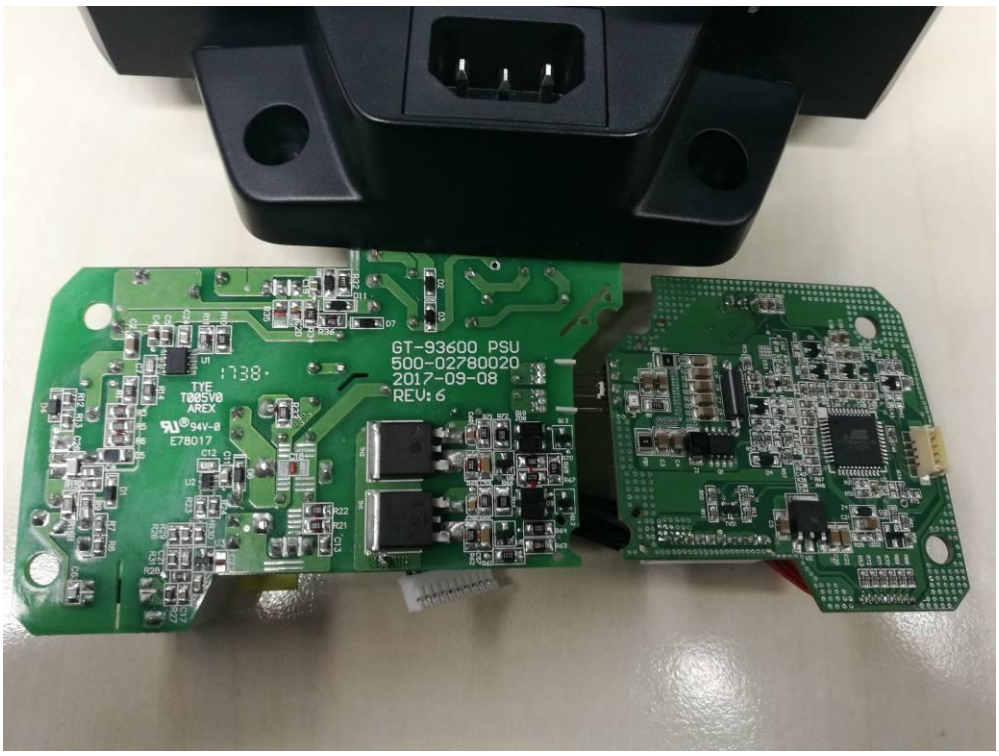
Internal view



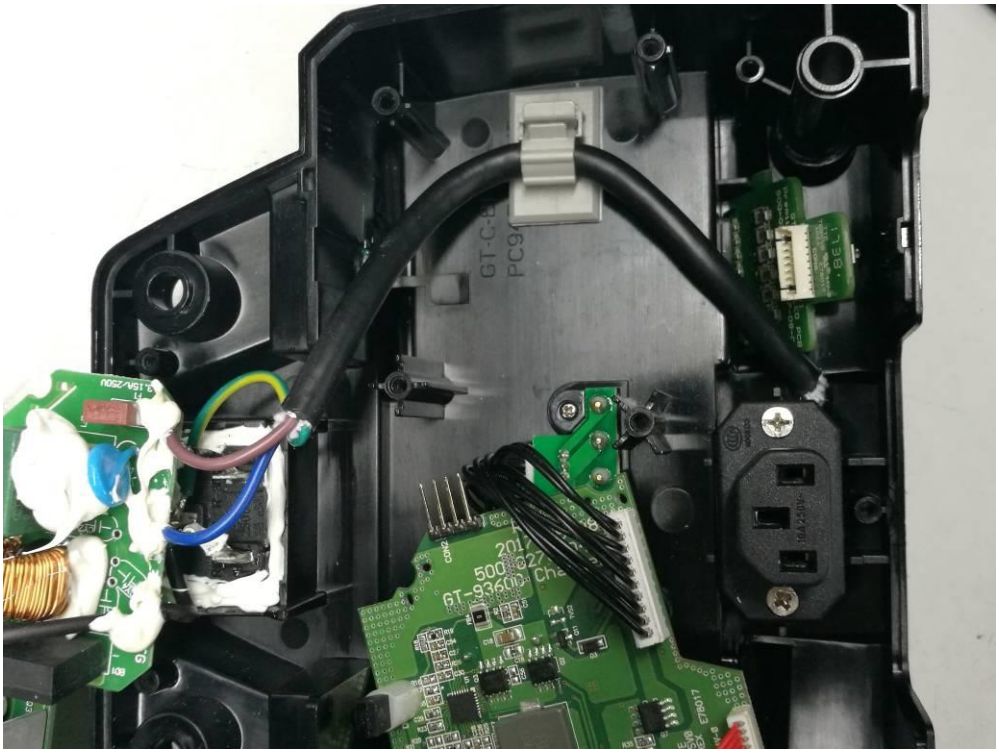
Internal view

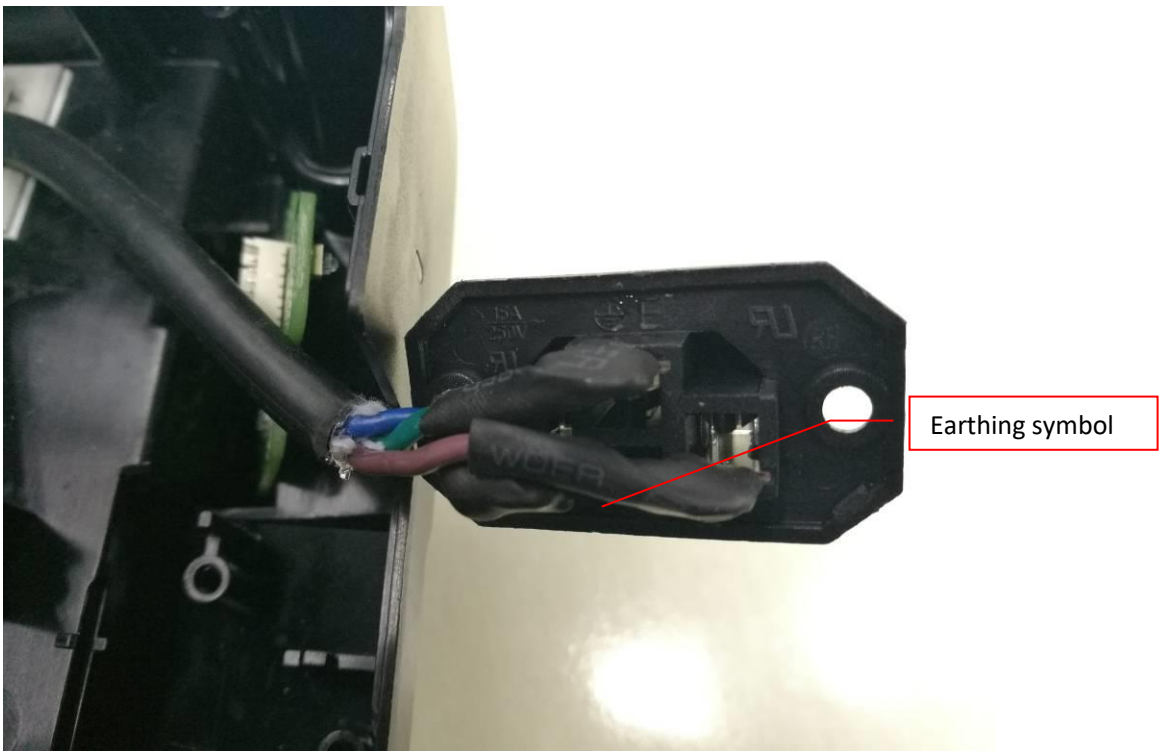


Internal view

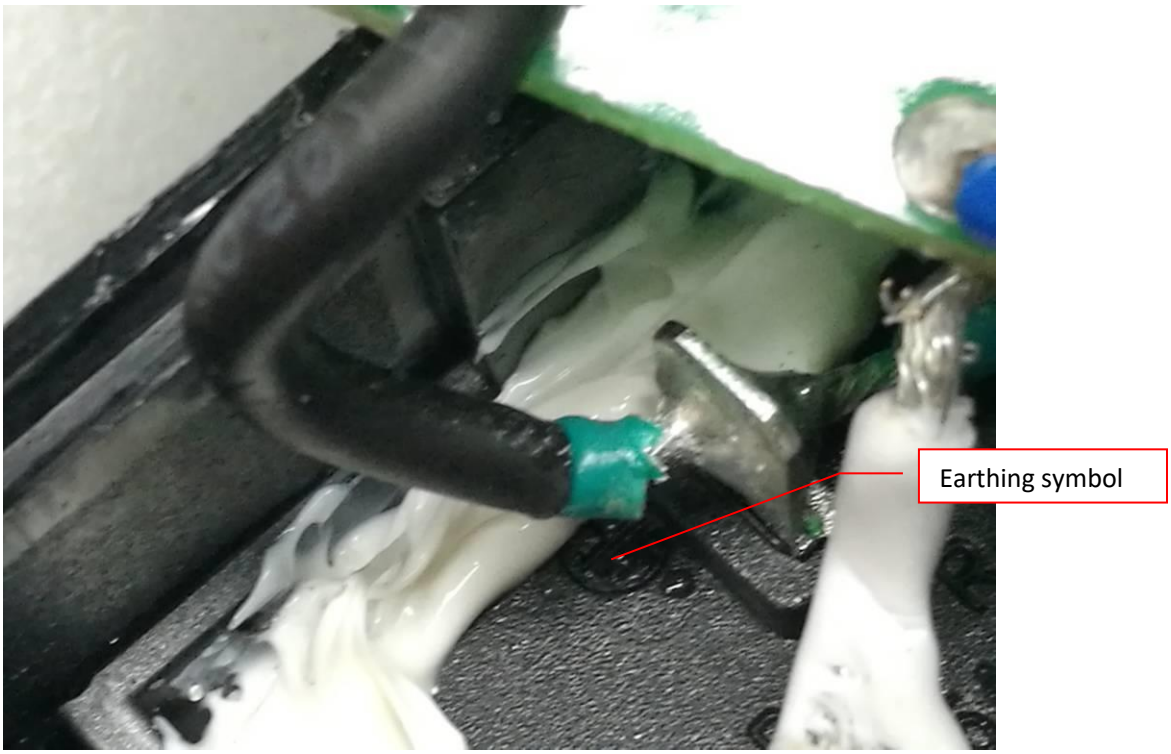


Internal view

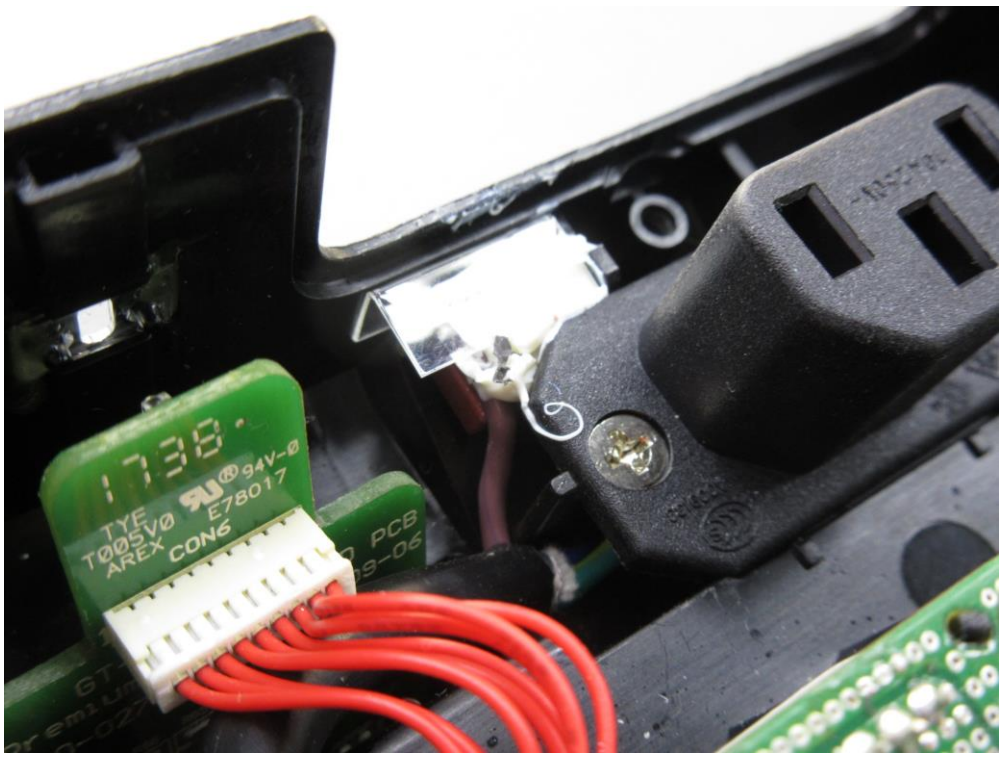




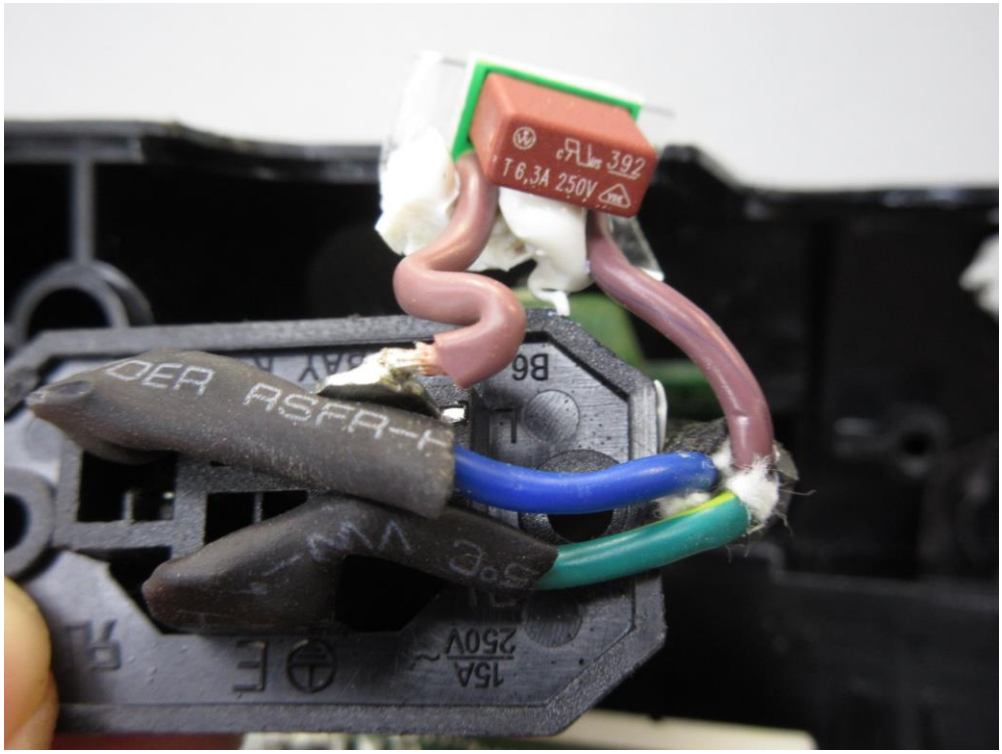
Internal view



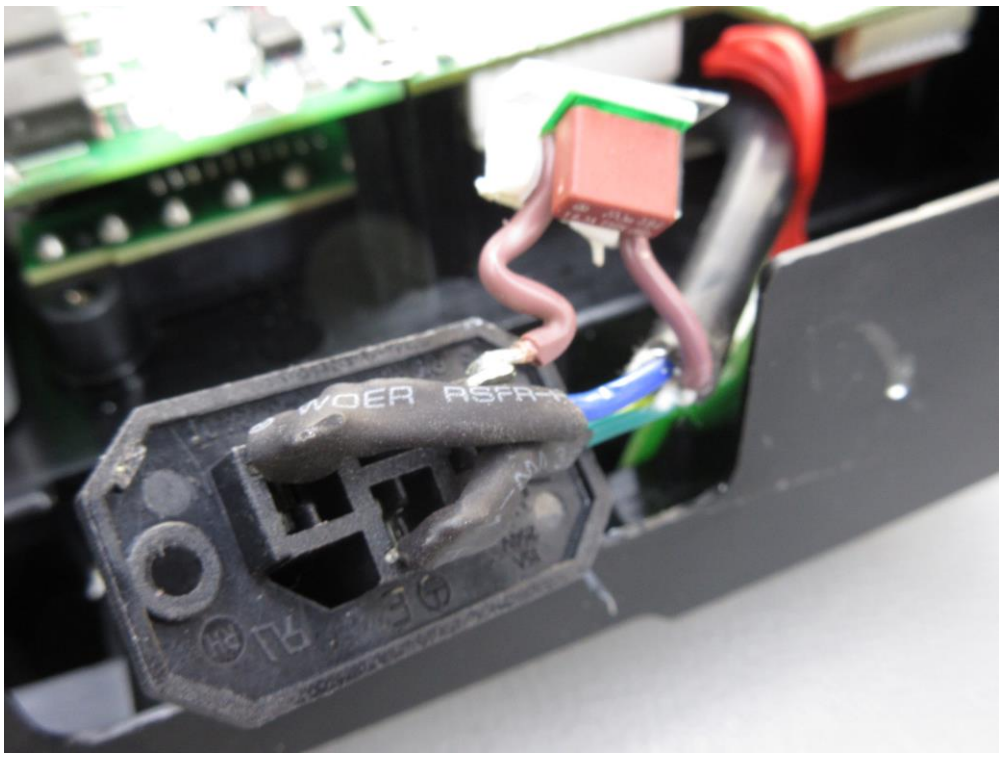
Internal view



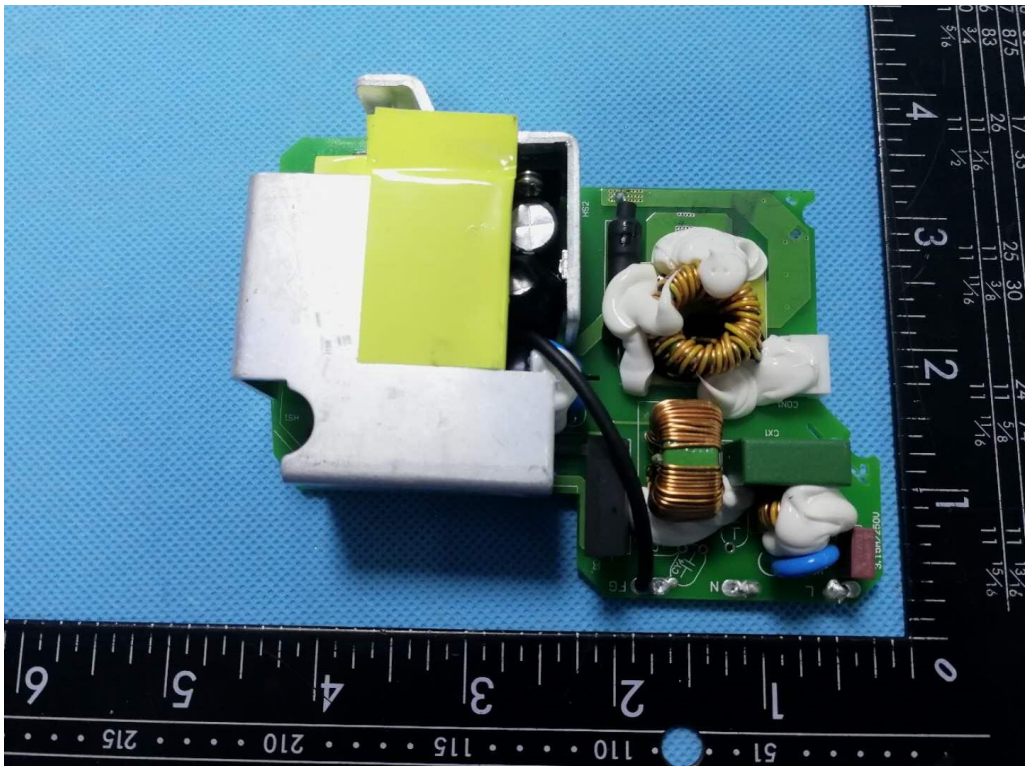
Overall view



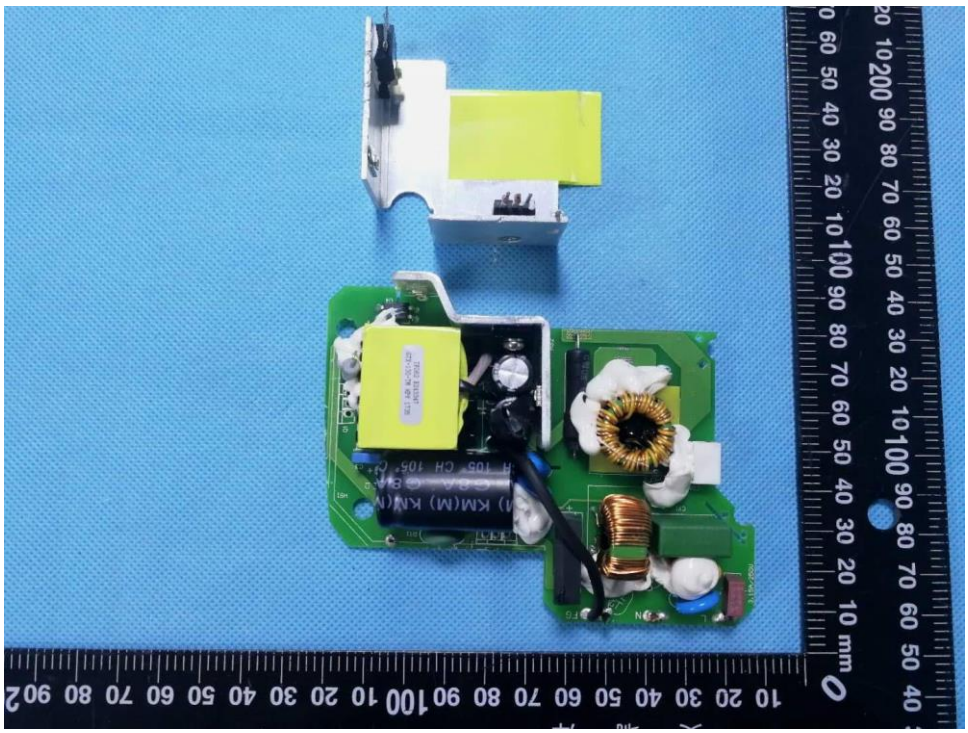
Internal view



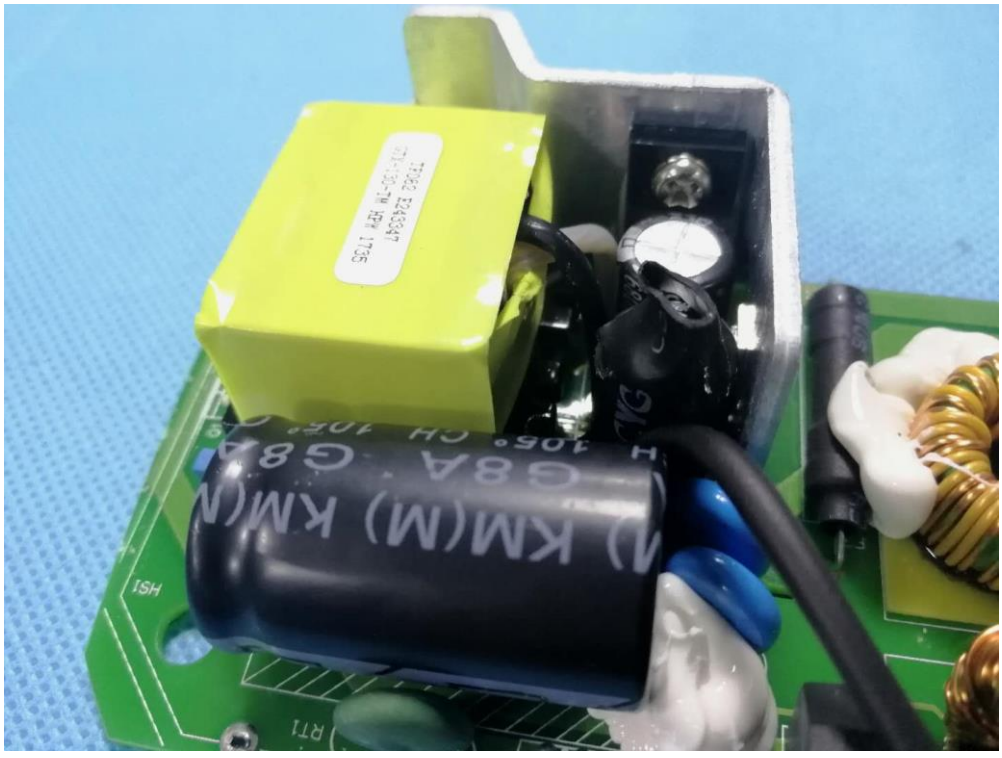
PCB for power board



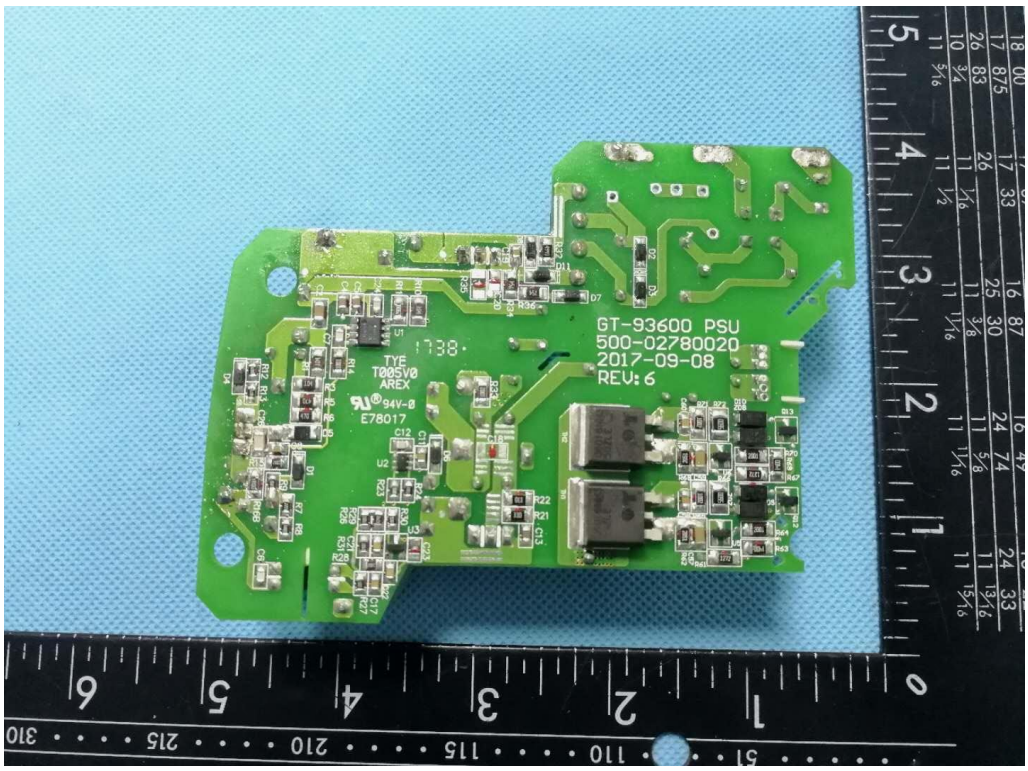
PCB for power board



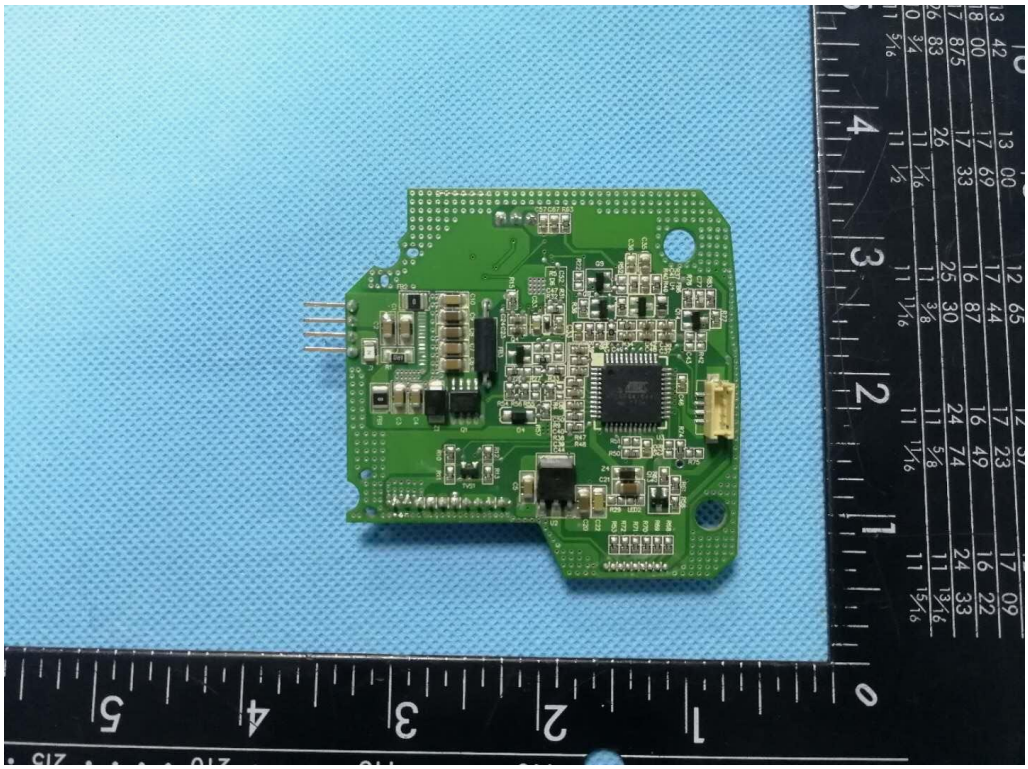
PCB for power board



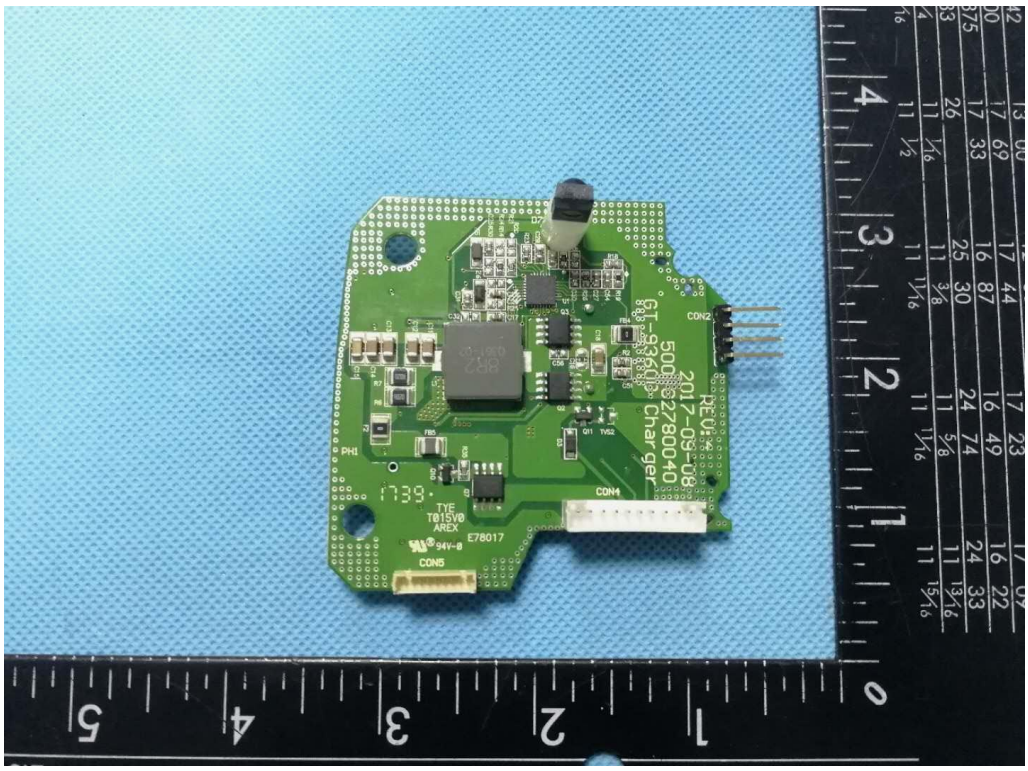
PCB for power board



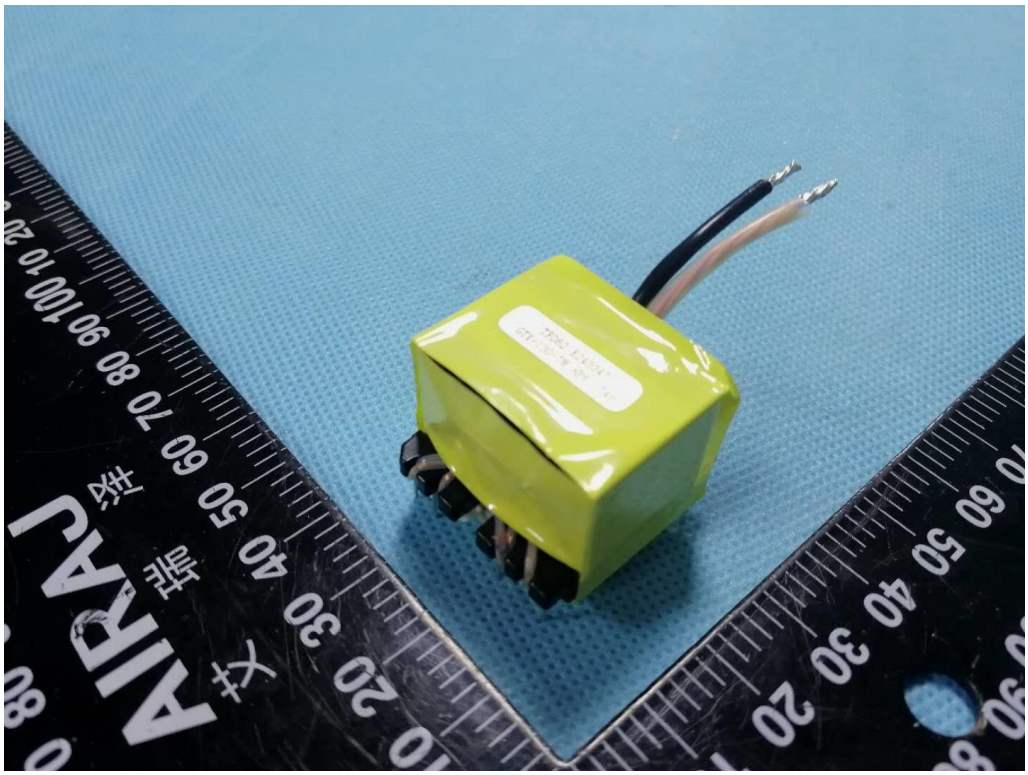
PCB for Secondary board



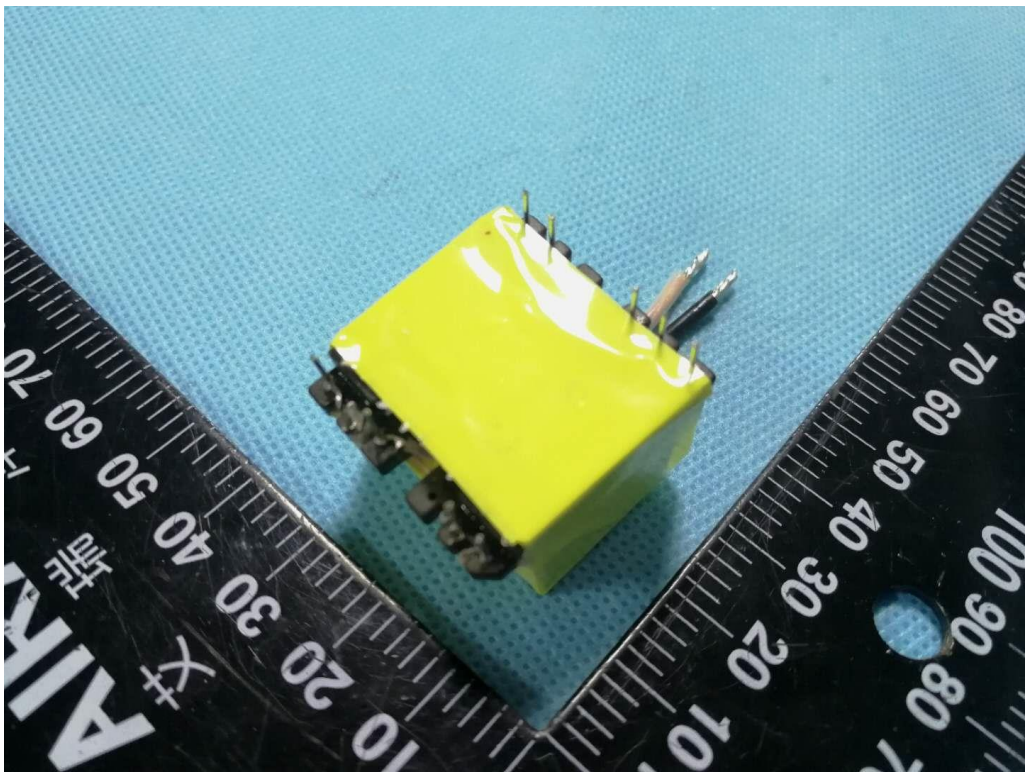
PCB for Secondary board



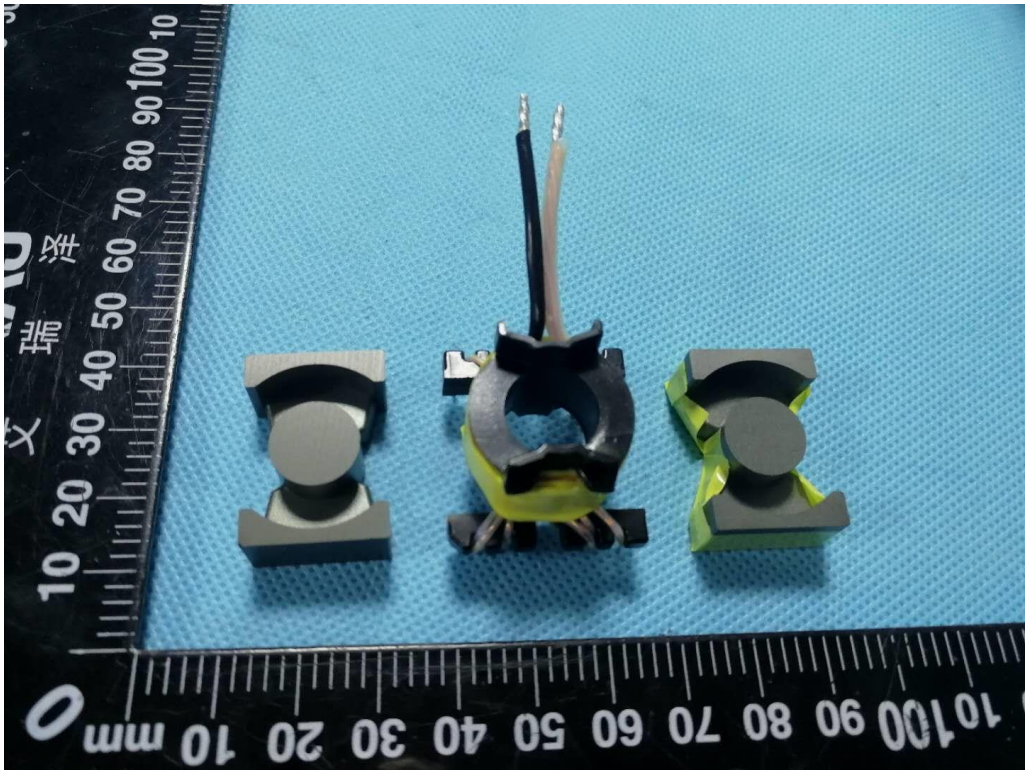
Transformer



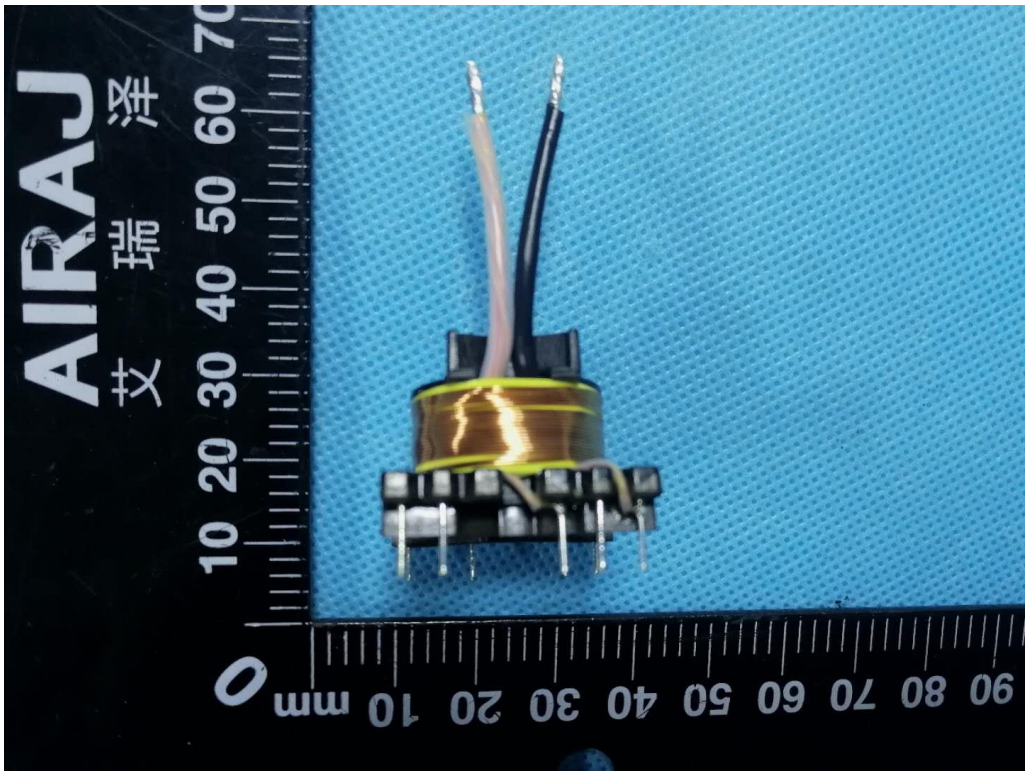
Transformer



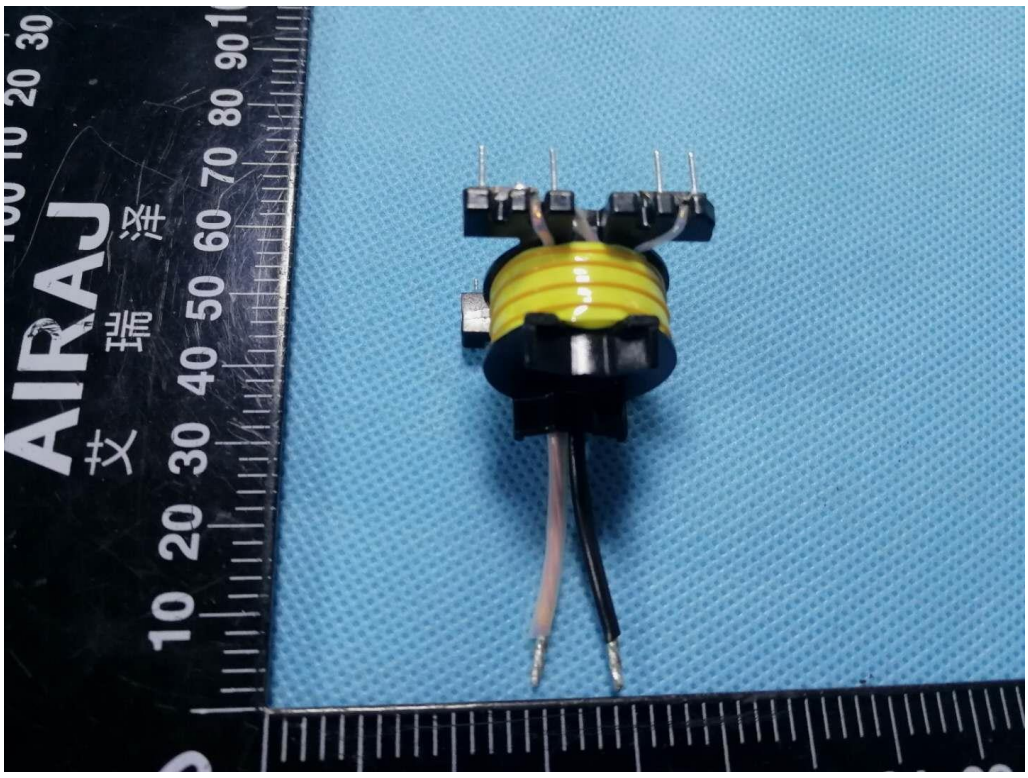
Transformer



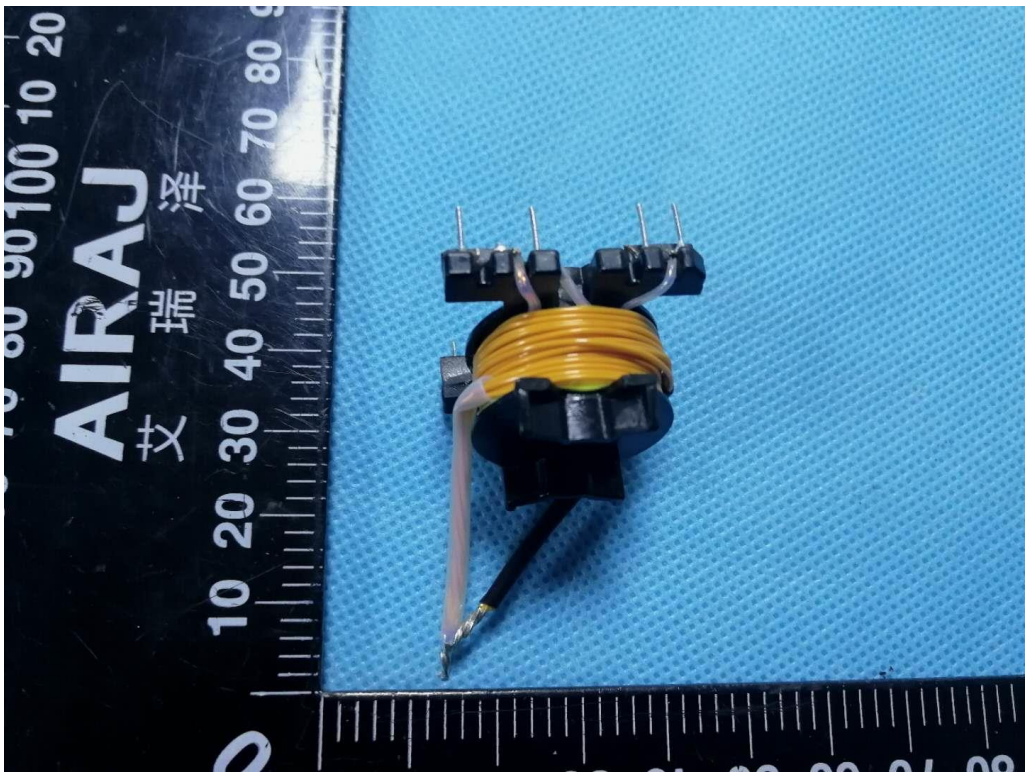
Transformer



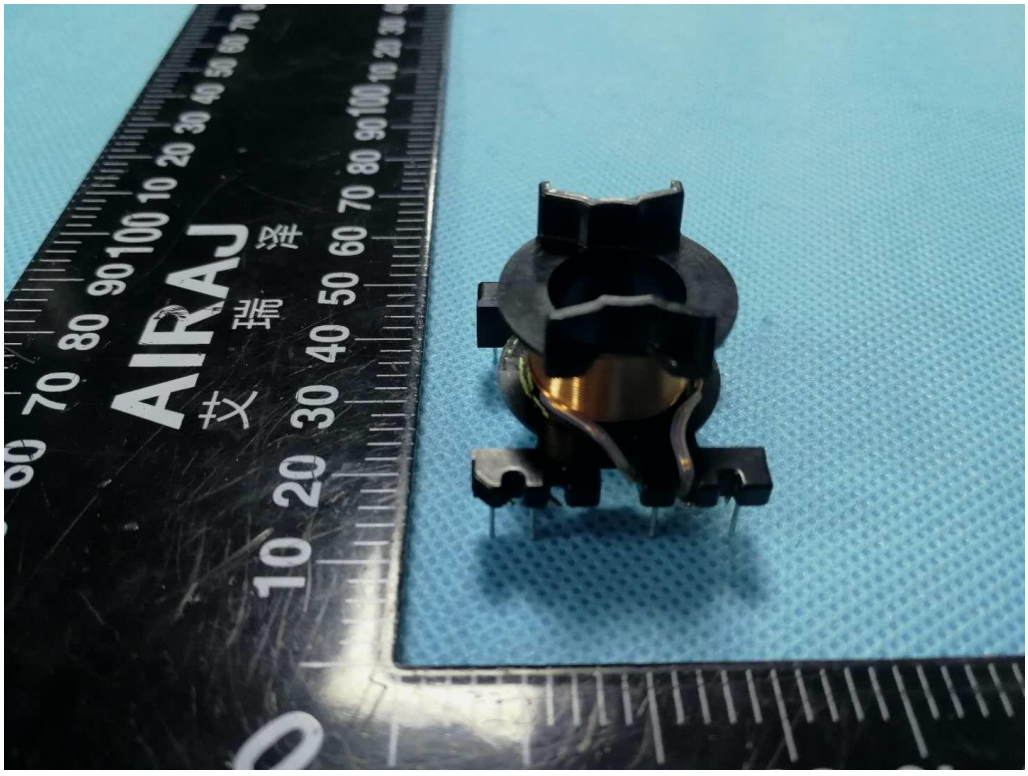
Transformer



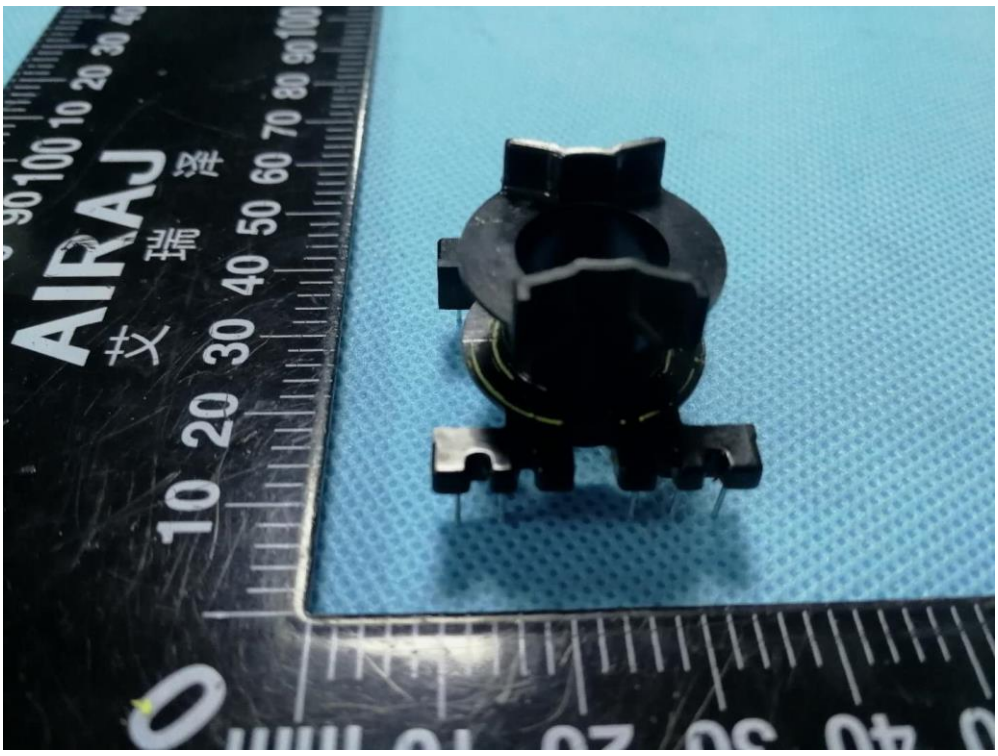
Transformer



Transformer



Transformer



IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict

Appendix 3: Annex BB of IEC 61558-2-16:2021

BB	Annex BB		P
	Particular requirements for associated transformers for switch mode power supplies with internal frequencies > 500 Hz		P
	See separate test report-form for these Annex.		P
BB.8	MARKING AND OTHER INFORMATION		N/A
BB.8.2	Marking for transformers IP00 or for associated transformers: type and trademark, instruction sheets		N/A
BB.8.11	Correct symbols:		N/A
	Volts	V	N/A
	Amperes	A (mA)	N/A
	Volt amperes (or volt-amperes reactive for reactors)	VA or (VAR)	N/A
	Watts	W	N/A
	Hertz	Hz	N/A
	Input	PRI	N/A
	Output	SEC	N/A
	Direct current	d.c. (DC) or ⎓	N/A
	Neutral	N	N/A
	Single-phase a.c.	~	N/A
	Three-phase a.c.	3 ~	N/A
	Three-phase and neutral a.c.	3N ~	N/A
	Power factor	cos φ	N/A
	Class II construction	⧈	N/A
	Class III construction	III	N/A
	Equipment of overvoltage category I	I	N/A
	Equipment of overvoltage category II	II	N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict

	Equipment of overvoltage category III		N/A
	Equipment of overvoltage category IV		N/A
	Fuse-link		N/A
	Rated max. ambient temperature	t_a	N/A
	Rated minimum ambient temperature	t_{amin}	N/A
	Rated minimum temperature	t_{min}	N/A
	Frame or core terminal		N/A
	Protective earth		N/A
	IP number	IPXX	N/A
	Earth (ground for functional earth)		N/A
	For indoor use only		N/A
	To indicate that the appliance is intended to be usable up to the maximum altitude 3 000 m.		N/A
	To indicate that the power supply unit shall not be used, if pins of the plug part are damaged.		N/A
	Additional Symbols (IEC 61558-2-16:09)		N/A
	SMPS (Switch mode power supply unit)		N/A
	SMPS incorporating a Fail-safe separating transformer		N/A
	SMPS incorporating a Non-short-circuit-proof separating transformer		N/A
	SMPS incorporating a Short-circuit-proof separating transformer (inherently or non-inherently)		N/A
	SMPS incorporating a Fail-safe isolating transformer		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict

	SMPS incorporating a Non-short-circuit-proof isolating transformer		N/A
	SMPS incorporating a Short-circuit-proof isolating transformer (inherently or non-inherently)		N/A
	SMPS incorporating a Fail-safe safety isolating transformer		N/A
	SMPS incorporating a Non-short-circuit-proof safety isolating transformer		N/A
	SMPS incorporating a Short-circuit-proof safety isolating transformer (inherently or non-inherently)		N/A
	SMPS incorporating a Fail-safe auto-transformer		N/A
	SMPS incorporating a Non-short-circuit proof auto-transformer		N/A
	SMPS incorporating a Short-circuit proof auto-transformer (inherently or non-inherently)		N/A
BB.9	PROTECTION AGAINST ELECTRIC SHOCK		N/A
BB.10	CHANGE OF INPUT VOLTAGE SETTING		N/A
BB.11	OUTPUT VOLTAGE AND OUTPUT CURRENT UNDER LOAD		N/A
BB.12	NO-LOAD OUTPUT VOLTAGE (see supplementary requirements in Part 2)		N/A
BB.13	SHORT-CIRCUIT VOLTAGE		N/A
BB.14	HEATING		P
BB.14.2	Application of 14.1 or 14.3 according to the insulation system	Tested together with charger	P
BB.14.2.1	Class of isolating system (classified materials according to IEC 60 085 and IEC 60 216)		N/A
BB.14.2.2	No classified material, or system but the measured temperature does not exceed the value of Class A		P

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict

BB.14.2.3	No classified material or system but the measured temperature exceeds the value for Class A, the live parts of the transformers are submitted to the test of 14.3		N/A
BB.14.3	Accelerated ageing test for undeclared class of isolating system		N/A
	Cycling test (10 cycles):		N/A
	– measuring of the no-load input current (mA)		N/A
BB.14.3.2	– heat run (temperature in table 4)		N/A
BB.14.3.3	– vibration test: 30 min; amplitude 0,35 mm; frequency range: 10 Hz, 55 Hz, 10 Hz		N/A
BB.14.3.4	– moisture treatment (48 h, 17.2)		N/A
BB.14.3.5	Measurements and tests at the beginning and after each test:		N/A
	– deviation of the no-load input current, measured at the beginning of the test less than 30%		N/A
	– insulation resistance acc. Cl.18.1 and 18.2		N/A
	– electric strength, no breakdown (18.3 and 18.4); 2 min; test voltage 35% of specified value		N/A
	– Transformers (50 or 60 Hz version) are tested after the dielectric strength test as follows: under no load; duration: 5 min; Upri(V):1,2 times rated supply voltage; frequency (Hz): 2 times rated frequency		N/A
BB.15	SHORT-CIRCUIT AND OVERLOAD PROTECTION		N/A
BB.16	MECHANICAL STRENGTH		N/A
BB.17	PROTECTION AGAINST HARMFUL INGRESS OF WATER AND MOISTURE		N/A
BB.18	INSULATION RESISTANCE AND ELECTRIC STRENGTH		P
BB.18.2	Insulation resistance between:		P
	– live parts and body for basic insulation ≥ 2 MΩ		N/A
	– live parts and body for reinforced insulation ≥ 7 MΩ		N/A
	– input circuits and output circuits for basic insulation ≥ 2 MΩ		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict

	– input circuits and output circuits for double or reinforced insulation ≥ 5 MΩ	Between primary and secondary windings: 1999MΩ	P
	– each input circuit and all other input circuits connected together ≥ 2 MΩ		N/A
	– each output circuit and all other output circuits connected together ≥ 2 MΩ		N/A
	– hazardous live parts and metal parts with basic insulation (Class II transformers) ≥ 2 MΩ		N/A
	– body and metal parts with basic insulation (Class II transformers) ≥ 5 MΩ		N/A
	– metal foil in contact with inner and outer surfaces of enclosures ≥ 2 MΩ		N/A
BB.18.3	Electric strength test (1 min): no flashover or breakdown:		P
	1) basic insulation between input circuits and output circuits; working voltage (V); test voltage (V) ..... :		N/A
	2) double or reinforced insulation between input circuits and output circuits; working voltage (V); test voltage (V) ..... :	WORKING VOLTAGE: 300V TEST VOLTAGE: 5250V	P
	3) basic or supplementary insulation between:		N/A
	4) Reinforced insulation between the body and live parts; working voltage (V); test voltage (V) ..... :		N/A
	5) Functional insulation for windings intended to be connected in series or parallel (test voltage = working voltage + 500 V)		N/A
BB.19	CONSTRUCTION		P
BB.19.1	General construction		P
BB.19.1.1	General		N/A
BB.19.1.2	Auto-transformers		N/A
BB.19.1.2.1	Plug connected auto-transformers where the rated input voltage is higher than the rated output voltage, shall not have any potential to protective earthing at the output socket higher than the rated output voltage.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

BB.19.1.2.2	Polarised input and output plug and socket-outlet system: an instruction shall be given for not using such a transformer with a nonpolarized plug and socket-outlet system.		N/A
BB.19.1.2.3	A polarity detecting device only energises the output in the case: output potential to earth ≤ rated output voltage, also with reversed input plug.		N/A
	– The contact separation of the device is ≥ 3mm		N/A
	– A current to earth does not exceed 0,75 Ma.		N/A
	– All tests are repeated under fault conditions of H.3.3 of annex H of part 1. The potential to earth does not exceed the max output voltage for more than 5 s.		N/A
	– for class I transformers, the insulation between the input / output winding and the body shall consist of at least basic insulation (rated for the working voltage)		N/A
	– for class II transformers, the insulation between the input / output winding and the body shall consist of double or reinforced insulation (rated for the working voltage).		N/A
BB.19.1.3	Separating transformers		N/A
BB.19.1.3.1	Input and output circuits electrically separated.		N/A
BB.19.1.3.2	The insulation between input and output winding(s) consist of basic insulation		N/A
	Class I transformer		N/A
	– Insulation between input windings and body consist of basic insulation		N/A
	– Insulation between output windings and body consist of basic insulation		N/A
	Class II transformer		N/A
	– Insulation between input windings and body consist of double or reinforced insulation		N/A
	– Insulation between output windings and body consist of double or reinforced insulation		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
BB.19.1.3.3	The insulation between input windings and intermediate conductive parts and the output windings and intermediate part consist of basic insulation		N/A
	For class I SMPS the insulation between input and output windings via the intermediate conductive parts consist of basic insulation		N/A
	For class II SMPS the insulation between input winding and the body and between the output windings and the body via the intermediate conductive parts consist of double or reinforced insulation.		N/A
BB.19.1.3.4	Parts of output circuits may be connected to protective earth		N/A
BB.19.1.3.5	No direct contact between output circuits and the body, unless:		N/A
	– Allowed for associated transformers by the equipment standard		N/A
BB.19.1.4	Isolating transformers and safety isolating transformers		P
BB.19.1.4.1	Input and output circuits electrically separated		P
	No possibility of any connection between these circuits		P
BB.19.1.4.2	The insulation between input and output winding(s) consist of double or reinforced insulation (exception see 19.1.4.4)		P
	Class I transformers **not** intended for connection to the mains by a plug:		—
	– Insulation between input windings and body connected to earth consist of basic insulation rated to the input voltage		N/A
	– Insulation between output windings and body, connected to earth consist of basic insulation rated for the output voltage		N/A
	Class I transformers intended for connection to the mains by a plug:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	– Insulation between input windings and body connected to earth consist of basic insulation rated to the working voltage		N/A
	– Insulation between output windings and body, connected to earth consist of supplementary insulation rated for the working voltage		N/A
	Class II transformers		P
	– Insulation between input windings and body consist of double or reinforced insulation rated to the input voltage		P
	– Insulation between output windings and body consist of double or reinforced insulation, rated to the output voltage		P
BB.19.1.4.3	For transformers with intermediate conductive parts not connected to the body (between input/output):		N/A
BB.19.1.4.3.1	For class I and class II transformers the insulation between input and output windings, via intermediate conductive parts, consist of double or reinforced insulation, rated to the working voltage.		N/A
	– For class II transformers the insulation between input winding and the body and between the output windings and the body via the intermediate conductive parts consist of double or reinforced insulation. (rated to the input voltage, for SELV circuits only basic insulation to the body)		N/A
	– For transformers, different from independent, the insulation between input and output windings, via intermediate conductive parts, consist of double or reinforced insulation, rated to the working voltage.		N/A
BB.19.1.4.3.2	Class I transformers with earthed core, and not allowed for class II equipment		N/A
	– Insulation from the input to the earthed core: basic insulation rated for the input voltage		N/A
	– Insulation from the output voltage to the earthed core: basic insulation rated for the output voltage		N/A
BB.19.1.4.3.3	Insulation between: input to intermediate conductive parts and output and intermediate parts consist of at least basic insulation		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	– If the insulation from input or output to the intermediate metal part is less than basic insulation, the part is considered to be connected to input or output.		N/A
BB.19.1.4.4	For class I transformers, with protective screen, **not** connected to the mains by a plug the following conditions comply:		N/A
	– The insulation between input winding and protective screen consist of basic insulation (rated input voltage)		N/A
	– The insulation between output winding and protective screen consist of basic insulation (rated output voltage)		N/A
	– The protective screen consist of metal foil or a wire wound screen extending the full width of the windings and has no gaps or holes		N/A
	– Where the protective screen does not cover the entire width of the input winding, additional insulation to ensure double insulation in this area, is used.		N/A
	– If the screen is made by a foil, the turns are isolated, overlap at least 3 mm		N/A
	– The cross-section of the screen and the lead out wire is at least corresponding to the rated current of the overload device		N/A
	– The lead out wire is soldered or fixed to the protective screen.		N/A
	For transformers for connection to the mains by the means of a plug of any type (incorporating or not), the alternative with basic insulation plus protective screening is not allowed.		N/A
BB.19.1.4.5	No connection between output circuit and protective earth, except of associated transformers (allowed by equipment standard) or 19.8 is fulfilled.		N/A
BB.19.1.4.6	No connection between output circuit and body, except of associated transformers (allowed by equipment standard)		N/A
BB.19.1.4.7	The distance between input and output terminals for the connection of external wiring is ≥ 25 mm	Building-in transformer	N/A
BB.19.1.4.8	Portable transformers having an rated output ≤ 630 VA shall be class II.		P

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Clause	Requirement + Test	Result - Remark	Verdict
BB.19.1.4.9	No connection between output circuit and body except of associated transformers (allowed by equipment standard)	No connection	P
BB.19.1.4.10	Protective screening is not allowed for transformers with plug connection to the mains	Building-in transformer	N/A
BB.19.12	Winding construction		P
BB.19.12.1	Undue displacement in all types of transformers not allowed:		P
	– of input or output windings or turns thereof		P
	– of internal wiring or wires for external connection	Building-in transformer	N/A
	– of parts of windings or of internal wiring in case of rupture or loosening	Building-in transformer	N/A
BB.19.12.2	Serrated tape:		N/A
	– distance through insulation according to table 22		N/A
	– one additional layer of serrated tape, and		N/A
	– one additional layer without serration		N/A
	– in case of cheek less bobbins the end turns of each layer shall be prevented from being displaced		N/A
BB.19.12.3	Insulated windings wires providing basic, supplementary or reinforced insulation, meet the following requirements:		P
	• Multi-layer extruded or spirally wrapped insulation, passed the tests of annex K		P
	• Basic insulation: two wrapped or one extruded wire		N/A
	• Supplementary insulation: two layers, wrapped or extruded		N/A
	• Reinforced insulation: three layers wrapped or extruded		P
	Spirally wrapped insulation:		N/A
	• creepage distances between wrapped layers > cl. 26 _ P1 values		N/A
	• path between wrapped layers sealed, the test voltage of K2 is multiplied with 1,35		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	• test 26.2.4 – Test A, passed for wrapped layers		N/A
	• the finished component pass the electric strength test according to cl. 18.3		N/A
a)	Insulated winding wire used for basic or supplementary insulation in a wound part:		N/A
	• comply with annex K		N/A
	• two layers for supplementary insulation		N/A
	• one layer for basic insulation		N/A
	• one layer for mechanical separation between the insulated wires of primary and secondary. This layer fulfils the requirement of basic insulation.		N/A
b)	Insulated winding wire used for reinforced insulation in a wound part:		P
	• comply with annex K	Certified TIW	P
	• three layers		P
	• relevant dielectric strength test of 18.3		P
	Where the insulated winding wire is wound:		P
	• upon metal or ferrite cores		P
	• upon enamelled wire		P
	• under enamelled wire		P
	• one layer for mechanical separation between the insulated wires and the core or the enamelled wires is required. This layer fulfils the requirement of basic insulation.		P
	• both windings shall not touch each other and also not the core.		P
	100 % routine test of Annex K3 of part 1 is fulfilled		N/A
	no creepage distances and clearances for insulated winding wires		P
c)	Toroidal cores used with TIW wires for double or reinforced insulation between the primary and secondary circuits shall comply with the following:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	1) a coating which fulfils the requirements of basic insulation between a winding and the core		N/A
	2) The primary winding consists of TIW wire with 3 layers (reinforced insulation) and the secondary winding consists of enamelled wire. These independent windings shall not be able to contact each other either by mechanical separation or a gap which fulfil the dielectric strength tests for basic insulation.		N/A
	3) For polyfilar windings (primary and secondary windings in contact with each other), the primary winding consists of TIW wire with 3 layers and the secondary winding consists of a TIW wire with 1 layer (requirements for primary and secondary windings can be changed). This construction also is allowed for use with EE-cores or similar.		N/A
d)	Toroidal cores used with FIW wires for double or reinforced insulation between the primary and secondary circuits shall comply with the following:		N/A
	1) a coating, which fulfil the requirements of basic insulation.		N/A
	2) The primary winding consists of FIW wire for reinforced insulation and the secondary winding consist of FIW wire – of basic insulation. These independent windings shall not be able to contact each other either by mechanical separation or a gap which fulfil the dielectric strength test for basic insulation.		N/A
	3) For polyfilar windings (primary and secondary windings in contact with each other), the primary winding and the secondary winding consist of FIW wire for reinforced insulation. This construction also is allowed to use for EE-core or similar.		N/A
e)	Toroidal cores used with TIW in combination with FIW wire, for double or reinforced insulation between the primary and secondary circuits shall comply with the following:		N/A
	1) a coating, which fulfils the requirements of basic insulation.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	2) The primary winding consists of FIW wire for reinforced insulation, and the secondary winding consists of TIW wire for basic insulation (1 layer). These independent windings shall not be able to contact each other either by mechanical separation or a gap which fulfil the dielectric strength tests for basic insulation.		N/A
	3) For polyfilar windings (primary and secondary windings in contact with each other), the primary winding consists of TIW wire for reinforced insulation (3 layer) and the secondary winding consists of FIW wire for reinforced insulation. This construction also is allowed for use with EE-cores or similar.		N/A
f)	Toroidal cores used with TIW in combination with FIW wire, for basic insulation between the primary and secondary circuits shall comply with the following:		N/A
	1) a coating, which fulfils the requirements of basic insulation		N/A
	2) The primary winding consists of FIW wire for basic insulation, and the secondary winding consists of TIW wire for basic insulation (1 layer). These independent windings shall not be able to contact each other either by mechanical separation or a gap which fulfils the dielectric strength tests for basic insulation.		N/A
	3) For polyfilar windings (primary and secondary windings in contact with each other), the primary winding consists of TIW wire for supplementary insulation (2 layers) and the secondary winding consists of FIW wire for basic insulation. This construction also is allowed for use with EE-cores or similar.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	4) Further polyfilar constructions with FIW and TIW wires in combination with enamelled wires for basic insulation only: 4.1) Primary winding consists of enamelled wire, secondary winding consists of FIW wire for reinforced insulation 4.2) Primary winding consists of enamelled wire, secondary winding consists of TIW wire for reinforced insulation		N/A
BB.19.12.3.1	Max. class F for transformers which use FIW-wire		N/A
BB.19.12.3.2	FIW wires comply with IEC 60851-5:2008, IEC 60317-0-7 and IEC 60317-56.		N/A
	• other nominal diameter as mentioned in table 24 can be calculated with the Formula (6) in 26.3.5:		N/A
	FIW wire used for basic or supplementary insulation for transformers according 19.1.3:		N/A
	• the test voltage of table 14, based on the working voltage of basic or supplementary insulation, comply with the min. voltage strength of table 24		N/A
	• one layer for mechanical separation is located between the insulated wires of primary and secondary. This layer fulfil the requirement of basic insulation		N/A
	• between FIW and enamelled wire, no requirements of creepage distances and clearances		N/A
	• no touch of FIW and enamelled wires		N/A
	FIW wire used for double or reinforced insulation for transformers according 19.1.4:		N/A
	• the test voltage of table 14, based on the working voltage of basic or supplementary insulation, comply with the min. voltage strength of table 24		N/A
	• for primary and secondary winding FIW-wire for basic insulation is used		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	• one layer for mechanical separation is located between the insulated wires of primary and secondary. This layer fulfil the requirement of basic insulation		N/A
	• no touch between the basic insulated PRI and SEC FIW-wires		N/A
	• between PRI- and SEC-FIW wires, no requirements of creepage distances and clearances		N/A
	Alternative construction used for reinforced insulation (reinforced insulated FIW wire and enamelled wire)		N/A
	• the test voltage of table 14, based on the working voltage reinforced insulation, comply with the min. voltage strength of table 24		N/A
	• one layer for mechanical separation is located between the reinforced insulated FIW wire and the enamelled wire. This layer fulfil the requirement of basic insulation		N/A
	• no touch between the FIW wire and the enamelled wire		N/A
	• between the reinforced FIW wire and any other parts, no requirements of creepage distances and clearances exist		N/A
	Alternative construction with FIW wires, basic or supplementary insulated for transformers with double or reinforced insulation:		N/A
	• the test voltage of table 14, based on the working voltage of basic or supplementary insulation, comply with the min. voltage strength of table 24		N/A
	• PRI or SEC basic insulated FIW wire and to the other winding (enamelled wire) requirements of supplementary insulation		N/A
	• creepage distances and clearances between the basic insulated FIW wire and the enamelled wire for basic or supplementary insulation are required.		N/A
	Where the FIW wire is wound		N/A
	• upon metal or ferrite cores		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	• one layer for mechanical separation between the insulated wires and the core or the enamelled wires is required. This layer fulfils the requirement of basic insulation.		N/A
	• both windings shall not touch each other and also not the core.		N/A
BB.20	COMPONENTS		N/A
BB.21	INTERNAL WIRING		N/A
BB.22	SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CABLES AND CORDS		N/A
BB.23	TERMINALS FOR EXTERNAL CONDUCTORS		N/A
BB.24	PROVISION FOR PROTECTIVE EARTHING		N/A
BB.25	SCREWS AND CONNECTIONS		N/A
BB.26	CREEPAGE DISTANCES AND CLEARANCES		P
BB.26.1	See 26.101		P
BB.26.2	Creepage distances (cr) and clearances (cr)		N/A
BB.26.2.1	General		P
	The creepage distance and clearance values are shown in Table 20 and Table 21.		P
BB.26.2.2	Windings covered with adhesive tape		N/A
	– all insulating materials are classified according to IEC 60085 and IEC 60216 (all parts);		N/A
	– the impulse voltage dielectric test of 6.1.2.2.1 of IEC 60664-1:2007 is fulfilled; and		N/A
	– test A of 26.2.4 is fulfilled		N/A
BB.26.2.3	Uncemented insulating parts pollution degree P2 or P3	P2	P
	– all isolating material are classified acc. To IEC 60085 and IEC 60216		P
	– values of pollution degree 1 are not applicable		P
BB.26.2.4	Cemented insulating parts		N/A
	– all isolating materials are classified acc. To IEC 60085 and IEC 60216		N/A
	– values of distance through insulation (dti) are fulfilled		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	– creepage distances and clearances are not required		N/A
	– test A of this sub clause is fulfilled		N/A
	Test A		N/A
	– thermal class		N/A
	– working voltage		N/A
	– Test with three specially specimens, with uninsulated wires, without impregnation or potting	(see appended table)	N/A
	Two of the three specimens are subjected to:		N/A
	– the relevant humidity treatment according to 17.2 (48 h)		N/A
	– the relevant dielectric strength test of 18.3 multiplied with factor 1,35		N/A
	– One of the three specimens is subjected to the relevant dielectric strength test of 18.3 multiplied by the factor 1,35 immediately at the end of the last cycle with high temperature		N/A
	Impulse dielectric test according to 6.1.2.2.1 of IEC 60664-1:2007 – see Annex R of IEC 61558-1		N/A
BB.26.2.5	Enclosed parts, by impregnation or potting		N/A
BB.26.2.5.1	– The requirements of reduced values as stated for pollution degree 1 (P1) are fulfilled		N/A
	– all isolating materials are classified acc. To IEC 60085 and IEC 60216		N/A
	Test B		N/A
	– thermal class		N/A
	– test voltage of 500 V or the working voltage		N/A
	– Test with three specially specimens, potted or impregnated. The dielectric strength test is applied directly to the joint.	(see appended table)	N/A
	Two of the three specimens are subjected to:		N/A
	– the relevant humidity treatment according to 17.2 (48 h)		N/A
	– the relevant dielectric strength test of 18.3 multiplied with factor 1,25		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	– One of the three specimens is subjected to the relevant dielectric strength test of 18.3 multiplied by the factor 1,25 immediately at the end of the last cycle with high temperature		N/A
	The three spacemen pass the Impulse dielectric test according to 6.1.2.2.1 of IEC 60664-1:2007– see Annex R of IEC 61558-1		N/A
BB.26.2.5.2	– The requirements of distance through insulation (dti) are fulfilled. (P1 values are not required)		N/A
	– all isolating materials are classified acc. To IEC 60085 and IEC 60216		N/A
	Test C		N/A
	– thermal class		N/A
	– working voltage		N/A
	– Test with three specimens, potted or impregnated. (finished components)	(see appended table)	N/A
	– Neither cracks, nor voids in the insulating compounds		N/A
	Two of the three specimens are subjected to:		N/A
	– the relevant humidity treatment according to 17.2 (48 h)		N/A
	– the relevant dielectric strength test of 18.3 multiplied with factor 1,35		N/A
	– One of the three specimens is subjected to the relevant dielectric strength test of 18.3 multiplied by the factor 1,35 immediately at the end of the last cycle with high temperature		N/A
	The three spacemen pass the Impulse dielectric test according to 4.1.1.2.1 of IEC 60 664-1 (1,2 / 50 ?s waveform) – see Annex R of IEC 61558-1		N/A
BB.26.3	Distance through insulation		N/A
BB.26.3.1	For supplementary, double or reinforced insulation, the required values of Tables 22 are fulfilled		N/A
	The insulation fulfil the material classification according IEC 60085 and 60216(all parts) or the test of 14.3		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
BB.26.3.2	Reduced values of the thickness of insulation for supplementary or reinforced insulation are allowed if the following conditions are fulfilled:		N/A
	– the isolating materials are classified acc. To IEC 60085 and IEC 60216		N/A
	– the test of 14.3 is fulfilled		N/A
	– If both requirements are fulfilled, the required values for solid insulation can be multiplied by 0,4		N/A
	– Minimum thickness of reinforced insulation ≥0,2 mm		N/A
	– Minimum thickness of supplementary insulation ≥0,1 mm		N/A
BB.26.3.3	Insulation in thin sheet form		N/A
	– If the layers are non-separable (glued together):		N/A
	– The requirement of 3 layers is fulfilled		N/A
	– The mandrel test according 26.3.4 is fulfilled with 150 N		N/A
	– The required values for d.t.i. of thin layers in Tables 22 is fulfilled.		N/A
	– If the layers are separated:		N/A
	– The requirement of 2 layers is fulfilled		N/A
	– If serrated tape is used, 1 additional layer (serrated) and one additional layer without serration is required		N/A
	– The mandrel test according 26.3.4 is fulfilled on each layer with 50±5 N		N/A
	– The required values for d.t.i. of thin layers in Tale 22 is fulfilled.		N/A
	– If the layers are separated (alternative:		N/A
	- The requirement of 3 layers is fulfilled		N/A
	– If serrated tape is used, 1 additional layer (serrated) and one additional layer without serration is required		N/A
	– The mandrel test according 26.3.4 is fulfilled on 2/3 of the layers with 100±5 N		N/A
	– The required values for d.t.i. of thin layers in Tale 22 is fulfilled.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Test according to 14.3 and if the isolating materials are classified acc. To IEC 60085 and IEC 60216 no distances through insulation are required for insulation in thin sheet form		N/A
	The values for thin layers are used for insulation in thin sheet form as follows:		N/A
	– rated output > 100 VA values for thin layers apply		N/A
	– rated output ≥ 25 VA and ≤ 100 VA 2/3 of the values for thin layers apply		N/A
	– rated output < 25 VA 1/3 of the values for thin layers apply		N/A
BB.26.3.4	Mandrel test of insulation in thin sheet form (specimen of 70±0,5 mm width are necessary):		N/A
	– If the layers are non-separable – at least 3 layers glued together fulfil the test:		N/A
	– pull force of 150 N		N/A
	– high voltage test of 5,0 Kv or the test voltage of 18.3 multiplied by 1,25 whatever is the greater. No flashover, no breakdown.		N/A
	– If the layers are separable and 2/3 of at least 3 layers fulfil the test.		N/A
	– pull force of 100 N		N/A
	– high voltage test of 5,0 Kv or the test voltage of 18.3 multiplied by 1,25 whatever is the greater. No flashover, no breakdowns.		N/A
	– If the layers are separable 1 of at least 2 layers fulfil the test:		N/A
	– pull force of 50 N		N/A
	– high voltage test of 5,0 Kv or the test voltage of 18.3 multiplied by 1,25 whatever is the greater. No flashover, no breakdown.		N/A
BB.26.101	Creepage distances and distances through insulation given in Table 21, Table 22 and Table 23 of IEC 61558-1:2017 are generally applicable (IEC 61558-2-16: 2021)	(see appended table)	P

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Clause	Requirement + Test	Result - Remark	Verdict
BB.26.102	In compliance with IEC 60664-4:2005, the requirements of 26.103 to 26.106 for creepage distances, clearances and solid insulation are required above 30 kHz and up to the frequency of 3 MHz. For frequencies above 3 MHz, the tests in accordance with 7.4 and 7.5 of IEC 60664-4:2005, high-frequency testing (high-frequency high-voltage test and high-frequency partial discharge test) shall be carried out.	Measured: 65.6kHz max	P
BB.26.103	Clearance (IEC 61558-2-16:2021)		P
	a.) Clearance for frequency ≥ 30 kHz according figure 101 two determinations are necessary:		P
	determination based on the rated impulse voltage of the rated supply voltage in accordance with Table 103 and Table 104.		P
	determination based on the measured peak working voltage in accordance with Table 106.	500V peak max. Between primary and secondary windings: 6.2mm	P
	b.) Clearance for frequency ≤ 30 kHz according figure 101 two determinations are necessary:		N/A
	– determination based on the rated impulse voltage of the rated supply voltage in accordance with Table 103 and Table 104.		N/A
	– determination based on the measured peak working voltage in accordance with Table 105.		N/A
BB.26.104	The working voltages of Table 105 and Table 106 for determination of clearances are peak working voltages. (IEC 61558-2-16: 2021)		P
	All peak working voltages including µs-peaks shall be used to determine clearances in accordance with Table 105 and Table 106.		P
BB.26.105	Creepage distances (IEC 61558-2-16: 2021)		P
	Two determinations of creepage distances are necessary (see Figure 102)		P
	– determination based on the measured RMS working voltage in accordance with Table 21 of IEC 61558-1:2017;		P

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Clause	Requirement + Test	Result - Remark	Verdict

	determination based on the measured peak working voltage in accordance with Table 107 to Table 112 and the fundamental frequency shall be considered		P
	A high-frequency RMS ripple voltage content not more than 10% can be neglected.		P
	The values in Table 107 to Table 112 do not take into account the effects of tracking phenomena for frequencies above 30 kHz.		P
	The most severe value of the required creepage distances in accordance with Table 107 to Table 112 for frequencies above 30 kHz and the relevant values in Table 21 of IEC 61558-1:2017 shall take precedence.		P
	If the value of the creepage distance is lower than the value of the clearance, the value of the clearance shall be applicable for the creepage distance.		P
	The peak working voltage also includes any DC voltage and any repetitive peak impulse generated by the SMPS (see 26.105). A determination based on RMS values is also required (see 26.104 and Table 112).	500V peak max. Between primary and secondary windings: 6.2mm	P
BB.26.106	Distance through insulation (IEC 61558-2-16:2021)		N/A
	Instead of partial discharge with high frequency voltage the test of the distance and the calculation of the electric field is applicable under the following conditions:		N/A
	– the max. frequency is < 10 MHz		N/A
	– the field strength approximately comply with Figure 103		N/A
	– no voids or gaps are present in between the solid insulation		N/A
	For thick layers d1 $\geq$ 0,75 the peak value of the field strength is $\leq$ 2 Kv/mm		N/A
	For thin layers d2 $\leq$ 30 µm the peak value of the field strength is $\leq$ 10 Kv/mm		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	For d1 > d > d2 formula (2) is used for calculation the field strength		N/A
BB.27	RESISTANCE TO HEAT, FIRE AND TRACKING		N/A
BB.E	ANNEX E , GLOW WIRE TEST		N/A
BB.E.1	The test is required according to IEC 60695-2-10 and IEC 60695-2-11 with the following additions:		N/A
BB.E.2	The requirements of 8.2, “Test temperatures” of IEC 60695-2-11:2014, apply with the temperature stated in 27.4 of IEC 61558-1		N/A
BB.E.3	Clause 7, “Conditioning”, of IEC 60695-2-11:2014 apply, preconditioning is required		N/A
BB.E.4	Clause 8, “Test procedure”, of IEC 60695-2-11:2014 apply, the tip of the glow wire is applied to the flat side of the surface.		N/A
BB.F	ANNEX F, REQUIREMENTS FOR MANUALLY OPERATED SWITCHES WHICH ARE PARTS OF THE TRANSFORMER		N/A
BB.H	ANNEX H, ELECTRONIC CIRCUITS (IEC 61558-1)		N/A
BB.K	ANNEX K, INSULATED WINDING WIRES FOR USE AS MULTIPLE LAYER INSULATION		N/A
BB.K.1	Wire construction:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	• insulated winding wire for basic or supplementary insulation (see 19.12.3)		N/A
	• insulated winding wire for reinforced insulation (see 19.12.3)		N/A
	• splid circular winding wires and stranded winding wires with 0,05 to 5 mm diameter		N/A
	• spirally wrapped insulation – overlapping		N/A
BB.K.2	Type tests		N/A
BB.K.2.1	General Tests between ambient temperature between 15° C and 35° C and at an humidity between 45% and 75 %		N/A
BB K.2.2	Electric strength test		N/A
BB K.2.2.1	Solid circular winding wires and stranded winding wires		N/A
	Test samples prepared according to clause 4.4.1 of IEC 60851-5:2008 (twisted pair)		N/A
	Dielectric strength test: 6 Kv for reinforced insulation		N/A
	Dielectric strength test: 3 Kv for basic or supplementary insulation		N/A
BB K.2.2.2	Square or rectangular wires .		N/A
	Test samples prepared according to clause 4.7.1 of IEC 60851-5:2008		N/A
	Dielectric strength test: 5,5 Kv for reinforced insulation		N/A
	Dielectric strength test: 2,75 Kv for basic or supplementary insulation		N/A
BB K.2.3	Flexibility and adherence		N/A
	Claus 5.1 in Test 8 of IEC 60851-3:2009 shall be used		N/A
	Test samples prepared according to clause 5.1.1.4 of IEC 60851-3:2009		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Dielectric strength test: 5,5 Kv for reinforced insulation		N/A
	Dielectric strength test: 2,75 Kv for basic or supplementary insulation		N/A
	Mandrel diameter according table K.1		N/A
	The tension to the wire during winding on mandrel is 118 N/mm² (118 MPa)		N/A
BB.K.2.4	Heat shock		N/A
	Test samples prepared according to 3.2.1 (in Test 9) of IEC 60851-6:2012		N/A
	• high voltage test immediately after this test		N/A
	• Dielectric strength test: 5,5 Kv for reinforced insulation		N/A
	• Dielectric strength test: 2,75 Kv for basic or supplementary insulation		N/A
BB.K.2.5	Retention of dielectric strength after bending (test as specified under test 13 of 4.6.1 c) of IEC 60 851-5)		N/A
	• high voltage test immediately after this test • Dielectric strength test: 5,5 Kv for reinforced insulation • Dielectric strength test: 2,75 Kv for basic or supplementary insulation		N/A
BB.K.3	Testing during manufacturing		N/A
BB.K.3.1	General Tests as subjected in K.3.2 and K.3.3		N/A
BB K.3.2	Routine test		N/A
	• Dielectric strength test: 4,2 Kv for reinforced insulation		N/A
	• Dielectric strength test: 2,1 Kv for basic or supplementary insulation		N/A
BB K.3.3	Sampling test		N/A
BB K.3.3.1	Solid circular winding wires and stranded winding wires		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Test with a twisted pair, prepared according clause 4.4.1 of IEC 60851-5:2008		N/A
	• Dielectric strength test: 6 Kv for reinforced insulation		N/A
	• Dielectric strength test: 3 Kv for basic or supplementary insulation		N/A
BB K.3.3.2	Square rectangular wire		N/A
	Samples prepared according to clause 4.7.1 of IEC 60851-5:2008		N/A
	• Dielectric strength test: 5,5 Kv for reinforced insulation		N/A
	• Dielectric strength test: 3 Kv for basic or supplementary insulation		N/A
BB.U	ANNEX U – INFORMATIVE – OPTIONAL TW – MARKING FOR TRANSFORMERS		N/A
V	**ANNEX V, SYMBOLS TO BE USED FOR THERMAL CUT-OUTS**		N/A
BB.26.2 TEST A	**TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION**		N/A
	Test with three special prepared specimens with uninsulated wires, without potting or impregnation		

cycles with 2 x working voltage between pri / sec	68 h at the temperature acc. Cl. 14 (min. 85 °C)	1 hour 25 °C	2 hour 0 °C	1 hour 25 °C	
1.					

BB.26.2 TEST B	**TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION**		N/A
	Test with three specially prepared specimens with potted – P1 values are required		

cycles with 2 x working voltage between pri / sec	68 h at the temperature acc. Cl. 14 (min. 85 °C)	1 hour 25 °C	2 hour 0 °C	1 hour 25 °C	
1.					

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict

BB.26.2 TEST B	**TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION**					N/A
	Test with three specially prepared specimens with potted – P1 values are required					
cycles with 2 x working voltage between pri / sec	68 h at the temperature acc. Cl. 14 (min. 85 °C)	1 hour 25 °C	2 hour 0 °C	1 hour 25 °C		

BB.26.2 TEST C	**TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION**					N/A
	Test with three specially prepared specimens with potting (only dti is required)					
cycles with 2 x working voltage between pri / sec	68 h at the temperature acc. Cl. 14 (min. 85 °C)	1 hour 25 °C	2 hour 0 °C	1 hour 25 °C		
1.						
BB.26.3.5	**TABLE: CREEPAGE DISTANCES AND CLEARANCES AND DISTANCES THROUGH INSULATION**					N/A
	Test for transformers, use FIW-wire					
cycles with 2 x working voltage between pri / sec	68 h at the temperature acc. Cl. 14 (min. 85 °C)	1 hour 25 °C	2 hour 0 °C	1 hour 25 °C		
1.						

BB 18.2	**TABLE: insulation resistance measurements**		**P**
Insulation resistance R between:		R (MΩ)	Required R (MΩ)
Between primary and secondary windings		1999	5MΩ
Supplementary information:			

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Clause	Requirement + Test	Result - Remark	Verdict

	TABLE: Dielectric Strength		**P**
Test voltage applied between:		**Test potential applied (V)**	**Breakdown / flashover (Yes/No)**
Primary and secondary windings		5250	No
Supplementary information:			

BB 18.3	**TABLE: Dielectric Strength**		**P**
Test voltage applied between:		Test potential applied (V)	Breakdown / flashover (Yes/No)
Between primary and secondary windings		1999	No
Supplementary information:			

BB 26	**TABLE: Clearance And Creepage Distance Measurements**					**P**
clearance cl and creepage distance dcr at/of:	**Up (V)**	**U r.m.s. (V)**	**Required cl (mm)**	**cl (mm)**	**required dcr (mm)**	**dcr (mm)**
Between primary and secondary windings	500	300	3.0	6.2 min.	5.5	6.2 min.
Supplementary information: Altitude 5000m considered.						

BB 26	**TABLE: Distance Through Insulation Measurements**			**N/A**
Distance through insulation di at/of:	**U r.m.s. (V)**	**Test voltage (V)**	**Required di (mm)**	**di (mm)**
Supplementary information:				