	Test Report issued under the responsibility of: **NCB TÜV SÜD Product Service GmbH** **Ridlerstr. 65, 80339 Munich**	

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

Report Number. ..... :	085-170502901-000
Date of issue ..... :	2017-10-24
Total number of pages ..... :	106
Name of Testing Laboratory preparing the Report ..... :	TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
Applicant's name ..... :	Future Cleaning Technologies FCT BV.
Address ..... :	Hoppenkuil 27B, 5626 DD Eindhoven, THE NETHERLANDS
Test specification:	
Standard ..... :	IEC 60335-2-29:2002 (Fourth Edition) +A1:2004 +A2:2009 for use in conjunction with IEC 60335-1:2010 (Fifth Edition) +A1:2013
Test procedure ..... :	CB
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC60335_2_29J
Test Report Form(s) Originator .... :	SIQ
Master TRF ..... :	Dated 2015-07

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Test item description ..... :	Battery charger
Trade Mark..... :	i-team
Manufacturer..... :	Dongguan Victory Battery Technology Co., Ltd
Model/Type reference..... :	S.72.0344
Ratings..... :	Input: 100-240V~, 50-60Hz, 7A Max. Output: 29.4VDC, 9A x 2 (each output 9A)

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☒ CB Testing Laboratory:	TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch	
Testing location/ address ..... :	5F, Communication Building 163 Pingyun Rd, Huangpu Ave. West Guangzhou 510656, PR China	
☐ Associated CB Testing Laboratory:		
Testing location/ address ..... :		
Tested by (name, function, signature) ..... :	Mr. Jacob Du (Project Handler)	
Approved by (name, function, signature) .. :	Mr. Ricky Zhang (Designated Reviewer)	
☐ 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):

Attachment No. 1: 37 pages of National and Group difference for IEC 60335-1:2010 (Fifth Edition) incl. Corr. 1:2010 and Corr. 2:2011 +A1:2013 according to CB bulletin;

Attachment No. 2: 8 pages of National and Group difference for IEC 60335-2-29 4th edition (2002) + Amendment 1 (2004) + Amendment 2 (2009) according to CB bulletin;

Attachment No. 3: 12 pages of photo document.

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
The submitted samples were tested and found to comply with the requirements of: - IEC 60335-1:2010 - IEC 60335-1:2010/AMD1:2013 - IEC 60335-2-29:2002 - IEC 60335-2-29:2002/AMD1:2004 - IEC 60335-2-29:2002/AMD2:2009 - Before placing the products in the different countries, the manufacturer must ensure that: Operating Instructions, Ratings Labels and Warnings Labels are in an Accepted or Official Language of the country in question; The equipment complies with the National Standards and/or Electrical Codes of the country, province or city or in question.	TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch 5F, Communication Building 163 Pingyun Rd, Huangpu Ave. West Guangzhou 510656, PR China

Summary of compliance with National Differences (List of countries addressed): See attachment of National and Group Differences for details.

Copy of marking plates:

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.



Remark: The symbols of positive terminal (+) and negative terminal (-) are marked near the output terminals.

Test item particulars ..... :	Battery Charger
Classification of installation and use ..... :	Class I portable appliance
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..... :	2017-09-01
Date (s) of performance of tests..... :	2017-09-02 to 2017-09-22

General remarks:

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

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)..... :	Dongguan Victory Battery Technology Co., Ltd Hudie No.2 Rd., Tianxin Village, Huangjiang Town, 523763 Dongguan City, Guangdong Province, PEOPLE'S REPUBLIC OF CHINA

General product information:

1. The battery charger is class I appliance, for indoor use only, the specified maximum ambient is 40°C.
2. The battery charger is intended to charge Li-ion battery packs as below:
   Capacity: Max. 14.0Ah
   Rated input voltage: 25.2V
   Max. cell number: 28 pcs
3. All battery packs to be charged shall comply with IEC 62133:2013.
4. The test samples are pre-production samples without serial models.
5. The battery charger's top enclosure is secured to bottom enclosure by screws.

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.		P
5.17	Appliances powered by rechargeable batteries that are recharged in the appliance tested in accordance with Annex B		N/A
	Battery-operated appliances powered by batteries that are non-rechargeable or not recharged in the appliance tested in accordance with Annex S		N/A
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
6.2	Protection against harmful ingress of water	Ordinary appliance	N/A
7	**MARKING AND INSTRUCTIONS**		**P**
7.1	Rated voltage or voltage range (V) .....:	100-240V	P
	Symbol for nature of supply, or .....:	See below	N/A
	Rated frequency (Hz) .....:	50-60Hz	P
	Rated power input (W), or .....:		N/A
	Rated current (A) .....:	7A max.	P
	Manufacturer's or responsible vendor's name, trademark or identification mark.....:	See page 4	P
	Model or type reference .....:	S.72.0344	P
	Symbol IEC 60417-5172, for class II appliances		N/A
	IP number, other than IPX0.....:	IP20	N/A
	Symbol IEC 60417-5180, for class III appliances, unless		N/A
	the appliance is operated by batteries only		N/A
	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

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	- rated d.c. output current (A)		P
	- rated current (A) of protective devices incorporated in a d.c. distribution board		N/A
	- polarity of the output terminals indicated by symbol IEC 60417-5005 for the positive terminal and IEC 60417-5006 for the negative terminal (IEC 60335-2-29/A2)		P
	- time-current characteristic of fuse-links of the time-lag type	Non-replaceable current fuse used, “T6.3A” marked on sample.	P
	If the output exceeds 20 VA, battery chargers marked with (IEC 60335-2-29):		—
	- before charging, read the instructions		P
	- for indoor use or do not expose to rain, unless appliance is at least IPX4	“for indoor use only” indicated on label	P
	If the output exceeds 20 VA and the battery charger is for lead-acid batteries, battery chargers marked with (IEC 60335-2-29):		—
	- 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	100V-240V	P
	Different rated values marked with the values separated by an oblique stroke		P
7.4	Appliances adjustable for different rated voltages or rated frequencies, the voltage or the frequency setting is clearly discernible	No adjustable device	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
	Output voltage clearly discernible if the battery charger can be adjusted to different rated d.c. output voltages (IEC 60335-2-29)		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
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		P
	the power input is related to the arithmetic mean value of the rated voltage range		N/A
	Relation between marking for upper and lower limits of rated power input or rated current and voltage is clear		P
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		N/A
	Units of physical quantities and their symbols according to international standardized system		P
7.7	Connection diagram fixed to appliances to be connected to more than two supply conductors and appliances for multiple supply, unless	Single supply voltage range	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)		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		N/A
7.10	Indications of switches on stationary appliances and controls on all appliances by use of figures, letters or other visual means ....:		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		N/A
7.12	Instructions for safe use provided	Refer to user manual	P

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	Details concerning precautions during user maintenance		P
	The instructions state that:		—
	- 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	Refer to user manual	P
	- children being supervised not to play with the appliance		P
	Instructions for safe use contains (IEC 60335-2-29):		—
	- specification of types, number of cells and rated capacity of batteries that can be charged	Refer to user manual	P
	- warning against recharging non-rechargeable batteries		P
	- statement that during charging, batteries must be placed in the well-ventilated area, only for battery chargers for lead-acid batteries		N/A
	- statement that battery chargers must only be plugged into an earthed socket-outlet, only for portable Class I battery chargers for outdoor use		N/A
	- explanation of automatic function stating any limitation, only for automatic battery chargers		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
	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		N/A
	Instructions for class III appliances state that it must only be supplied at SELV, unless		N/A
	it is a battery-operated appliance, the battery being charged outside the appliance		N/A
	For appliances for altitudes exceeding 2000 m, the maximum altitude is stated..... .....:		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	The instructions for appliances incorporating a functional earth states that the appliance incorporates an earth connection for functional purposes only		N/A
7.12.1	Sufficient details for installation supplied		N/A
	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 (IEC 60335-2-29).		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		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		N/A
7.12.4	Instructions for built-in appliances:		—
	- dimensions of space		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		N/A
	Replacement cord instructions, type Y attachment		N/A
	Replacement cord instructions, type Z attachment		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
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		N/A
7.12.7	Instructions for fixed appliances stating how the appliance is to be fixed		N/A
7.12.8	Instructions for appliances connected to the water mains:		—
	- max. inlet water pressure (Pa) ....:		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
7.13	Instructions and other texts in an official language	English, other languages should be evaluated during national approval.	P
7.14	Marking clearly legible and durable, rubbing test as specified		P
7.15	Markings on a main part	On body	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		N/A
	For stationary appliances, name, trademark or identification mark and model or type reference visible after installation		N/A
	For fixed appliances, name, trademark or identification mark and model or type reference visible after installation according to the instructions		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		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	Fuse is not replaceable	N/A
7.101	D.C. distribution boards marked with (IEC 60335-2-29):		—
	- maximum output current (A) for each output circuit..... .....:		N/A
	- types of any additional power supply which can be connected		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
8	**PROTECTION AGAINST ACCESS TO LIVE PARTS**		**P**
8.1	Adequate protection against accidental contact with live parts		P
8.1.1	Requirement applies for all positions, detachable parts removed		P
	Lamps behind a detachable cover not removed, if conditions met	No lamp	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		P
	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	No visible glowing heating elements	N/A
8.1.4	Accessible part not considered live if:		—
	- 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	29.21V measured at output terminal	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. 0.194mA (normal) Max. 0.216mA (short-circuit CY6A)	P
	- for peak values over 42,4 V up to and including 450 V, capacitance not exceeding 0,1 μF		P
	- for peak values over 450 V up to and including 15 kV, discharge not exceeding 45 μC		P
	- for peak values over 15kV, the energy in the discharge not exceeding 350 mJ		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
8.1.5	Live parts protected at least by basic insulation before installation or assembly:		—
	- built-in appliances		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		P
	Only possible to touch parts separated from live parts by double or reinforced insulation		P
9	**STARTING OF MOTOR-OPERATED APPLIANCES**		**N/A**
	Requirements and tests are specified in part 2 when necessary		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.....:		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		N/A
	Otherwise the current is the arithmetic mean value		P

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	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 current is related to the arithmetic mean value of the range		N/A
10.101	No-load d.c. output voltage does not exceed 42,2 V (IEC 60335-2-29):	0V	P
10.102	Arithmetic mean value of output current does not deviate from rated d.c. output current by more than 10 % (IEC 60335-2-29)	(see appended table)	P
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 .....:		P
	Battery chargers are 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		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 only supplied at 1,06 times rated voltage (IEC 60335-2-29)	Both at 1.06 times and at 0.94 times rated voltage	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 are operated until steady conditions are established (IEC 60335-2-29)		P
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		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		P
	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

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
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) .....:	(see appended table)	P
	Protective impedance and radio interference filters disconnected before carrying out the tests		P
13.2	For class 0, class II and class III appliances, and class II constructions, leakage current measured by means of the circuit described in figure 4 of IEC 60990		P
	For class 0I and class I appliances, a low impedance ammeter may be used		N/A
	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**		**P**
	Appliances withstand the transient over-voltages to which they may be subjected		P
	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	Ordinary	P
	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	N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	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		N/A
	Built-in appliances installed according to the instructions		N/A
	Appliances placed or used on the floor or table placed on a horizontal unperforated support		N/A
	Appliances normally fixed to a wall and appliances with pins for insertion into socket-outlets are mounted on a wooden board		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
	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

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	Appliances incorporating an appliance inlet tested with or without an connector, whichever is most unfavourable		N/A
	Detachable parts are removed		N/A
	Overfilling test with additional amount of water, over a period of 1 min (l) .....:		N/A
	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		P
	Humidity test for 48 h in a humidity cabinet	93% RH, 30°C, 48h	P
	Reassembly of those parts that may have been removed		P
	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).....:	(see appended table)	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:		—
	- 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		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	With the radio interference filters disconnected, the leakage current do not exceed limits specified .....:		N/A
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 .....:		N/A
	No breakdown during the tests		P
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).....:	1.06 x 240V = 254.4V	P
	Output terminals of battery chargers are short-circuited (IEC 60335-2-29)	When output terminals are short-circuited, the unit shut down immediately.	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		P
	Temperature of the winding not exceeding the value specified in table 8		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
	Electronic circuits so designed and applied that a fault will not render the appliance unsafe .....:	(see appended table)	P
	if the appliance also has a control that limit the temperature during clause 11 it is subjected to the test of 19.4, and		N/A
	Appliances incorporating motors subjected to the tests of 19.7 to 19.10, as applicable		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	Appliances incorporating electronic circuits subjected to the tests of 19.11 and 19.12, as applicable		P
	Appliances incorporating contactors or relays subjected to the test of 19.14, being carried out before the tests of 19.11		N/A
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 elements	N/A
19.3	Test of 19.2 repeated; test voltage (V), power input of 1,24 times rated power input (W) .....:		N/A
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		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		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		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
	capacitor is of class P2 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

IEC 60335-2-29			
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		N/A
19.9	Running overload test on appliances incorporating motors intended to be remotely or automatically controlled or liable to be operated continuously		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		N/A
	Appliances incorporating an electronic circuit that relies upon a programmable component to function correctly, subjected to the test of 19.11.4.8, unless		N/A
	restarting does not result in a hazard		N/A
	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		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		P

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	- 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:		—
	- 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		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:		—
	- 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		N/A
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:		—
	a) short circuit of functional insulation if clearances or creepage distances are less than the values specified in clause 29	(see appended table)	P
	b) open circuit at the terminals of any component	(see appended table)	P
	c) short circuit of capacitors, unless	(see appended table)	P
	they comply with IEC 60384-14	(see appended table)	P
	d) short circuit of any two terminals of an electronic component, other than integrated circuits	(see appended table)	P
	This fault condition is not applied between the two circuits of an optocoupler	(see appended table)	P
	e) failure of triacs in the diode mode	(see appended table)	P
	f) failure of microprocessors and integrated circuits	(see appended table)	P
	g) failure of an electronic power switching device	(see appended table)	P
	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

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
19.11.3	If the appliance incorporates a protective electronic circuit which operates to ensure compliance with clause 19, the relevant test is repeated with a single fault simulated, as indicated in a) to g) of 19.11.2		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		N/A
	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
	Surge protective devices disconnected, unless		N/A
	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		N/A
19.11.4.2	The appliance is subjected to radiated fields in accordance with IEC 61000-4-3, test level 3		N/A
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		N/A
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		N/A
	An open circuit test voltage of 2 kV is applicable for the line-to-line coupling mode		N/A
	An open circuit test voltage of 4 kV is applicable for the line-to-earth coupling		N/A
	Earthed heating elements in class I appliances disconnected		N/A
19.11.4.5	The appliance is subjected to injected currents in accordance with IEC 61000-4-6, test level 3		N/A
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		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	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		N/A
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		N/A
	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) .....:	(see appended table)	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)	P
	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/A2)		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:		—
	- basic insulation (V).....:	1000V	P
	- supplementary insulation (V) .....:	1750V	P
	- reinforced insulation (V) .....:	3180V	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		N/A
	The appliance does not undergo a dangerous malfunction, and		P
	no failure of protective electronic circuits, if the appliance is still operable		N/A

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:		—
	- do not become operational, or		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:		—
	- 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		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		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)		N/A
19.102	Reverse connection of battery chargers to a fully charged battery at rated voltage (IEC 60335-2-29)	Reverse connection of battery is not possible and limited by the specified battery connection	N/A
	The capacity of the battery (IEC 60335-2-29).....:		N/A
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)		N/A
20	**STABILITY AND MECHANICAL HAZARDS**		**P**
20.1	Appliances having adequate stability		P

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	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	DC fan adequately enclosed	P
	Protective enclosures, guards and similar parts are non-detachable, and		P
	have adequate mechanical strength		P
	Enclosures that can be opened by overriding an interlock are considered to be detachable parts	Non-detachable	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		P
21	**MECHANICAL STRENGTH**		**P**
21.1	Appliance has adequate mechanical strength and is constructed as to withstand rough handling		P
	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		P
	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	Enclosure: min. 2.0mm	P
	The insulation is tested as specified, and does withstand the electric strength test of 16.3		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
21.101	Battery chargers, other than built-in battery chargers, having a mass not exceeding 5 kg, subjected to a drop test (IEC 60335-2-29)		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)		N/A
	Vibration test as specified in IEC 60068-2-6 (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
	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 considered	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		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		N/A
	Applied torque not exceeding 0,25 Nm		N/A
	Pull force of 50 N 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 1 mm		N/A
	Each pin subjected to a torque of 0,4 Nm; the pins are not rotating, unless		N/A
	rotating does not impair compliance with this standard		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
22.4	Appliance for heating liquids and appliance causing undue vibration not provided with pins for insertion into socket-outlets		N/A
22.5	No risk of electric shock when touching the pins of the plug, 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	Bleeder resistor: R2A=R2B=R2C=150kΩ, CX1=CX2=0.47µF	P
	Voltage not exceeding 34 V (V) .....:	Measured 32 V after 1s	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		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		P
	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		P
	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:		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
	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

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
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	50N, 10s applied on enclosure.	P
22.12	Handles, knobs etc. fixed in a reliable manner		N/A
	Fixing in wrong position of handles, knobs etc. indicating position of switches or similar components not possible		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
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		P
22.14	No ragged or sharp edges creating a hazard for the user in normal use, or during user maintenance		P
	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		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		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		N/A
22.18	Current-carrying parts and other metal parts resistant to corrosion		P
22.19	Driving belts not relied upon to provide the required level of insulation, unless		N/A
	constructed to prevent inappropriate replacement		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
22.20	Direct contact between live parts and thermal insulation effectively prevented, unless	No thermal insulation	N/A
	material used is non-corrosive, non-hygroscopic and non-combustible		N/A
22.21	Wood, cotton, silk, ordinary paper and fibrous or hygroscopic material not used as insulation, unless	No such material 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		P
22.24	Bare heating elements, except in class III appliances or class III constructions that do not contain live parts, adequately supported		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	Output circuit supplied through a safety isolating transformer (IEC 60335-2-29)		P
	No connection between the output circuit and accessible metal parts or an earthing terminal (IEC 60335-2-29)		P
	Insulation between parts operating at safety extra-low voltage and live parts complies with the requirements for double or reinforced insulation (IEC 60335-2-29)	Reinforced insulation	P
22.27	Parts connected by protective impedance separated by double or reinforced insulation		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		N/A

IEC 60335-2-29			
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	No parts can be omitted	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		N/A
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		P
	Ceramic material not tightly sintered, similar materials or beads alone not used as supplementary or reinforced insulation	No such material used	N/A
	Ceramic and similar porous material in which heating conductors are embedded is considered to be basic insulation, not reinforced insulation		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		N/A
	unearthed metal parts separated from live parts by basic insulation only		N/A
	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

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	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		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		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
	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		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		P
22.38	Capacitors not connected between the contacts of a thermal cut-out		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
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		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 (CY6A and CY6B, 1CY6A and CY6B) connected in series	P
	Values specified in 8.1.4 not exceeded if any one of the components are short-circuited or open-circuited	See 8.1.4	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 capacitor used	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		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

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
22.47	Appliances connected to the water mains withstand the water pressure expected in normal use		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		N/A
22.49	For remote operation, the duration of operation is to be set before the appliance can be started, unless		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		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		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:		—
	- 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		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		N/A
22.54	Button cells and batteries designated R1 not accessible without the aid of a tool, unless		N/A
	the cover of their compartment can only be opened after at least two independent movements have been applied simultaneously		N/A
22.102	Each circuit supplied from a d.c. distribution board incorporates an overload protective device (IEC 60335-2-29)		N/A
22.103	Battery chargers for installing in caravans or similar vehicles constructed so that they can be securely fixed to a support (IEC 60335-2-29)		N/A
23	**INTERNAL WIRING**		**P**

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
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		N/A
23.2	Beads etc. on live wires cannot change their position, and are not resting on sharp edges		N/A
	Beads inside flexible metal conduits contained within an insulating sleeve		N/A
23.3	Electrical connections and internal conductors movable relatively to each other not exposed to undue stress		P
	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		P
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		N/A
	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,		P

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	except that the sheath of a cord complying with IEC 60227 or IEC 60245 may provide supplementary insulation.		N/A
	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		P
	be such that it can only be removed by breaking or cutting		P
23.7	The colour combination green/yellow only used for earthing conductors		N/A
23.8	Aluminium wires not used for internal wiring		P
23.9	Stranded conductors not consolidated by soldering where they are subjected to contact pressure, unless		P
	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		N/A
	Relays tested as part of the appliance, or		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
	Components can comply with the requirements for clearances and creepage distances for functional insulation in the relevant component standard		P
	30.2 of this standard apply to parts of non-metallic material in components including parts of non-metallic material supporting current-carrying connections		P

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	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		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		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		N/A
	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		P
	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
	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		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	Approved appliance inlet used	P
24.1.1	Capacitors likely to be permanently subjected to the supply voltage and used for radio interference suppression or for voltage dividing, complying with IEC 60384-14		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		N/A
	Safety isolating transformers complying with IEC 61558-2-6		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	If they have to be tested, they are tested according to Annex G		P
24.1.3	Switches complying with IEC 61058-1, the number of cycles of operation being at least 10 000		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
	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 complying with IEC 60730-1 with the relevant part 2. The number of cycles of operation being at least:		—
	- 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 complying with IEC 60320-1	Approved appliance inlet used	P
	However, for class II appliances classified higher than IPX0, the appliance couplers comply with IEC 60320-2-3		N/A
	Interconnection couplers complying with IEC 60320-2-2		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
24.1.6	Small lamp holders similar to E10 lampholders complying with IEC 60238, the requirements for E10 lampholders being applicable		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		N/A
24.1.8	The relevant standard for thermal links is IEC 60691		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 and 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:		—
	- switches or automatic controls in flexible cords		P
	- devices causing the protective device in the fixed wiring to operate in the event of a fault in the appliance		P
	- thermal cut-outs that can be reset by soldering, unless		N/A
	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		N/A
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 standard output plug or socket-outlets for output connections.	P
24.5	Capacitors in auxiliary windings of motors marked with their rated voltage and capacitance, and used accordingly		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

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
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		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		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		N/A
	One or more of the following conditions are to be met:		—
	- the capacitors are of class P2 according to IEC 60252-1		N/A
	- 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:		—
	- 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

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	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		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:		—
	- a set of terminals allowing the connection of a flexible cord		N/A
	- a fitted supply cord		N/A
	- a set of supply leads accommodated in a suitable compartment		N/A
	- 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) .....:		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 to the appliance:		—
	- type X attachment		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

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
25.6	Plugs fitted with only one flexible cord		N/A
25.7	Supply cords, other than for class III appliances, being one of the following types:		—
	- rubber sheathed (at least 60245 IEC 53)		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		—
	• 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		—
	• 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
	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 automobile batteries shall not be fitted with natural rubber sheathed supply cords (IEC 60335-2-29).		N/A
25.8	Nominal cross-sectional area of supply cords not less than table 11; rated current (A); cross-sectional area (mm^2) .....:	Max. 7.0A; 0.75mm^2(Max. length 2m)	P
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.		N/A
25.11	Conductors of supply cords not consolidated by soldering where they are subject to contact pressure, unless		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		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
25.13	Inlet openings so constructed as to prevent damage to the supply cord		N/A
	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:		—
	- applied force (N).....:		N/A
	- number of flexings.....:		N/A
	The test does not result in:		—
	- 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, conductors of the supply cord relieved from strain, twisting and abrasion by use of cord anchorage		N/A
	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 supply 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

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	Pull and torque test of supply cord, 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:		—
	- 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
	- 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

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	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:		—
	- 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
	- 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:		—
	- live parts not accessible during insertion or removal		N/A
	Requirement not applicable to appliance inlets complying with IEC 60320-1		N/A
	- connector can be inserted without difficulty		N/A
	- the appliance is not supported by the connector		N/A
	- 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
	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

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
25.25	Dimensions of pins that are inserted into socket-outlets compatible with the dimensions of the relevant socket-outlet.		P
	Dimensions of pins and engagement face in accordance with the dimensions of the relevant plug in IEC/TR 60083		P
26	**TERMINALS FOR EXTERNAL CONDUCTORS**		**N/A**
26.1	Appliances provided with terminals or equally effective devices for connection of external conductors		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 to 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
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:		—
	- the terminal does not become loose		N/A
	- internal wiring is not subjected to stress		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	- 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
	This requirement does not apply to the terminals of the output circuit (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 (mm^2) .....:		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

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	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**
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		P
	Earthing terminals and earthing contacts not connected to the neutral terminal		P
	Class 0, II and III appliances have no provision for earthing		N/A
	Class II appliances and class III appliances can incorporate an earth for functional purposes		N/A
	Safety extra-low voltage circuits not earthed, unless		N/A
	protective extra-low voltage circuits		N/A
27.2	Clamping means of earthing terminals adequately secured against accidental loosening		N/A
	Terminals for the connection of external equipotential bonding conductors allow connection of conductors of 2,5 to 6 mm^2, and		N/A
	do not provide earthing continuity between different parts of the appliance, and		N/A
	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		P

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	For appliances with supply cords, current-carrying conductors become taut before earthing conductor, if the cord slips out of the cord anchorage		P
	Requirements not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes		N/A
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		N/A
	Adequate protection against rusting of parts of coated or uncoated steel, only intended to provide or transmit contact pressure		N/A
	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		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		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.		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		N/A

IEC 60335-2-29			
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		P
	Screws not of soft metal liable to creep, such as zinc or aluminium		P
	Diameter of screws of insulating material min. 3 mm		N/A
	Screws of insulating material not used for any electrical connections or connections providing earthing continuity		N/A
	Screws used for electrical connections or connections providing earthing continuity screwed into metal		N/A
	Screws not of insulating material if their replacement by a metal screw can impair supplementary or reinforced insulation		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.....:	Diameter of screw fixed enclosure: 3.94 mm, Test torque:1.2 Nm, 10 times; Diameter of screw fixed DC fans and inlet: 4.96 mm, Test torque: 2.0 Nm, 10 times; Diameter of screw fixed PCB: 2.96 mm, Test torque: 0.5 Nm, 10 times	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		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:		—
	• 30.2.2 is applicable and that carry a current not exceeding 0,5 A		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	• 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:		—
	- 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
	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 .....:		N/A
	The microenvironment is pollution degree 1 under type 1 protection		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	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 .....:	(see appended table)	P
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)	P
	for basic insulation and functional insulation they comply with the impulse voltage test of clause 14		P
	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		N/A
	Impulse voltage test is not applicable:		—
	- when the microenvironment is pollution degree 3, or		N/A
	- for basic insulation of class 0 and class 01 appliances		N/A
	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

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
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:		—
	- table 16 based on the rated impulse voltage .....:	(see appended table)	P
	- table F.7a in IEC 60664-1, frequency not exceeding 30 kHz		P
	- clause 4 of IEC 60664-4, frequency exceeding 30 kHz		P
	If values of table 16 are largest, the impulse voltage test of clause 14 may be applied instead, unless		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		P
	However, clearances are not specified if the appliance complies with clause 19 with the functional insulation short-circuited		P
	Lacquered conductors of windings considered to be bare conductors		P
	However, clearances at crossover points are not measured		P
	Clearance between surfaces of PTC heating elements may be reduced to 1mm		N/A
29.1.5	Appliances having higher working voltages than rated voltage, clearances for basic insulation are the largest values determined from:		—
	- table 16 based on the rated impulse voltage .....:		P
	- table F.7a in IEC 60664-1, frequency not exceeding 30 kHz		P
	- clause 4 of IEC 60664-4, frequency exceeding 30 kHz		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

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

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	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 .....:		N/A
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 .....:		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 .....:		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 .....:	(see appended table)	P
	Creepage distances may be reduced if the appliance complies with clause 19 with the functional insulation short-circuited		P
29.3	Supplementary and reinforced insulation have adequate thickness, or a sufficient number of layers, to withstand the electrical stresses		P
	Compliance checked:		—
	- by measurement, in accordance with 29.3.1, or		P
	- by an electric strength test in accordance with 29.3.2, or		P
	- 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		N/A
	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

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
29.3.1	Supplementary insulation have a thickness of at least 1 mm		N/A
	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		N/A
	Reinforced insulation consist of at least 3 layers	Approved TIW used in T1, T2 and 1T1, 1T2; Secondary lead wires wrapped with Min. 2 layers of tube additionally, consisting of at least 3 layers' insulation; 3 Layers insulation sheet used around T1 and 1T1	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
	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		N/A
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	P
	parts supporting live parts, and	Transformer bobbin, PCB	P
	parts of thermoplastic material providing supplementary or reinforced insulation		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)	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)	P

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	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) .....:	(see appended table)	P
30.2	Parts of non-metallic material resistant to ignition and spread of fire		P
	This requirement does not apply to:		—
	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		N/A
	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		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)	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	(see appended table)	N/A
	The test severity is:		—
	- 750 °C, for connections carrying a current exceeding 0,5 A during normal operation		N/A
	- 650 °C, for other connections		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	Glow-wire applied to an interposed shielding material, if relevant		N/A
	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:		—
	- 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:		—
	- 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)	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 .....:		N/A
30.2.3.1	Parts of non-metallic material supporting connections carrying a current exceeding 0,2 A during normal operation, and	Transformer bobbin, PCB, output connector	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)	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		N/A
30.2.3.2	Parts of non-metallic material supporting connections, and	Transformer bobbin, PCB, output connector	P
	parts of non-metallic material within a distance of 3mm,		P
	subjected to the glow-wire test of IEC 60695-2-11 with appropriate severity level:	(see appended table)	P
	- 750 °C, for connections carrying a current exceeding 0,2 A during normal operation		N/A
	- 650 °C, for other connections		P

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

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	However, the consequential needle-flame test is not carried out on non-metallic parts, including small parts, within the cylinder that are:		—
	- 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		N/A
	- 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)	P
	Test not applicable to conditions as specified.....:		N/A
31	**RESISTANCE TO RUSTING**		**P**
	Relevant ferrous parts adequately protected against rusting		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		P
A	**ANNEX A (INFORMATIVE) ROUTINE TESTS**		**P**
	Description of routine tests to be carried out by the manufacturer		P
A.2	Electric strength test		P
	An electric strength test is carried out between the input and output circuits, the test voltage being:		—
	- 2 000 V, for battery chargers having a rated voltage not exceeding 150 V;		N/A
	- 2 500 V, for other battery chargers.		P
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
	This annex does not apply to battery chargers		N/A
	Three forms of construction covered:		N/A

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

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
7.12	The instructions give information regarding charging		N/A
	The instructions for appliances incorporating batteries intended to be replaced by the user includes required information		N/A
	Details about how to remove batteries containing materials hazardous to the environment given		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
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

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
21.B.101	Appliances having pins for insertion into socket-outlets have adequate mechanical strength		N/A
19.13	The battery does not rupture or ignite		
	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:		—
	- 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
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**		**P**
	Needle-flame test carried out in accordance with IEC 60695-11-5, with the following modifications:		—
7	Severities		P
	The duration of application of the test flame is 30 s ± 1 s		P
9	Test procedure		—
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		P

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
9.2	The first paragraph does not apply		P
	If possible, the flame is applied at least 10 mm from a corner		P
9.3	The test is carried out on one specimen		P
	If the specimen does not withstand the test, the test may be repeated on two additional specimens, both withstanding the test		N/A
11	Evaluation of test results		—
	The duration of burning not exceeding 30 s		N/A
	However, for printed circuit boards, the duration of burning not exceeding 15 s		P
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		—
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

IEC 60335-2-29			
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**		**P**
	The following modifications to this standard are applicable for safety isolating transformers:		—
7	Marking and instructions		P
7.1	Transformers for specific use marked with:		P
	-name, trademark or identification mark of the manufacturer or responsible vendor .....:		P
	-model or type reference .....:		P
17	Overload protection of transformers and associated circuits		P
	Fail-safe transformers comply with subclause 15.5 of IEC 61558-1		N/A
22	Construction		P
	Subclauses 19.1 and 19.1.2 of IEC 61558-2-6 are applicable		P
29	Clearances, creepage distances and solid insulation		P
29.1, 29.2, 29.3	The distances specified in items 2a, 2c and 3 in table 13 of IEC 61558-1 apply		P
	For insulated winding wires complying with subclause 19.12.3 of IEC 61558-1 there are no requirements for clearances or creepage distances		P
	For windings providing reinforced insulation, the distance specified in item 2c of table 13 of IEC 61558-1 is not assessed		P

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	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		P
H	**ANNEX H (NORMATIVE) SWITCHES**		**N/A**
	Switches comply with the following clauses of IEC 61058-1, as modified below:		—
	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
	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

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

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

IEC 60335-2-29			
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
	- 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

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	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...:	PCB: 175V	P
	The test is carried out on five specimens		P
	In case of doubt, additional test with proof voltage reduced by 25 V, 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 WARM DAMP EQUABLE CLIMATES**		**N/A**
	Modifications applicable for class 0 and 01 appliances having a rated voltage exceeding 150V, intended to be used in countries having a warm damp equable climate and that are marked WDaE		N/A
	Modifications may also be applied to class 1 appliances having a rated voltage exceeding 150V, intended to be used in countries having a warm damp equable climate and that are marked WdaE, if liable to be connected to a supply mains that excludes the protective earthing conductor		N/A
5.7	The ambient temperature for the tests of clauses 11 and 13 is 40 +3/0 °C		N/A
7.1	The appliance marked with the letters WDaE		N/A
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		N/A
	The instructions state that the appliance is considered to be suitable for use in countries having a warm damp equable climate, but may also be used in other countries		N/A
11.8	The values of Table 3 are reduced by 15 K		N/A
13.2	The leakage current for class I appliances not exceeding 0,5 mA		N/A
15.3	The value of t is 37 °C		N/A
16.2	The leakage current for class I appliances not exceeding 0,5 mA (mA):		N/A

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
19.13	The leakage current test of 16.2 is applied in addition to the electric strength test of 16.3		N/A
Q	**ANNEX Q (INFORMATIVE) SEQUENCE OF TESTS FOR THE EVALUATION OF ELECTRONIC CIRCUITS**		**P**
	Description of tests for appliances incorporating electronic circuits		P
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
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

IEC 60335-2-29			
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
	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

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

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 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	--	--	--
1.2 VOID				--	--	--
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	--	--	--
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	--	--	--
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	--	--	--
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	--	--	--

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
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	--	--	--
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	--	--	--
5 Internal data path	Stuck at	Word protection with single bit redundancy	H.2.19.8.2	--	--	--
5.1 VOID				--	--	--
5.2 Addressing	Wrong address	Word protection with single bit redundancy including the address	H.2.19.8.2	--	--	--
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	--	--	--
6.1 VOID				--	--	--
6.2 VOID				--	--	--
6.3 Timing	Wrong point in time	Time-slot monitoring, or scheduled transmission Time-slot and logical monitoring, or comparison of redundant communication channels by either: reciprocal comparison independent hardware comparator	H.2.18.10.4 H.2.18.18 H.2.18.10.3 H.2.18.15 H.2.18.3	--	--	--
	Wrong sequence	Logical monitoring, or time-slot monitoring, or Scheduled transmission	H.2.18.10.2 H.2.18.10.4 H.2.18.18			

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
7 Input/output periphery	Fault conditions specified in 19.11.2	Plausibility check	H.2.18.13	--	--	--
7.1 VOID				--	--	--
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	--	--	--
7.2.2 Analog multiplexer	Wrong addressing	Plausibility check	H.2.18.13	--	--	--
8 VOID				--	--	--
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	--	--	--
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

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

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
11.5	Appliances are supplied with the most unfavourable supply voltage between		—
	– 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
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

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
AA	**ANNEX AA (NORMATIVE)** **BATTERY CHARGERS FOR USE BY CHILDREN (IEC 60335-2-29/A1)**		**N/A**
	Battery chargers intended to be used by children at least eight years old without supervision shall comply with this standard but as modified by this annex. 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	**GENERAL CONDITIONS FOR THE TESTS**		N/A
5.201	When batteries are used, the generally available rechargeable batteries giving the most unfavourable conditions are used		N/A
6.1	Battery chargers suitable for outdoor use shall be class III		N/A
	Other battery chargers shall be class II or class III		N/A
6	**CLASSIFICATION**		**N/A**
6.2	Battery chargers suitable for outdoor use shall be at least IPX7		N/A
6.201	Enclosures shall be classified at least IP3X with regard to protection against ingress of solid foreign objects.		N/A
7	**MARKING AND INSTRUCTIONS**		**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

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
	Height of lettering at least 3 mm		N/A
8	**PROTECTION AGAINST ACCESS TO LIVE PARTS**		**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	**POWER INPUT AND CURRENT**		**N/A**
10.101	The output voltage not exceed 42,4 V peak		N/A
11	**HEATING**		**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
	- 35 K, if of other material.		N/A
17	**OVERLOAD PROTECTION OF TRANSFORMERS AND ASSOCIATED CIRCUITS**		**N/A**
	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	**ABNORMAL OPERATION**		**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	**MECHANICAL STRENGTH**		**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. 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	**CONSTRUCTION**		**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

IEC 60335-2-29			
Clause	Requirement + Test	Result - Remark	Verdict
22.202	Battery chargers shall be constructed so that reverse charging is prevented, regardless of the state of charge of the battery. This applies even if the battery is inserted with the wrong polarity.		N/A
24	**COMPONENTS**		**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	**SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS**		**N/A**
25.1	Battery charger not provided with an appliance inlet		N/A
25.5	Battery charger provided with type Y or type Z attachment		N/A

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

10.1	TABLE: Input power deviation				N/A
Input deviation of/at:	**P rated (W)**	**P measured (W)**	**ΔP (%)**	**Required ΔP (%)**	**Remark**
Supplementary information:					

10.2	TABLE: Input current deviation				N/A
Current deviation of/at:	**I rated (A)**	**I measured (A)**	**ΔI (%)**	**Required ΔI (%)**	**Remark**
100V / 50Hz	7.0	6.070	-13.29%	+15%	RC load Figure 101
240V / 50Hz	7.0	2.429	-65.30%	+15%	
100V / 60Hz	7.0	5.975	-14.64%	+15%	
240V / 60Hz	7.0	2.382	-65.97%	+15%	
100V / 50Hz	7.0	5.635	-19.50%	+15%	Battery as load
240V / 50Hz	7.0	2.255	67.79%	+15%	
100V / 60Hz	7.0	5.619	-19.73%	+15%	
240V / 60Hz	7.0	2.261	-67.70%	+15%	
Supplementary information: --					

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**
100V / 50Hz	29.4	9	8.822	-1.98%	±10%	RC load Figure 101
240V / 50Hz	29.4	9	8.814	-2.07%	±10%	
100V / 60Hz	29.4	9	8.808	-2.13%	±10%	
240V / 60Hz	29.4	9	8.821	-1.99%	±10%	

11.8	TABLE: Heating Test				P
	Test voltage (V) ..... :	94V/60Hz; 254.4V/50Hz			—
	Ambient (°C) ..... :	25			—
Thermocouple Locations	**Max. temperature rise measured, ΔT (K)**				**Max. temperature rise limit, ΔT (K)**
Loading:	Battery as load		RC load Figure 101		--
	94V	254.4V	94V	254.4V	

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

Supply cord	2.5	1.8	3.4	0.1	35
AC inlet	13.0	11.7	5.4	1.3	30
ZV1	13.3	11.4	4.4	1.1	45
RT1	54.0	20.3	47.9	18.2	Ref.
CX1	13.9	11.8	2.0	0.5	60
CY1	9.0	7.8	1.1	0.8	85
L1	13.7	10.6	17.3	3.3	80
CX2	14.3	11.1	12.8	3.0	60
L2	20.3	11.5	31.1	6.5	80
CY3	9.0	7.7	0.6	0.3	85
T3 winding	32.4	23.4	26.4	3.1	80
C3B	26.1	22.8	9.3	4.2	65
PCB under DB1	29.0	24.7	24.7	8.6	90
C6B	32.9	30.3	18.6	10.1	65
L5 winding	39.4	37.8	28.3	21.0	80
T1 winding	54.3	53.2	37.5	34.3	70
T1 core	46.5	46.1	35.1	30.1	Ref.
T2 winding	29.2	28.7	13.1	10.3	70
T2 core	25.5	25.2	10.9	8.1	Ref.
C9	42.2	40.6	38.3	33.9	65
PCB under T1	42.9	41.3	23.9	19.1	90
PCB under Q1	32.0	29.0	33.7	11.8	90
PCB under D3A	54.9	50.7	52.5	48.6	90
CY6A	32.8	27.0	24.2	15.2	85
P4	18.2	18.5	9.8	7.1	60
P1	36.6	35.4	17.9	13.8	60
P3	20.3	20.7	10.9	8.3	60
Inner wire link to battery	21.2	20.8	10.8	8.2	160
Inner wire link to Fan	20.6	20.5	7.9	5.4	40
Inner wire link to display	20.9	20.9	5.8	3.7	40
CY7	31.1	26.0	31.8	18.1	85
1T1 winding	48.6	48.0	40.4	36.0	70
1T2 winding	28.7	28.3	25.2	17.3	70
1C3B	24.6	21.6	10.3	4.9	65
PCB under 1Q1	47.8	30.0	45.1	15.5	90

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

PCB under 1D3A	33.7	34.0	27.0	24.5	90
Enclosure bottom inside near transformer T1	25.3	24.2	9.4	4.7	Ref.
Enclosure bottom outside near transformer T1	21.2	20.4	9.6	6.9	45
Enclosure top inside near transformer T1	21.0	19.9	3.7	2.1	Ref.
Enclosure top outside near transformer T1	20.5	19.9	3.0	1.9	45
Support	7.4	13.4	8.0	3.3	50
Supplementary information: Tma=40ºC					

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:						

13.2	**TABLE: Leakage current**		**P**
	Heating appliances: 1,15 x rated input (W).. :	--	—
	Motor-operated and combined appliances: 1,06 x rated voltage (V) ..... :	254.4V/50Hz	—
Leakage current between		**I (mA)**	**Max. allowed I (mA)**
L/N poles and enclosure		0.02 mA peak	0.35 mA peak
L/N poles and output terminals		0.101 mA peak	0.35 mA peak
Supplementary information: --			

13.3	**TABLE: Electric strength**	**P**
Test voltage applied between:	**Test potential applied (V)**	**Breakdown / flashover (Yes/No)**
L and N before F1 (F1 opened) (B)	AC 1000V	No
L/N pole and output terminals (R)	AC 3180V	No
Primary and secondary of T1 (R)	AC 3180V	No
Secondary and iron core of T1 (R)	AC 3180V	No

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

Primary and secondary of T2 (R)	AC 3180V	No
Secondary and iron core of T2 (R)	AC 3180V	No
Primary and enclosure with foil (R)	AC 3180V	No
1 layer of insulation tape (S)	AC 1750V	No
Supplementary information: B = Basic insulation, S = Supplementary insulation, R = Reinforced insulation.		

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) ..... :	254.4V, 60Hz	—
	Three phase appliances 1,06 x rated voltage divided by √3 (V) ..... :	--	—

Leakage current between	**I (mA)**	**Max. allowed I (mA)**
L/N poles and enclosure	0.02	0.25 mA
L/N poles and output terminals	0.113	0.25 mA
Supplementary information: --		

16.3	**TABLE: Dielectric strength**	**P**
Test voltage applied between:	**Test potential applied (V)**	**Breakdown / flashover (Yes/No)**
L and N before F1 (F1 opened) (B)	AC 1250V	No
L/N pole and output terminals (R)	AC 3180V	No
Primary and secondary of T1 (R)	AC 3180V	No
Secondary and iron core of T1 (R)	AC 3180V	No
Primary and secondary of T2 (R)	AC 3180V	No
Secondary and iron core of T2 (R)	AC 3180V	No
Primary and enclosure with foil (R)	AC 3180V	No
1 layer of insulation tape (R)	AC 3180V	No

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

Supplementary information:
B = Basic insulation, S = Supplementary insulation, R = Reinforced insulation.

17	TABLE: Overload protection		P
Thermocouple locations		**Max. temperature rise measured, ΔT (K)**	**Max. temperature rise limit, ΔT (K)**
L5 winding		54.5	125
T1 winding		63.4	125
T1 core		50.0	Ref.
T2 winding		22.7	125
T2 core		18.8	Ref.
Inner wire link to battery		18.4	175
Inner wire link to Fan		17.2	55
Inner wire link to display		16.6	55
Enclosure bottom inside near transformer T1		16.8	Ref.
Enclosure bottom outside near transformer T1		12.7	Ref.
Enclosure top inside near transformer T1		12.8	Ref.
Enclosure top outside near transformer T1		9.8	Ref.
Support		7.8	Ref.
Supplementary information: Test under 254.4V, 50Hz			

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)**	**ΔT (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?	YES	Input: 240V/50Hz
Are there "off" or "stand-by" position?	NO	--

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

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	See clause 19.11.2	No hazard was found.	N/A	N/A	N/A	N/A	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	See clause 19.102	No hazard was found.	N/A	N/A	N/A	N/A	Pass
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) ..... :					—
Temperature of winding	**R_1 (Ω)**	**R_2 (Ω)**	**ΔT (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)**	**ΔT (K)**	**T (°C)**	**Max. T (°C)**	

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

Supplementary information:					

19.11	**TABLE: fault condition tests**					**P**
	ambient temperature (°C) ..... :				40°C	—
	model/type of appliance ..... :				**See rating label**	—
	rated markings of appliance ..... :				**See rating label**	—
com-ponent No.	**fault**	**test vol-tage (V)**	**test time**	**fuse No.**	**fuse cur-rent (A)**	**result**
BD1	SC	240	1s	F1	--	Fuse (F1) opened immediately, no hazard.
Q2 pin G-D	SC	240	1s	F1	--	Fuse (F1) opened immediately, no hazard.
Q2 pin D-S	SC	240	1s	F1	--	Fuse (F1) opened immediately, no hazard.
Q2 pin G-S	SC	240	10min	F1	0.344	Unit shutdown immediately, no damaged, no hazard.
Q1 pin G-D	SC	240	1s	F1	--	Fuse (F1) opened immediately, no hazard.
Q1 pin D-S	SC	240	1s	F1	--	Fuse (F1) opened immediately, no hazard.
Q1 pin G-S	SC	240	10min	F1	0.344	Unit shutdown immediately, no damaged, no hazard.
U1 pin 1-7	SC	240	10min	F1	0.169	Unit shutdown immediately, no damaged, no hazard.
U2 pin 7-10	SC	240	10min	F1	0.168	Unit shutdown immediately, no damaged, no hazard.
T1 pin 5-6	SC	240	1s	F1	--	Fuse (F1) opened immediately, no hazard.
T1 pin 7-9	SC	240	10min	F1	0.167	Unit shutdown immediately, no damaged, no hazard.
T1 pin 9-11	SC	240	10min	F1	0.167	Unit shutdown immediately, no damaged, no hazard.
P1 pin 1-2	SC	240	10min	F1	0.167	Unit shutdown immediately, no damaged, no hazard.
P1 pin 3-4	SC	240	10min	F1	0.167	Unit shutdown immediately, no damaged, no hazard.
P1 pin 1	OC	240	10min	F1	0.167	Unit shutdown immediately, no damaged, no hazard.
P1 pin 3	OC	240	10min	F1	0.167	Unit shutdown immediately, no damaged, no hazard.
T2 pin 1-4	SC	240	10min	F1	0.167	Unit shutdown immediately, no damaged, no hazard.

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

T1 pin 2-3	SC	240	10min	F1	0.167	Unit shutdown immediately, no damaged, no hazard.
T1 pin 5-6	SC	240	10min	F1	0.301	Unit shutdown immediately, no damaged, no hazard.
P3 pin 1-2	SC	240	10min	F1	0.167	Unit shutdown immediately, no damaged, no hazard.
P3 pin 3-4	SC	240	10min	F1	0.167	Unit shutdown immediately, no damaged, no hazard.
P3 pin 1	OC	240	10min	F1	0.167	Unit shutdown immediately, no damaged, no hazard.
P3 pin 3	OC	240	10min	F1	0.167	Unit shutdown immediately, no damaged, no hazard.
D3A	SC	240	10min	F1	0.167	Unit shutdown immediately, no damaged, no hazard.
Output "+" and "-"	SC	240	10min	F1	0.167	Unit shutdown immediately, no damaged, no hazard.
Fan	Stalled	240	2h37min	F1	2.289	Unit ran for thermal equilibrium, no damaged, no hazard.
Opening	Block	240	6h	F1	6.315	Unit ran for thermal equilibrium, no damaged, no hazard.

Supplementary information:

1. "SC" means short-circuited test; "OC" means open-circuited test.

2. All the test samples have passed the Hi-Pot test between primary and secondary (3180V, 1min).

3. The appliance didn't emit flames, molten metal, or poisonous or ignitable gas in hazardous amounts and temperature rises not exceed the values shown in table 19 during the tests.

19.13	**TABLE: Abnormal operation, temperature rises**	**P**

Thermocouple locations	**Max. temperature rise measured, ΔT (K)**	**Max. temperature rise limit, ΔT (K)**
Fan stalled		
Supply cord	0.2	135
T1 winding	47.5	125
T1 core	44.6	125
T2 winding	16.6	125
T2 core	9.4	125
Inner wire link to battery	20.0	Ref.
Inner wire link to Fan	12.3	Ref.
Inner wire link to display	7.0	Ref.
1T1 winding	42.3	125
1T2 winding	22.2	125
Enclosure bottom inside near transformer T1	13.3	Ref.
Enclosure bottom outside near transformer T1	10.7	Ref.
Enclosure top inside near transformer T1	5.3	Ref.

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

19.13	TABLE: Abnormal operation, temperature rises		P
Thermocouple locations		**Max. temperature rise measured, ΔT (K)**	**Max. temperature rise limit, ΔT (K)**
Enclosure top outside near transformer T1		4.2	Ref.
Support		17.2	135
Blocked opening			
Supply cord		14.3	135
T1 winding		86.9	125
T1 core		83.1	125
T2 winding		68.5	125
T2 core		67.6	125
Inner wire link to battery		71.6	Ref.
Inner wire link to Fan		68.0	Ref.
Inner wire link to display		66.7	Ref.
1T1 winding		99.5	125
1T2 winding		79.4	125
Enclosure bottom inside near transformer T1		63.1	Ref.
Enclosure bottom outside near transformer T1		57.5	Ref.
Enclosure top inside near transformer T1		14.3	Ref.
Enclosure top outside near transformer T1		86.9	Ref.
Support		83.1	135
Supplementary information:			

19.102	TABLE: Reverse connection test		N/A
Thermocouple locations		**Max. temperature rise measured, ΔT (K)**	**Max. temperature rise limit, ΔT (K)**
Supplementary information:			

21.1	TABLE: Impact resistance		P
Impacts per surface	**Surface tested**	**Impact energy (Nm)**	**Comments**
Three blows	Top enclosure	1.0	No hazards
Three blows	Right side enclosure	1.0	No hazards
Three blows	Left side enclosure	1.0	No hazards
Three blows	Bottom enclosure	1.0	No hazards
Three blows	Front enclosure	1.0	No hazards

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

21.1	TABLE: Impact resistance		P
Impacts per surface	**Surface tested**	**Impact energy (Nm)**	**Comments**
Three blows	Rear enclosure	1.0	No hazards
Supplementary information: --			

24.1	TABLE: Components				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Cordset (US)	CARRY ON TRADING (CANADA) LTD	CO-103	Plug: 10A, 125V, 5-15P, Cord: SJT, 18AWG, Max. Length 2m	UL	UL E171605
Plug (EU)	CARRY ON ELECTRIC CO., LTD	CO-005	16A, 250V	EN 60884-1	OVE 15114-002-10
-Cord (EU)	CARRY ON ELECTRIC CO., LTD	H03VV-F, H05VV-F, H05RR-F	3 G 0.75mm², Max. Length 2m	EN 60227-5	EN
Plug (UK)	CARRY ON ELECTRIC CO., LTD	CO-402	13A, 250V	BS 1363	DEKRA 4317512.03
-Cord (UK)	CARRY ON ELECTRIC CO., LTD	H03VV-F or H05VV-F	3G 0.75 mm², Max. Length 2m	--	KEMA-KEUR BS
-Cord (UK)	Lucky United	H05RR-F	3G 0.75 mm², Max. Length 2m	--	VDE
Plug (SWISS)	CARRY ON ELECTRIC CO., LTD	CO-007	10A, 250V	IEC 60884-1	SEV IK-3848
-Cord (SWISS)	LUCKY UNITRD, HUASHENG	H05RN-F	3G 0.75mm², Max. Length 2m	IEC 60227-5	IEC
-Cord (SWISS)	CARRY ON ELECTRIC CO., LTD	H03VV-F	3G 0.75mm², Max. Length 2m	IEC 60227-5	IEC
Plug (KC)	LEE YUEN ELECTRICAL MFY LIMITED	LY-16	16A, 250V	K60884-1	HU04010-5011B
-Cord (KC)	LEE YUEN Electrical Mfy	H03VV-F or H05VV-F	3G 0.75mm², Max. Length 2m	IEC 60227-5	IEC
-Cord (KC)	Dongguan Lucky United ED Electric Eire & Cable Co Ltd	H05RR-F	3G 0.75mm², Max. Length 2m	IEC 60227-5	IEC
Plug (JP)	HOI LUEN ELECTRICAL MANUFACTURER CO., LTD.	LY-35	7A, 125V	J60884-1	JET5760-43001-1004

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

-Cord (JP)	HOI LUEN ELECTRICAL MANUFACTURER CO., LTD.	VCTF	0.75 mm², Max. Length 2m	J60227-5	JET5760-12009-1001
Plug (AU)	CARRY ON ELECTRIC CO., LTD	CO-201	250V, 10A	AS/NZS 3112	SAA-141206-EA
-Cord (AU)	CARRY ON ELECTRIC CO., LTD	H05VV-F	3G 0.75mm², Max. Length 2m	AS/NZS 60227.5	SAA-140710-EA
-Cord (AU)	CARRY ON ELECTRIC CO., LTD	H03VV-F	3G 0.75mm², Max. Length 2m	AS/NZS 60227.5	SAA-140710-EA
-Connector (AU)	CARRY ON ELECTRIC CO., LTD	CO-004/R	250V, 10A	AS/NZS 60320.1	SAA-141207-EA
Enclosure	RADICI PLASTICS (SUZHOU) CO LTD	Radiflam S RV 200K AE(a)C	V-0, 140°C	UL 94	UL E337835
PCB	KINGBOARD LAMINATES HOLDINGS LTD	KB-6150	V-0, 130°C	UL 94	UL E123995
Fuse (F1 and 1F1)	Conquer Electronics Co., Ltd.	MST	T6.3A, 250V	IEC/EN 60127-1 IEC/EN 60127-3	VDE 40017118
(Alternative)	Littlefuse, Inc.	392	T6.3A, 250V	IEC/EN 60127-1 IEC/EN 60127-3	VDE 126983
(Alternative)	Cooper Bussmann LLC	SS-5	T6.3A, 250V	IEC/EN 60127-1 IEC/EN 60127-3	VDE 40015513
(Alternative)	Hollyland Company Limited	5ET	T6.3A, 250V	IEC/EN 60127-1 IEC/EN 60127-3	VDE 40015669
(Alternative)	Shenzhen Lanson Electronics Co. Ltd.	SMT	T6.3A, 250V	IEC/EN 60127-1 IEC/EN 60127-3	VDE 40013102
Varistor(ZV1)	Thinking Electronic Industrial Co., Ltd.	TVR10561D	Min.250V, 85°C	IEC/EN 61051-1 IEC/EN 61051-2 IEC/EN 61051-2-2	VDE 40021243
(Alternative)	Centra Science Corp.	CNR-10V561K	Min.250V, 85°C	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE 127092
(Alternative)	Brightking (Shenzhen) Co., Ltd.	561KD10	Min.250V, 85°C	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE 40027827
NTC (RT1, 1RT1)	Nanjing Shiheng Electronics Co., Ltd.	MF72-2.5D15	2.5Ω, Φ15, 8A	EN 60539-1	TUV RH R 50245892
(Alternative)	Thinking Electronics Co. LTD.	SCK-X5	2.5Ω, Φ15, 8A	EN 60539-1	TUV RH R 50050155

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

(Alternative)	JiangSu XingShun Electronics CO. LTD.	2.5D2-15	2.5Ω, Φ15, 8A	EN 60539-1	VDE 40019309
(Alternative)	NanJing Ke Min Electronics CO. LTD.	NSP2R58	2.5Ω, Φ15, 8A	EN 60539-1	TUV B151093844001
X2 capacitor (CX1, CX2, 1CX1 and 1CX2)	Shenzhen Su Rong Capacitors Co., Ltd.	MPX/MKP	0.47uF, 280Vac, X2, 40/100/21	IEC/EN 60384-14	VDE 40008924
(Alternative)	Shenzhen Sincerity Technology Co., Ltd.	MPX/MKP	0.47uF, 280Vac, X2, 40/110/56	IEC/EN 60384-14	VDE 40028812
(Alternative)	Xiamen Faratronic Co. Ltd.	MKP62	0.47uF, 275Vac, X2, 40/110/56	IEC/EN 60384-14	VDE 40000358
(Alternative)	Shenzhen Jinghao Capacitor Co., Ltd.	CBB62B	0.47uF, 280Vac, X2, 40/110/56	IEC/EN 60384-14	VDE 40018690
Y2 Capacitor (CY6A, CY6B, 1CY6A and 1CY6B)	Guangdong Huiwan Electronics Technology Co., LTD.	AB Series	AC 300V, 2200pF, 40/125/21, Y2	IEC/EN 60384-14	VDE 40043991
(Alternative)	JYH HSU (JEC) ELECTRONICS LTD	JY	AC 400V, 2200pF, 40/125/21, Y2	IEC/EN 60384-14	VDE 40038643
(Alternative)	Success Electronics Co., Ltd.	SF	AC 300V, 2200pF, 40/125/56, Y2	IEC/EN 60384-14	VDE 40016665
(Alternative)	Walsin Technology Corp.	AC	AC 400V, 2200pF, 40/125/21, Y2	IEC/EN 60384-14	VDE 40001829
Y2 Capacitor (CY1, CY2, CY3, CY4, CY5, 1CY1, 1CY2, 1CY3, 1CY4 and 1CY5)	Guangdong Huiwan Electronics Technology Co., LTD.	AB Series	AC 300V, 1000pF, 40/125/21, Y2	IEC/EN 60384-14	VDE 40043991
(Alternative)	JYH HSU (JEC) ELECTRONICS LTD	JY	AC 400V, 1000pF, 40/125/21, Y2	IEC/EN 60384-14	VDE 40038643
(Alternative)	Success Electronics Co., Ltd.	SF	AC 300V, 1000pF, 40/125/56, Y2	IEC/EN 60384-14	VDE 40016665
(Alternative)	Walsin Technology Corp.	AC	AC 400V, 1000pF, 40/125/21, Y2	IEC/EN 60384-14	VDE 40001829

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

Y1 Capacitor (CY7, CY8, 1CY7 and 1CY8)	Guangdong Huiwan Electronics Technology Co., LTD.	AB Series	AC 300V, 4700pF, 40/125/21, Y1	IEC/EN 60384-14	VDE 40043991
(Alternative)	JYH HSU (JEC) ELECTRONICS LTD	JY	AC 400V, 4700pF, 40/125/21, Y1	IEC/EN 60384-14	VDE 40038643
(Alternative)	Success Electronics Co., Ltd.	SF	AC 300V, 4700pF, 40/125/56, Y1	IEC/EN 60384-14	VDE 40016665
(Alternative)	Walsin Technology Corp.	AC	AC 400V, 4700pF, 40/125/21, Y1	IEC/EN 60384-14	VDE 40001829
Opto-coupler (P1, P2, P3, P4, 1P1, 1P2, 1P3 and 1P4)	Lite-On Technology Corporation	LTV-817	Ext. Cr≥7.0mm, Ext. Cl≥7.0mm, Int. Cr&Cl: - *), DTI≥0.4mm, Max. 115°C	IEC/EN 60747-5-5; IEC/EN 60950-1	VDE, FI
(Alternative)	COSMO Electronics Corporation	KPC817	Ext. Cr>8.0mm, Ext. Cl>8.0mm, Int. Cr&Cl: - *), DTI> 0.5mm, Max. 100°C	IEC/EN 60747-5-5; IEC/EN 60950-1	VDE
(Alternative)	Everlight electronics Co., Ltd.	EL 817	Ext. Cr≥7.6mm, Ext. Cl≥7.6mm, Int. Cr&Cl: - *), DTI≥0.4mm, Max. 110°C	UL 1577; IEC/EN 60747-5-5; IEC/EN 60950-1	UL, VDE, FI
Inlet (CON1)	Rich Bay Co., Ltd.	R-30190	AC 250V, 10A	IEC/EN60320-1	VDE 40030224
(Alternative)	Zhe Jiang Bei Er Jia Electronic Co., Ltd.	ST-A01-001L	AC 250V, 10A	IEC/EN60320-1	VDE 40013388
Transformer (T1 and 1T1)	Dong Guan EV Electronics Technology Co., Ltd	D1504-F300S29.4C	Class B	IEC/EN 60335-2-29	Test with appliance
-Bobbin	CHANG CHUN PLASTIS CO. LTD.	T375J	Phenolic, V-0, 150°C, min. thickness: 0.71 mm	UL94, UL746C	UL E59481
- Magnet wire	PACIFIC ELECTRIC WIRE & CABLE (SHENZHEN) CO LTD	UEW/U	130°C	UL 1446	UL E201757
(Alternative)	PACIFIC ELECTRIC WIRE & CABLE (SHENZHEN) CO LTD	UEWN/U	155°C	UL 1446	UL E201757

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

(Alternative)	DONG GUAN YIDA INDUSTRIAL CO LTD	xUEW/130, QA-x/130	130°C	UL 1446	UL E344055
(Alternative)	DONG GUAN YIDA INDUSTRIAL CO LTD	xUEW/155, QA-x/155	155°C	UL 1446	UL E344055
- Triple insulated wire	COSMOLINK CO. Ltd.	TIW-M	130°C	IEC/EN 60950-1	VDE 138053
(Alternative)	Dah Jin Technology Co., Ltd.	TLW-B	130°C	IEC/EN 62368-1	VDE 40008834
-Varnish	QUALIPOLY CHEMICAL CORP	1032B	130°C	UL 1446	UL E213437
-Tube	GREAT HOLDING INDUSTRIAL CO LTD	TFT-201	200°C	UL 224	UL E156256
(Alternative)	DONGGUAN LING FREE HARDWARE PLASTICS PRODUCT CO LTD	LING FREE PTFE TUBE (300V)	200°C	UL 224	UL E352366
-Margin tape	JINGJIANG FUWEI ADHESIVE PRODUCT CO LTD	WF101	Rated 130°C	UL 510	UL E302608
(Alternative)	JINGJIANG JINGYI ADHESIVE PRODUCT CO LTD	WF310 (a)	Rated 130°C	UL 510	UL E246950
- Insulation tape	JINGJIANG FUWEI ADHESIVE PRODUCT CO LTD	FW	130°C	UL 510	E302608
(Alternative)	SUZHOU MAILADUONA ELECTRIC MATERIAL CO LTD	JY312#	130°C	UL 510	E188295
Transformer (T2 and 1T2)	Dong Guan EV Electronics Technology Co., Ltd	DL-10S5	Class B	IEC/EN 60335-2-29	Test in appliance

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

-Bobbin	CHANG CHUN PLASTIS CO. LTD.	T375J	Phenolic, V-0, 150°C, min. thickness: 0.71 mm	UL94, UL746C	UL E59481
- Magnet wire	PACIFIC ELECTRIC WIRE & CABLE (SHENZHEN) CO LTD	UEW/U	130°C	UL 1446	UL E201757
(Alternative)	PACIFIC ELECTRIC WIRE & CABLE (SHENZHEN) CO LTD	UEWN/U	155°C	UL 1446	UL E201757
(Alternative)	DONG GUAN YIDA INDUSTRIAL CO LTD	xUEW/130, QA-x/130	130°C	UL 1446	ULE344055
(Alternative)	DONG GUAN YIDA INDUSTRIAL CO LTD	xUEW/155, QA-x/155	155°C	UL 1446	ULE344055
- Triple insulated wire	COSMOLINK CO. Ltd.	TIW	130°C	IEC/EN 60950-1	VDE 138053
(Alternative)	Dah Jin Technology Co., Ltd.	TLW-B	130°C	IEC/EN 62368-1	VDE 40008834
-Varnish	QUALIPOLY CHEMICAL CORP	1032B	155°C	UL 1446	UL E213437
-Tube	GREAT HOLDING INDUSTRIAL CO LTD	TFT-201	200°C	UL 224	UL E156256
(Alternative)	DONGGUAN LING FREE HARDWARE PLASTICS PRODUCT CO LTD	LING FREE PTFE TUBE (300V)	200°C	UL 224	UL E352366
-Margin tape	JINGJIANG FUWEI ADHESIVE PRODUCT CO LTD	WF101	Rated 130°C	UL 510	UL E302608
(Alternative)	JINGJIANG JINGYI ADHESIVE PRODUCT CO LTD	WF310 (a)	Rated 130°C	UL 510	UL E246950

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

- Insulation tape	JINGJIANG FUWEI ADHESIVE PRODUCT CO LTD	FW	130°C	UL 510	E302608
(Alternative)	SUZHOU MAILADUONA ELECTRIC MATERIAL CO LTD	JY312#	130°C	UL 510	E188295
Inductor (L1, L2, 1L1 and 1L2)	Dong Guan EV Electronics Technology Co., Ltd	T22X14X8	130°C	IEC/EN 60335-2-29	Test in appliance
- Magnet wire	PACIFIC ELECTRIC WIRE & CABLE (SHENZHEN) CO LTD	UEW/U	130°C	UL 1446	UL E201757
(Alternative)	PACIFIC ELECTRIC WIRE & CABLE (SHENZHEN) CO LTD	UEWN/U	155°C	UL 1446	UL E201757
- Insulation tape	JINGJIANG FUWEI ADHESIVE PRODUCT CO LTD	FW	130°C	UL 510	E302608
Heat-shrinkable tubing	SHENZHEN WOLIDA TRADING CO LTD	RSFR-H	125°C, 600V	UL 224	UL E329530
(Alternative)	GUANGZHOU KAIHENG NEW MATERIAL CO LTD	K-102	125°C, 600V	UL 224	UL E321827
Internal wire (for battery charge terminal)	DongGuan HaoDe Wire & Cable Technology CO. LTD.	3135	600V, 16AWG, 200°C, VW-1	UL 758	UL E364036
(Alternative)	Interchangeable	Interchangeable	300V, 16AWG, 200°C, VW-1	UL 758	UL
Output wire (for displayer and DC fan)	ZHONGSHAN XINSHENG ELECTRIC CO LTD	1007	300V, 24AWG, 80°C, VW-1	UL 758	UL E328303
(Alternative)	Interchangeable	Interchangeable	300V, 24AWG, 80°C, VW-1	UL 758	UL
Rectifier Bridge (DB1, 1DB1)	--	--	Min 600V, min 10A	--	--

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

MOSFET (Q1, 1Q1)	--	--	Min 600V, min 20A	--	--
MOSFET (Q2, Q3, 1Q2, 1Q3)	--	--	Min 500V, min 11A	--	--
Discharge Register (R2A, R2B and R2C)	--	--	Each Max. 150K Ω, min 1/4W	--	--
Current Limited Register (R7A, R7B, 1R7A and 1R7B)	--	--	Each Min. 3.6 Ω, min 1/4W	--	--
Output connector (for battery charge terminal)	RADICI Plastics (SuZhou) CO LTD.	Radiflam S FR(a)	V-0, 65°C	UL94	UL E337835
DC fan	ShenZhen HuaXia HengTai Electronic CO., LTD	DA06020S12 HA	12V 0.2A	UL507	UL E254715
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)**
Screw for fixing enclosure	3.98	II	1.2
Supplementary information: --			

29.1	TABLE: working voltage measurement		P
Location	**RMS Voltage (V)**	**Peak Voltage (V)**	**Comments**
T1 Pin 5 – Pin 7	181	324	
T1 Pin 5 – Pin 9	182	260	
T1 Pin 5 – Pin 11	192	266	
T1 Pin 6 – Pin 7	204	408	
T1 Pin 6 – Pin 9	222	440	
T1 Pin 6 – Pin 11	242	464	
T2 Pin 1 – Pin 5	320	424	
T2 Pin 1 – Pin 6	320	440	
T2 Pin 2 – Pin 5	168	344	
T2 Pin 2 – Pin 6	169	344	

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

T2 Pin 3 – Pin 5	169	424	
T2 Pin 3 – Pin 6	169	392	
T2 Pin 4 – Pin 5	**320**	**496**	Max. RMS voltage/Peak Voltage
T2 Pin 4 – Pin 6	320	496	
P1 Pin 3 – Pin 1	172	352	
P1 Pin 4 – Pin 1	171	352	
P1 Pin 3 – Pin 2	172	352	
P1 Pin 4 – Pin 2	172	352	
P2 Pin 3 – Pin 1	171	352	
P2 Pin 4 – Pin 1	171	352	
P2 Pin 3 – Pin 2	172	352	
P2 Pin 4 – Pin 2	172	352	
P3 Pin 3 – Pin 1	171	352	
P3 Pin 4 – Pin 1	171	352	
P3 Pin 3 – Pin 2	172	352	
P3 Pin 4 – Pin 2	171	352	
P4 Pin 3 – Pin 1	172	352	
P4 Pin 4 – Pin 1	171	352	
P4 Pin 3 – Pin 2	171	352	
P4 Pin 4 – Pin 2	170	352	
CY6A Pri. – CY6B Sec.	168	344	

29.1	**TABLE: Clearances**					**P**
	Overvoltage category.....:	II				—
		Type of insulation:				
Rated impulse voltage (V):	**Min. cl (mm)**	**Basic (mm)**	**Supplementary (mm)**	**Reinforced (mm)**	**Functional (mm)**	**Verdict / Remark**
330	0,2* / 0,5 / 0,8**	--	--	--	--	N/A
500	0,2* / 0,5 / 0,8**	--	--	--	--	N/A
800	0,2* / 0,5 / 0,8**	--	--	--	--	N/A
1 500	0,5 / 0,8** / 1,0***	--	--	--	--	N/A
2 500	1,5 / 2,0***	3.6[1)]	2.5[3)]	--	3.0[2)]	P

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

29.1	**TABLE: Clearances**		**P**
	Overvoltage category.....:	II	—

		Type of insulation:				
Rated impulse voltage (V):	**Min. cl (mm)**	**Basic (mm)**	**Supplementary (mm)**	**Reinforced (mm)**	**Functional (mm)**	**Verdict / Remark**
4 000	3,0 / 3,5***	--	--	6.3[4)]	--	P
6 000	5,5 / 6,0***	--	--	--	--	N/A
8 000	8,0 / 8,5***	--	--	--	--	N/A
10 000	11,0 / 11,5***	--	--	--	--	N/A

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

29.1	**TABLE: Clearances**		**P**
	Overvoltage category.....:	II	—

		Type of insulation:				
Rated impulse voltage (V):	**Min. cl (mm)**	**Basic (mm)**	**Supplementary (mm)**	**Reinforced (mm)**	**Functional (mm)**	**Verdict / Remark**

Supplementary information:

*) For tracks on printed circuit boards if pollution degree 1 and 2
**) For pollution degree 3
***) If the construction is affected by wear, distortion, movement of the parts or during assembly

Clearance (cl) distance at/of/between:

Functional insulation:

L and N before fuse F1/1F1: Cl =3.2mm

Two pins of fuse F1/1F1: Cl =3.0mm

Basic insulation:

Primary live parts and functional earthing: Cl=3.6mm

Pri. trace and sec. trace under CY1/1CY1: Cl =3.8mm

Pri. trace and sec. trace under CY2/1CY2: Cl =4.1mm

Pri. trace and sec. trace under CY3/1CY3: Cl =4.0mm

Pri. trace and sec. trace under CY4/1CY4: Cl =4.0mm

Pri. trace and sec. trace under CY5/1CY5: Cl =4.0mm

Pri. trace and sec. trace under CY6A/1CY6A: Cl =5.1mm

Supplementary insulation:

Pri. Trace and sec. trace under CY6B/1CY6B: Cl =4.8mm

Secondary circuit and functional earthing: Cl=2.5mm

Reinforced insulation:

Primary live parts and accessible enclosure: Cl =8.0mm

Pri. trace and sec. Trace under P1/1P1: Cl =8.0mm

Pri. trace and sec. Trace under P2/1P2: Cl =8.0mm

Pri. trace and sec. Trace under P3/1P3: Cl =8.0mm

Pri. trace and sec. Trace under P4/1P4: Cl =8.0mm

T1/1T1 primary winding/core and secondary circuit: Cl =6.7mm

T2/1T2 primary winding/core and secondary circuit: Cl =6.7mm

Remark:

1) The iron core of the transformer was considered as the primary live part.

2) If no specified, the worst condition was considered.

3) The secondary winding wires of T1/1T1 and T1/1T2 are approved reinforced insulation wires.

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

29.2	TABLE: Creepage distances, basic, supplementary and reinforced insulation										P
Working voltage (V)	**Creepage distance (mm) Pollution degree**										
	1	**2**			**3**			**Type of insulation**			
		Material group			**Material group**						
		I	**II**	**IIIa/IIIb**	**I**	**II**	**IIIa/IIIb***	**B****	**S****	**R****	**Verdict**
≤50	0,18	0,6	0,85	1,2	1,5	1,7	1,9		—	—	N/A
≤50	0,18	0,6	0,85	1,2	1,5	1,7	1,9	—		—	N/A
≤50	0,36	1,2	1,7	2,4	3,0	3,4	3,8	—	—		N/A
125	0,28	0,75	1,05	1,5	1,9	2,1	2,4		—	—	N/A
125	0,28	0,75	1,05	1,5	1,9	2,1	2,4	—		—	N/A
125	0,56	1,5	2,1	3,0	3,8	4,2	4,8	—	—		N/A
250	0,56	1,25	1,8	2,5	3,2	3,6	4,0	3.6	—	—	P
250	0,56	1,25	1,8	2,5	3,2	3,6	4,0	—	2.5	—	P
250	1,12	2,5	3,6	5,0	6,4	7,2	8,0	—	—	6.3	P
400	1,0	2,0	2,8	4,0	5,0	5,6	6,3		—	—	N/A
400	1,0	2,0	2,8	4,0	5,0	5,6	6,3	—		—	N/A
400	2,0	4,0	5,6	8,0	10,0	11,2	12,6	—	—		N/A
500	1,3	2,5	3,6	5,0	6,3	7,1	8,0		—	—	N/A
500	1,3	2,5	3,6	5,0	6,3	7,1	8,0	—		—	N/A
500	2,6	5,0	7,2	10,0	12,6	14,2	16,0	—	—		N/A
>630 and ≤800	1,8	3,2	4,5	6,3	8,0	9,0	10,0		—	—	N/A
>630 and ≤800	1,8	3,2	4,5	6,3	8,0	9,0	10,0	—		—	N/A
>630 and ≤800	3,6	6,4	9,0	12,6	16,0	18,0	20,0	—	—		N/A
>800 and ≤1000	2,4	4,0	5,6	8,0	10,0	11,0	12,5		—	—	N/A
>800 and ≤1000	2,4	4,0	5,6	8,0	10,0	11,0	12,5	—		—	N/A
>800 and ≤1000	4,8	8,0	11,2	16,0	20,0	22,0	25,0	—	—		N/A
>1000 and ≤1250	3,2	5,0	7,1	10,0	12,5	14,0	16,0		—	—	N/A
>1000 and ≤1250	3,2	5,0	7,1	10,0	12,5	14,0	16,0	—		—	N/A
>1000 and ≤1250	6,4	10,0	14,2	20,0	25,0	28,0	32,0	—	—		N/A
>1250 and ≤1600	4,2	6,3	9,0	12,5	16,0	18,0	20,0		—	—	N/A
>1250 and ≤1600	4,2	6,3	9,0	12,5	16,0	18,0	20,0	—		—	N/A
>1250 and ≤1600	8,4	12,6	18,0	25,0	32,0	36,0	40,0	—	—		N/A

IEC 60335-2-29											
Clause	Requirement + Test							Result - Remark			Verdict
>1600 and ≤2000	5,6	8,0	11,0	16,0	20,0	22,0	25,0		—	—	N/A
>1600 and ≤2000	5,6	8,0	11,0	16,0	20,0	22,0	25,0	—		—	N/A
>1600 and ≤2000	11,2	16,0	22,0	32,0	40,0	44,0	50,0	—	—		N/A
>2000 and ≤2500	7,5	10,0	14,0	20,0	25,0	28,0	32,0		—	—	N/A
>2000 and ≤2500	7,5	10,0	14,0	20,0	25,0	28,0	32,0	—		—	N/A
>2000 and ≤2500	15,0	20,0	28,0	40,0	50,0	56,0	64,0	—	—		N/A
>2500 and ≤3200	10,0	12,5	18,0	25,0	32,0	36,0	40,0		—	—	N/A
>2500 and ≤3200	10,0	12,5	18,0	25,0	32,0	36,0	40,0	—		—	N/A
>2500 and ≤3200	20,0	25,0	36,0	50,0	64,0	72,0	80,0	—	—		N/A
>3200 and ≤4000	12,5	16,0	22,0	32,0	40,0	45,0	50,0		—	—	N/A
>3200 and ≤4000	12,5	16,0	22,0	32,0	40,0	45,0	50,0	—		—	N/A
>3200 and ≤4000	25,0	32,0	44,0	64,0	80,0	90,0	100,0	—	—		N/A
>4000 and ≤5000	16,0	20,0	28,0	40,0	50,0	56,0	63,0		—	—	N/A
>4000 and ≤5000	16,0	20,0	28,0	40,0	50,0	56,0	63,0	—		—	N/A
>4000 and ≤5000	32,0	40,0	56,0	80,0	100,0	112,0	126,0	—	—		N/A
>5000 and ≤6300	20,0	25,0	36,0	50,0	63,0	71,0	80,0		—	—	N/A
>5000 and ≤6300	20,0	25,0	36,0	50,0	63,0	71,0	80,0	—		—	N/A
>5000 and ≤6300	40,0	50,0	72,0	100,0	126,0	142,0	160,0	—	—		N/A
>6300 and ≤8000	25,0	32,0	45,0	63,0	80,0	90,0	100,0		—	—	N/A
>6300 and ≤8000	25,0	32,0	45,0	63,0	80,0	90,0	100,0	—		—	N/A
>6300 and ≤8000	50,0	64,0	90,0	126,0	160,0	180,0	200,0	—	—		N/A
>8000 and ≤10000	32,0	40,0	56,0	80,0	100,0	110,0	125,0		—	—	N/A
>8000 and ≤10000	32,0	40,0	56,0	80,0	100,0	110,0	125,0	—		—	N/A
>8000 and ≤10000	64,0	80,0	112,0	160,0	200,0	220,0	250,0	—	—		N/A
>10000 and ≤12500	40,0	50,0	71,0	100,0	125,0	140,0	160,0		—	—	N/A
>10000 and ≤12500	40,0	50,0	71,0	100,0	125,0	140,0	160,0	—		—	N/A
>10000 and ≤12500	80,0	100,0	142,0	200,0	250,0	280,0	320,0	—	—		N/A

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

Supplementary information:

*) Material group IIIb is allowed if the working voltage does not exceed 50 V

**) B = Basic insulation, S = Supplementary insulation, R = Reinforced insulation

Creepage distances for transformer T2/1T2 limit Cr=3.3mm for BI and SI. Cr=6.4mm for RI. (based on working voltage max. Vrms=320V).

Other creepage distances limit is Cr=5.0 mm for reinforced insulation; Cr=2.5 mm for basic insulation and supplementary insulation. (based on creepage distances limit not less than clearance limit).

Creepage (Cr) distance at/of/between:

Basic insulation:

Primary live parts and functional earthing: Cr =3.6mm

Pri. trace and sec. trace under CY1/1CY1: Cr =3.8mm

Pri. trace and sec. trace under CY2/1CY2: Cr =4.1mm

Pri. trace and sec. trace under CY3/1CY3: Cr =4.0mm

Pri. trace and sec. trace under CY4/1CY4: Cr =4.0mm

Pri. trace and sec. trace under CY5/1CY5: Cr =4.0mm

Pri. trace and sec. trace under CY6A/1CY6A: Cr =5.1mm

Supplementary insulation:

Pri. Trace and sec. trace under CY6B/1CY6B: Cr =4.8mm

Secondary circuit and functional earthing: Cr=2.5mm

Reinforced insulation:

Primary live parts and accessible enclosure: Cr =8.0mm

Pri. trace and sec. Trace under P1/1P1: Cr =8.0mm

Pri. trace and sec. Trace under P2/1P2: Cr =8.0mm

Pri. trace and sec. Trace under P3/1P3: Cr =8.0mm

Pri. trace and sec. Trace under P4/1P4: Cr =8.0mm

T1/1T1 primary winding/core and secondary circuit: Cr =6.7mm

T2/1T2 primary winding/core and secondary circuit: Cr =6.7mm

Remark:

1) The iron core of the transformer was considered as the primary live part.

2) If no specified, the worst condition was considered.

3) The secondary winding wires of T1/1T1 and T1/1T2 are approved reinforced insulation wires.

29.2	TABLE: Creepage distances, functional insulation			P
Working voltage (V)	**Creepage distance (mm) Pollution degree**			
	1	**2**	**3**	

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

		Material group			Material group			
		I	II	IIIa/IIIb	I	II	IIIa/IIIb*	Verdict / Remark
≤10	0,08	0,4	0,4	0,4	1,0	1,0	1,0	N/A
50	0,16	0,56	0,8	1,1	1,4	1,6	1,8	N/A
125	0,25	0,71	1,0	1,4	1,8	2,0	2,2	N/A
250	0,42	1,0	1,4	**2,0**	2,5	2,8	3,2	P
400	0,75	1,6	2,2	3,2	4,0	4,5	5,0	N/A
500	1,0	2,0	2,8	4,0	5,0	5,6	6,3	N/A
>630 and ≤800	1,8	3,2	4,5	6,3	8,0	9,0	10,0	N/A
>800 and ≤1000	2,4	4,0	5,6	8,0	10,0	11,0	12,5	N/A
>1000 and ≤1250	3,2	5,0	7,1	10,0	12,5	14,0	16,0	N/A
>1250 and ≤1600	4,2	6,3	9,0	12,5	16,0	18,0	20,0	N/A
>1600 and ≤2000	5,6	8,0	11,0	16,0	20,0	22,0	25,0	N/A
>2000 and ≤2500	7,5	10,0	14,0	20,0	25,0	28,0	32,0	N/A
>2500 and ≤3200	10,0	12,5	18,0	25,0	32,0	36,0	40,0	N/A
>3200 and ≤4000	12,5	16,0	22,0	32,0	40,0	45,0	50,0	N/A
>4000 and ≤5000	16,0	20,0	28,0	40,0	50,0	56,0	63,0	N/A
>5000 and ≤6300	20,0	25,0	36,0	50,0	63,0	71,0	80,0	N/A
>6300 and ≤8000	25,0	32,0	45,0	63,0	80,0	90,0	100,0	N/A
>8000 and ≤10000	32,0	40,0	56,0	80,0	100,0	110,0	125,0	N/A
>10000 and ≤12500	40,0	50,0	71,0	100,0	125,0	140,0	160,0	N/A

Supplementary information:
*) Material group IIIb is allowed if the working voltage does not exceed 50 V

Creepage (Cr) distance at/of/between:
Functional insulation:
L and N before fuse F1/1F1: Cr =3.2mm
Two pins of fuse F1/1F1: Cr =3.0mm

30.1	TABLE: Ball Pressure Test of Thermoplastics		P
Allowed impression diameter (mm) .....:		<2mm	—
Object/ Part No./ Material	**Manufacturer/ trademark**	**Test temperature (°C)**	**Impression diameter (mm)**
Transformer bobbin / T375J	Chang Chun Plastics Co., Ltd.	125	0.74

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

Enclosure / Radiflam S RV 200K AE(a)C)	RADICI PLASTICS (SUZHOU) CO LTD	125	0.98
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**	
			te	**ti**	**te**	**ti**		
Enclosure / Radiflam S RV 200K AE(a)C)	RADICI PLASTICS (SUZHOU) CO LTD	Pass	--	--	0	0	--	Pass
Transformer bobbin / T375J	Chang Chun Plastics Co., Ltd.	Pass	--	--	0	0	Pass	Pass
PCB/ KB-6150	KINGBOARD LAMINATES HOLDINGS LTD	Pass	--	--	0	0	Pass	Pass

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) ≤ 2s] (Yes/No):	Yes
If no, then surrounding parts passed the needle-flame test of annex E (Yes/No) .....:	N/A
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) .....:	N/A

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

30.2/30.4	TABLE: Needle- flame test (NFT)				P
Object/ Part No./ Material	**Manufacturer/ trademark**	**Duration of application of test flame (ta); (s)**	**Ignition of specified layer Yes/No**	**Duration of burning (tb) (s)**	**Verdict**

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

PCB/ KB-6150	KINGBOARD LAMINATES HOLDINGS LTD	30	No	0	Pass
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					

Attachment No. 1

National Differences and Group Differences for

IEC 60335-1:2010 (Fifth Edition) incl. Corr. 1:2010 and Corr. 2:2011 + A1:2013

Countries Included: See overview in following page

Attachment contains

Cover page and National and Group Differences:

Total: 37 pages

Explanation for Abbreviations:
Possible Verdicts: **P** = Pass, **F**= Fail, **N**/**A** = Not Applicable
Remarks:
Throughout this report, a point is used as the decimal separator.

Attachment No. 1

IEC 60335-1 5th edition (2010) incl. Corr. 1:2010 and Corr. 2:2011 + A1:2013 as per IEC Bulletin

Safety of household and similar electrical appliances General Requirements

National Differences covered by this report

Country	CENELEC Group differ. (see separate attachment)	National differ.	Base standard	National standard	Tested
AU Australia, NZ New Zealand	-	Yes	IEC 60335-1 ed5.1	AS/NZS 60335.1:2011+Amdt1:2012+Amdt2 :2014+Amdt3:2015	Yes
CA Canada	-	Yes	IEC 60335-1 ed5	CAN/CSA-C22.2 No. 60335-1-11	Yes
Korea, Republic Of	-	Yes	IEC 60335-1, 3rd edition (1991) + Amendment 1 (1994)		Yes
SA Saudi Arabia	-	Yes	IEC 60335-1 ed5	SASO GSO IEC 60335-1: 2012	Yes

Attachment No. 1

Note: Before placing the products in the different countries, the manufacturer must ensure that:

1. Operating Instructions, Ratings Labels and Warnings Labels are in an Accepted or Official Language of the country in question.
2. The equipment complies with the National Standards and/or Electrical Codes of the country, province or city in question.

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict
Australia, New Zealand			**AU, NZ**
5.8.1	*Replace* with the following variation: **5.8.1** 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.		P
5.201	After Clause 5.19 add the following variation: 5.201 For appliances, other than class III appliances, that are intended for connection to the supply mains and that are not marked with – a rated voltage of at least 240 V for single-phase appliances and at least 415 V for three-phase appliances, or – a rated voltage range that includes 240 V for single-phase appliances and 415 V for three-phase appliances, the rated voltage is equal to 240 V for single-phase appliances and 415 V for three phase appliances, and the upper limit of the rated voltage range is equal to 240 V for single-phase appliances and 415 V for three-phase appliances. In addition, the rated current or rated power input is equal to the calculated value corresponding to 240 V for single-phase appliances and 415 V for three-phase appliances as appropriate. NOTE 1 Example of calculation If the appliance is marked with a rated voltage of 230 V and a rated current "A" or a rated power input "P", it will be tested as if it is marked with a rated voltage of 240 V and a rated current of A x (240/230) or a rated power input of P x (240/230)2.		P
6.1	*Replace* the requirement with 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**.		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 – a **rated voltage** of at least: • 230 V for single phase appliances; • 400 V for polyphase appliances. or – a **rated voltage range** that includes: • 230 V for single phase appliances; • 400 V for polyphase appliances.		P

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict
7.13	*Replace* the requirement with the following variation: Instructions and other text required by this standard shall be written in English.		P
22.3	Replace the first paragraph of the test specification with the following variation: Compliance is checked by inserting the pins of the appliance into a socket-outlet capable of accepting a plug complying with Figure 2.1(a) of AS/NZS 3112. The socket-outlet has a horizontal pivot at a distance of 8 mm behind the engagement face of the socket-outlet and in the plane of the lower intersection of the centre lines of the contact apertures.		N/A
	Replace the third, fourth and fifth paragraphs of the test specification with the following variation: A new sample of the appliance shall be subjected to and shall comply with the tests in 2.13.9.2 of AS/NZS 3112.		N/A
22.201	After Clause 22.52 add the following variation: 22.201 Appliances having integral pins for insertion into socket outlets shall comply with the appropriate requirements of AS/NZS 3112. Compliance is checked as specified in Annex J of AS/NZS 3112 NOTE 1 Clause J.2.2.3 (Internal connections for plug portions) of AS/NZS 3112 is covered by clause 23 of this standard NOTE 2 Clause J.2.2.6.2 (High voltage test) of AS/NZS 3112, except for the test of the insulation of the insulated pins, is covered by clause 16 of this standard. NOTE 3 Clause J.2.2.6.4 (Temperature rise test) of AS/NZS 3112 is covered by clause 11 of this standard NOTE 4 Clause J.2.2.6.7 (Equipment with integral pins intended to be supported by the contacts of a socket-outlet) of AS/NZS 3112 is covered by clause 22.3 of this standard		N/A
24.1	Before Note 1, insert the following variation. NOTE 201 The relevant IEC standard may be replaced with the relevant Australia/New Zealand standard where applicable.		P
24.1.7	Add the following variation to the test specification: Telecommunication interface circuitry must comply with the Telecom Labelling Notice issued under the Telecommunications Act instead of IEC 62151. NOTE 201 The Telecommunications Act is administered by the Australian Media and Communications Authority.		N/A

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict
25.1	After the requirement *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.		N/A
Table 11	In footnote a insert the following variation: However, they cannot be used in **class I appliances.**		N/A
Amdt1:2012	**General** *Under the list of interests represented on Committee EL/2 replace:* Association of Certification Bodies *By* Energy Networks Australia **FOREWORD** *Insert the following as a new third paragraph:* This Standard incorporates Amendment No. 1 (June 2012). The changes required by the amendments are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected. Where an application date other than immediate is applicable to an amendment the date of application (DOA) and the date of withdrawal (DOW) if relevant, is indicated by the marginal bar against the part affected. **Annex ANZ** *Replace* entry relating to IEC 61558-2-6 by the following. IEC 61558-2-6 2009 *Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V - Part 2-6: Particular requirements and tests for safety isolating transformers and power supply units incorporating safety isolating transformers* 61558.2.6 2011 Amendment 1 2012		P
Amdt2:2014	**22 Construction** **22.33** *Delete* the last sentence of the first paragraph of the requirement and introduce it as a new first paragraph of the requirement.		P

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict
Amdt2:2014	**Annex ANZ** **(normative)** **Normative references to international publications with their corresponding joint Australia/New Zealand publications** The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies. NOTE When an international publication has been modified by national variations the relevant joint Australia/New Zealand publications applies if the national variations are needed to ensure the safety of the appliance for Australia/New Zealand conditions. These international publications are indicated by (mod). If an international publication is not so indicated, then either it or the listed Australia/New Zealand publication may be used. **Publication** / **Year** / **Title** / **AS/NZS** / **Year** *Approval and test specification – Plugs and socket-outlets* / 3112 Amendment 1 Amendment 2 / 2011 2012 2013 IEC 60252-1 / 2010 / *AC motor capacitors – Part 1: General – Performance, testing and rating – Safety requirements – Guidance for installation and operation* IEC 60034-1 / *Rotating electrical machines – Part 1: Rating and performance* IEC 60730-2-9 Amendment 1 / 2008 20111 / *Automatic electrical controls for household and similar use – Part 2-9: Particular requirements for temperature sensing controls* IEC 61558-2-16 / *Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V – Part 2-16: Particular requirements and tests for switch mode power supply units and transformers for switch mode power supply units* / 61558.2.16 IEC 62477-1 / *Safety requirements for power electronic converter systems and equipment – Part 1: General*		P
Amdt3:2015	**3.1.201** After Clause 3.1.12 *add* the following variation: **3.1.201** **outlet load** maximum allowed load that may be connected to appliance outlets and socket outlets accessible to the user Note to entry 1 A USB outlet is not considered to be an appl iance outlet		--
Amdt3:2015	**7.1** After the first paragraph of the requirement *insert* the following variation: For appliance outlets and socket outlets accessible to the user – that are incorporated in appliances connected to the supply mains; and – that operate at **rated voltage;** the appliance shall be marked with their maximum **outlet load** in Watts.		N/A
Amdt3:2015	**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.		N/A
Amdt3:2015	**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* *– that operate at **rated voltage;*** *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.*		N/A

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict
Amdt3:2015	**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.*		N/A
Amdt3:2015	**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.*		N/A
Amdt3:2015	**19.13** After the seventh paragraph of the test specification *insert* the following variation: *The no-load output voltage of an SELV outlet or connector shall not increase by more than 10% of its no-load output voltage in normal use.* *The no-load output voltage of a USB outlet or connector shall not increase by more than 3 V or 10% of its no-load output voltage in normal use, whichever is higher.*		P
Amdt3:2015	**22.2** After the first paragraph of the requirement *insert* the following variation: 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.		N/A
Amdt3:2015	**22.202** After 22.201 *add* the following variation: COPYRIGHT **22.202** Appliance outlets and socket outlets accessible to the user – that are incorporated in appliances connected to the supply mains; and – that operate at **rated voltage;** shall be single-phase and have a current rating not exceeding 16 A. The socket outlets shall – comply with AS/NZS 3112; – accept a 3-pin, flat-pin plug as described in Figure 2.1(a1) of AS/NZS 3112. 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: – a circuit breaker for equipment complying with IEC 60934; – a manually resettable trip-free or cycling trip-free overcurrent **protection device**; – a non-user replaceable fuse-link. 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. The current rating of the appliance outlets and socket outlets is obtained from the marked **outlet load** in watts divided by the **rated voltage**. *Compliance is checked by inspection and for a manually resettable trip-free or cycling tripfree overcurrent **protection device** by the following tests.* *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.* *The device shall operate to interrupt the current within 2 h.* *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.* *The device shall operate to interrupt the current within 5 s.* *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.* *The device shall comply with the ball pressure test of 30.1 carried out at 160 °C.* *The device shall comply with the glow-wire test of 30.2.3.1 with a test severity of 960 °C.*		N/A
Amdt3:2015	**Annex ANZ** *Insert* the following new reference IEC 60934 *Circuit-breakers for equipment (CBE)*		N/A
Canada			**CA**
	CAN/CSA-C22.2 No. 60335-1-11 is an adoption with deviations of IEC 60335-1 edition 4.2. The NCB will, however, accept use of IEC 60335-1 edition 5.1 for the purpose of demonstration of compliance with CAN/CSA-C22.2 No. 60335-1-11,		P

Attachment No. 1

<table>
<tr><th colspan="4">NATIONAL DIFFERENCES</th></tr>
<tr><th>Clause</th><th>Requirement –Test</th><th>Result - Remark</th><th>Verdict</th></tr>
<tr><td></td><td colspan="2">provided that the following National Deviations are addressed.
When this document is used, the requirements of IEC 60335-1 edition 5.1 apply except as modified below; it is not acceptable to revert to requirements in earlier editions of IEC 60335-1.</td><td></td></tr>
<tr><td>2</td><td>2DV.1 DR Addition:
This standard is applicable to household and similar electrical appliances and equipment which are designed to be installed in accordance with relevant installation codes: National Electrical Code (NEC) ANSI/NFPA 70; or CSA C22.1 Canadian Electrical Code (CEC) Part I; or Mexican Electrical Installations NOM-001-SEDE.

2DV.2 DC Addition:

Certain IEC component standard requirements are replaced by the relevant requirements of component standards, examples of which are listed in Annex DVA.</td><td></td><td>P</td></tr>
<tr><td>3.4.1</td><td>3.4.1DV DR Modification to replace the definition with the following:

EXTRA-LOW VOLTAGE: Voltage that does not exceed 30 V rms or 42,4 V peak ac or dc.</td><td></td><td>P</td></tr>
<tr><td>3.4.2</td><td>3.4.2DV DR Modification to replace the first paragraph with the following:

SAFETY EXTRA-LOW VOLTAGE: Voltage not exceeding 30 V rms or 42,4 V peak or 30 V dc between conductors and between conductors and earth. Where an appliance is intended for use immersed in water, SAFETY EXTRA-LOW VOLTAGE is 15 V rms or 21,2 V peak or 15 V dc.</td><td></td><td>P</td></tr>
<tr><td>3.6.4</td><td>3.6.4DV DE Modification to add the following note:

NOTE 3 A LIMITED POWER SOURCE is not considered to be LIVE PARTS.</td><td></td><td>P</td></tr>
<tr><td>3</td><td>3.10DV D2 Addition:

LIMITED POWER SOURCE: A power source whose output voltage is SELV and the maximum output current and other parameters are limited in accordance with Table 3.10DV.1.

Table 3.10DV.1 – Limits for inherently LIMITED POWER SOURCES
<table>
<tr><th colspan="2">Output voltage[1)] (U_{OC})</th><th>Output current[2)] (I_{SC}) A</th><th>Apparent power[3)] (S) VA</th></tr>
<tr><th>V a.c.</th><th>V d.c.</th><th></th><th></th></tr>
<tr><td>≤ 20
20 < U_{OC} ≤ 30
–</td><td>≤ 20
20 < U_{OC} ≤ 30
30 < U_{OC} ≤ 42,4</td><td>≤ 8,0
≤ 8,0
≤ 150 /U_{OC}</td><td>≤ 5 x U_{OC}
≤ 100
≤ 100</td></tr>
<tr><td colspan="4">[1)] U_{OC}: Output voltage measured with all load circuits disconnected. Voltages are for substantially sinusoidal a.c. and ripple free d.c. For non-sinusoidal a.c. and d.c. with ripple greater than 10% of the peak, the peak voltage shall not exceed 42,4 V.</td></tr>
</table></td><td></td><td>P</td></tr>
</table>

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict
	[2] I_{SC}: Maximum output current with any non-capacitive load, including a short circuit measured 5 s after application of the load if the limited power circuit is protected by an electronic circuit or a PTC and 60 s if protected by an impedance. [3] S (VA): Maximum output VA with any load. Initial transients lasting less than 5 s are permitted to exceed the limit if the limited power circuit is protected by an electronic circuit or a PTC and 60 s if protected by an impedance. 3.11DV D2 Addition: PROTECTIVE EARTHING CONDUCTOR: A conductor connecting the main protective earthing terminal or lead in the equipment to the building earth, or in the power SUPPLY CORD, connecting a main protective earthing terminal in the equipment to an earth point in the building installation. 3.12DV D2 Addition: PROTECTIVE BONDING CONDUCTOR: A conductor in the equipment, or a combination of conductive parts in the equipment, connecting a main protective earthing terminal to a part of the equipment that is required to be earthed.		
4	4DV DE Modification of the first paragraph: Replace “cause no danger to persons or surroundings.” with “reduce the risk of fire, electric shock, and/or injury to persons.”		P
6.1	6.1DV.1 DR Modification to add the following: Class 0I appliances are not allowed. NOTE Class 0I may be allowed if specified in the applicable part 2. 6.1DV.2 DR Modification to add the following: CLASS 0 appliances shall not exceed 150 volts (rms) to ground.		N/A
7.1	7.1DV.1 D2 Modification to add the following note: NOTE 5 Where IP numbers are required to be marked, alternate markings may be used. Where the alternate markings are used, compliance with 6.2 is determined by the applicable part 2. 7.1DV.2 DR Modification to add the following paragraph and notes after the last paragraph: If the temperature rise of the insulation of the fixed wiring supplying an appliance for permanent connection to the supply mains exceeds the temperature rise specified in Table 3 during the test of Clause 11, the equipment shall be marked with the substance of the following: “Use supply wires suitable for ____ °C”		N/A

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict
	NOTE 6 The temperature specified in the marking will be 75°C or 90°C except where another rating is permitted by national electrical installation code wiring rules. NOTE 7 Additional information (e.g. AWG size) may be provided as part of the marking where appropriate to facilitate installation in accordance with the national electrical installation code wiring rules. Compliance is checked by inspection and during the test of Clause 11.		
7.8	7.8DV DR Modification to add the following note: NOTE The marking of the letter N for the neutral conductor terminal is not required for Type Y attachments.		N/A
7.12.3	7.12.3DV DR Deletion: Delete Clause 7.12.3.		N/A
7	7.17DV DR Addition: Appliances requiring the usage of time delay overcurrent protective devices in accordance with 9DV.2 shall be so marked to indicate the use of time delay fuses only. 7.18DV DR Addition: Appliances equipped with output terminals supplied from a LIMITED POWER SOURCE shall be marked to indicate Class 2 wiring.		P
8.1.1	8.1.1DV D1 Modification to add the following after the third paragraph: The articulated probe of Figure 12DV shall be applied without appreciable force when the product is: a) A hand-held product, or a hand-held part of a product, or b) Accessible to children while the product is operating.		N/A
9	9DV DR Addition of 9DV.1 – 9DV.4: 9DV.1 An appliance shall start and operate on a circuit protected by a non-time delay fuse having a current rating corresponding to the supply mains to which the appliance would normally be connected. 9DV.2 The use of time delay fuses is acceptable for stationary appliances marked as indicated in Clause 7.17DV. 9DV.3 Compliance is checked by the test		P

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict
	specified in 9DV.4 9DV.4 The appliance shall be capable of starting 3 times at the conditions of Clause 11 at the rated voltage. The appliance shall start under conditions representing the beginning of normal operation and the beginning of the normal operating cycle. The performance is unacceptable if the fuse opens or an overload protector provided as part of the appliance operates.		
11.8	11.8DV DC Modification to revise Table 3 as specified in 11.8DV.1 – 11.8DV.6: 11.8DV.1 Change temperature rise for “Points where the insulation of the wires can come into contact with parts of the terminal block or compartment for fixed wiring, for stationary appliances not provided with a supply cord” to 35K. 11.8DV.2 Change temperature rise for “Material used as insulation, other than that specified for wires and windings: impregnated or varnished textile, paper or press-board” from 70 to 65. 11.8DV.3 Change temperature rise for “– polytetrafluoroethylene” from 265 to 180. 11.8DV.4 Replace footnote “c” with the following: [c] This limit may be exceeded if the marking specified in 7.1DV.1 is supplied. 11.8DV.5 Add footnote k: [k] Maximum temperature rise for RTV silicone rubber is 105°. 11.8DV.6 Add footnote l: [l] The maximum temperature rise of parts in contact with oil should be considered in the applicable part 2.		P
13.1	13.1DV.1 D1 Modification to replace the last paragraph with the following: Protective impedance and radio interference filters shall not be disconnected before carrying out the tests. 13.1DV.2 D1 Modification to add the following note: NOTE At operating temperature includes warm-up and cool-down periods.		P
13.2	13.2DV.1 D1 Modification to replace all the dashed items of the 8th paragraph with the following dashed items:		P

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict
	- for CLASS II APPLIANCES *0,25 mA* *- for CLASS 0, CLASS 0I AND CLASS III APPLIANCES* *0,5 mA* *- for portable CLASS I APPLIANCES* *0,75 mA* *- for all cord connected STATIONARY APPLIANCES* *0,75 mA* *- for other STATIONARY CLASS I MOTOR-OPERATED APPLIANCES* *3,5mA* *- for other STATIONARY CLASS I HEATING APPLIANCES* *0,75 mA or 0,75 mA per kW rated power input of the appliance with a maximum of 5 mA, whichever is higher* 13.2DV.2 D2 Modification to add the following 11th paragraph: For a cord connected product employing a sheathed type heating element, the leakage current may exceed 0,5 mA or 0,75 mA, as applicable, but shall not exceed 2,5 mA during a period of 5 minutes beginning when the 0,5 mA or 0,75 mA value was exceeded. At the end of the 5 minute period, the leakage current shall not exceed 0,5 mA or 0,75 mA, as applicable. 13.2DV.3 D1 Modification to add the following 12th paragraph: For heating appliances incorporating a user adjustable heater control, the control shall be additionally adjusted, if necessary, so that it interrupts operation while the final measurements are taken. 13.2DV.4 D1 Modification to add the following note after Note 2: NOTE 3 Higher leakage current values, not exceeding 3.5mA, may be allowed by the applicable part 2 standards for Class I appliances employing radio interference filters.		
13.3	13.3DV.1 D1 Modification to replace footnote “a” of Table 4 with the following: [a] Appliances rated more than 250 V are tested at 2 U + 1000 V. 13.3DV.2 D1 Modification to add footnote “c” to Table 4 and add superscript “c” after “Basic insulation”: [c] For wet and moist applications, special test voltages could be considered in the applicable part 2.		P
15.1.1	15.1.1DV DR Modification to add the following note: NOTE For use in other than indoor ordinary		N/A

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict
	locations, appliances may need to be evaluated in accordance with the alternative standards (Standard for Enclosures for Electrical Equipment, UL 50, Special Purpose Enclosures, CAN/CSA C22.2 No. 94, and NMX-J-529-ANCE).		
16.1	16.1DV D1 Modification to replace the 3rd paragraph with the following. Protective impedance and radio interference filters shall not be disconnected before carrying out the tests.		P
16.2	16.2DV.1 D2 Modification of the third dashed item in 5th paragraph. Delete the second sentence “In this case the leakage current with the filter disconnected shall not exceed the limits specified.” 16.2DV.2 D1 Replace all the dashed items of the 4th paragraph with the following dashed items: *- for CLASS II APPLIANCES* — *0,25 mA* *- for CLASS 0, CLASS 0I AND CLASS III APPLIANCES* — *0,5 mA* *- for portable CLASS I APPLIANCES* — *0,75 mA* *- for all cord connected STATIONARY APPLIANCES* — *0,75 mA* *- for other STATIONARY CLASS I MOTOR-OPERATED APPLIANCES* — *3,5mA* *- for other STATIONARY CLASS I HEATING APPLIANCES* — *0,75 mA or 0,75 mA per kW rated power input of the appliance with a maximum of 5 mA, whichever is higher* 16.2DV.3 D2 Modification to add the following note: NOTE Higher leakage current values, not exceeding 3.5mA, may be allowed by applicable part 2 standards for Class I appliances employing radio interference filters.		P
16.3	16.3DV.1 D1 Modification to replace footnote “a” of Table 7 with the following: [a] Appliances rated more than 250 V are tested at 2 U + 1000 V. 16.3DV.2 D1 Modification to add footnote “d” to Table 7 and add superscript “, d” after “Basic insulation”: [d] For wet and moist applications, special test voltages could be considered in the applicable		P

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict
	part 2.		
20.2	20.2DV D1 Modification to add the following after the fourth paragraph: The articulated probe of Figure 12DV shall be applied without appreciable force when the product is: a) A hand-held product, or a hand-held part of a product, or b) Accessible to children while the product is operating. NOTE “Without appreciable force” is considered to be a force not exceeding 1 N.		N/A
21.1	21.1DV.1 D2 Modification to add 21.1DV.1.1 – 21.1DV.1.3 after the end of the second paragraph: 21.1DV.1.1 As an alternative to the spring hammer, the required impact may be applied by a solid, smooth, steel sphere 50 ± 1 mm in diameter, weighing approximately 0,53 kg. 21.1DV.1.2 For top surfaces, the steel sphere shall be allowed to fall freely from rest through the distance required to cause it to strike the enclosure when the sphere has the specified energy. 21.1DV.1.3 For surfaces other than the top, the steel sphere shall be suspended by a fine wire and allowed to fall as a pendulum through the distance required to cause it to strike the surface with the specified impact, and the enclosure shall be so placed that the surface to be tested is vertical and in the same vertical plane as the point of support of the pendulum. 21.1DV.2 D2 Modification of the third paragraph: In the third paragraph, replace “0,5 J” with “2 J”.		P
22.2	22.2DV D2 Modification to add the following: Disconnection of the neutral is not necessary for all single phase stationary appliances.		P
22.3	22.3DV DC Modification to replace the 2nd and 3rd paragraph, and the note, with the following: A socket outlet-supported appliance shall meet the tipping moment requirements of Annex DVC.		N/A
22.11	22.11DV D2 Modification to add 22.11DV.1 – 22.11DV.8: 22.11DV.1 Adhesives shall not be used to secure NON-DETACHABLE PARTS to surfaces that		N/A

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict
	have a temperature that exceeds 70°C during the test of Clause 11. 22.11DV.2 If NON-DETACHABLE PARTS are secured with adhesive to the inside of the ENCLOSURE or to other parts inside the ENCLOSURE, the adhesive shall have adequate bonding properties throughout the life of the equipment. 22.11DV.3 Compliance is checked by examination of the construction and test (see Annex DVA). In case of doubt, compliance is checked by the tests specified in 22.11DV.4 – 22.11DV.8. 22.11DV.4 A sample of the equipment or a part of the ENCLOSURE with the non-detachable part attached shall be evaluated with the sample placed with the barrier or screen on the underside. 22.11DV.5 Condition the sample in an oven at one of the following temperatures for the time durations specified: a) 100°C± 2°C for one week; or b) 90°C± 2°C for three weeks; or c) 82°C± 2°C for eight weeks 22.11DV.6 Upon completion of the temperature conditioning: a) Remove the sample from oven and leave it at any convenient temperature between 20°C and 30°C for 1 h, b) Place the sample in a freezer at -40°C± 2°C for 4h, c) Remove and allow the sample to come to any convenient temperature between 20°C and 30°C for 8 h, d) Place the sample in a cabinet at 91% to 95% relative humidity for 72 h, e) Remove the sample and leave it at any convenient temperature between 20°C and 30°C for 1 h, f) Place the sample in an oven at the temperature used for the temperature conditioning for 4 h, and g) Remove the sample and allow it to reach any convenient temperature between 20°C and 30°C		

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict
	for 8 hrs. The sample shall then be immediately subjected to the force and torque tests of 22.11 and the impact test of Clause 21. The barrier or screen shall not fall off or partly dislodge as a result of these tests. 22.11DV.7 With the concurrence of the manufacturer, it is permitted to increase any of the above time durations specified in 22.11DV.5 or 22.11DV.6. 22.11DV.8 Additional testing may need to be conducted if the ENCLOSURE is exposed to oils and solvents during normal operation.		
22.12	22.12DV D1 Modification to add the following sentence to the note: Friction fits are not considered reliable with respect to protection against a hazard.		N/A
22	22.55DV D1 Addition: General use socket outlets, if provided, should be considered in the applicable part 2 standards.		N/A
24	24DV DC Modification to replace Clause 24 with the following: In this standard, component requirements are replaced by the relevant requirements of component standards listed in Annex DVA.		P
25.2	25.2DV D1 Modification to add the following: Multiple supply mains connections may be permitted only as specified in part 2 standards.		N/A
25.8	25.8DV.1 DR Modification to replace 25.8 with 25.8DV.1.1 – 25.8DV.1.2 25.8DV.1.1 Ampacities of SUPPLY CORDS and attachment plugs shall not be less than the current rating of the appliance and shall be suitable for the application in accordance with national electrical installation requirements. 25.8DV.1.2 Compliance is checked by inspection.		N/A
26.6	26.6DV.1 DR Modification: Replace the wording “shown in Table 13” in the first paragraph by “in accordance with the national electrical codes”. 26.6DV.2 DR Deletion: Delete Table 13.		N/A
27.2	27.2ADV D1 Addition:		N/A

Attachment No. 1

<table>
<tr><th colspan="4">NATIONAL DIFFERENCES</th></tr>
<tr><th>Clause</th><th>Requirement –Test</th><th>Result - Remark</th><th>Verdict</th></tr>
<tr><td></td><td>27.2ADV.1 If a fastener is intended to be used to secure a bonding conductor, it shall only be used for that purpose unless it is clear that it is unlikely to be removed or replaced during servicing.

27.2ADV.2 A single binding post may be used to secure both bonding conductors and the earthing conductor providing that the nut securing the earthing conductor is not relied on to secure the bonding conductors.</td><td></td><td></td></tr>
<tr><td>27.5</td><td>27.5DV.1 D1 Modification to replace the 4th and 5th paragraph with 27.5DV.1.1 – 27.5DV.1.4 and Table 27.5DV:

27.5DV.1.1 A current derived from a source having a no-load voltage not exceeding 12 V (a.c. or d.c.) and equal at least 2,0 times the rating of the earthed branch circuit, is passed between the earthing terminal or earthing contact and each of the ACCESSIBLE METAL PARTS in turn.

NOTE For the purpose of this requirement, the minimum rating of the branch circuit is 20 Amps

27.5DV.1.2 The voltage drop between the earthing terminal of the appliance or the earthing contact of the appliance inlet and the ACCESSIBLE METAL PART is measured and shall not exceed 4 volts.

27.5DV.1.3 The resistance of the PROTECTIVE EARTHING CONDUCTOR is not included in the measurement. However, if the PROTECTIVE EARTHING CONDUCTOR is supplied with the equipment, it may be included in the test circuit, but the measurement of the voltage drop is made only from the main protective earthing terminal to the part required to be earthed.

27.5DV.1.4 The resistance calculated from the current of this voltage drop shall not exceed 0,1 ohm. The test duration is specified in Table 27.5DV.

Table 27.5DV – Earthing resistance test duration
<table>
<tr><th>Over-current protection of branch circuit required for equipment (amps)</th><th>Time (min)</th></tr>
<tr><td>0-30</td><td>2</td></tr>
<tr><td>31-60</td><td>4</td></tr>
<tr><td>61-100</td><td>6</td></tr>
<tr><td>101-200</td><td>8</td></tr>
<tr><td>201 and over</td><td>10</td></tr>
</table>
27.5DV.2 D1 Modification:

Delete Note 1.</td><td></td><td>N/A</td></tr>
<tr><td>27</td><td>27.7DV D1 Addition of 27.7DV.1 – 27.7DV.1.8:

27.7DV.1 Size of Protective Conductors

27.7DV.1.1 PROTECTIVE EARTHING CONDUCTORS shall at least be of the same size as supply conductors and shall comply with the minimum conductor sizes of column A of Table 27.7DV.1.2.1.

27.7DV.1.2 Compliance is checked by inspection and measurement.

Table 27.7DV.1.2.1 – Minimum size of protective conductors</td><td></td><td>N/A</td></tr>
</table>

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict

RATED CURRENT of the equipment under consideration	Minimum conductor sizes AWG(mm^2)	
	A	B
	PROTECTIVE EARTHING CONDUCTOR AWG (mm^2)	PROTECTIVE BONDING CONDUCTOR AWG (mm^2)
Up to and including 10	18 (0,82)	20 (0,52)
Over 10 up to and including 13	16 (1,31)	18 (0,82)
Over 13 up to and including 18	14 (2,08)	16 (1,31)
Over 18 up to and including 25	12 (3,31)	14 (2,08)
Over 25 up to and including 30	10 (5,26)	12 (3,31)
Over 30 up to and including 40	8 (8,36)	10 (5,26)
Over 40 up to and including 55	6 (13,29)	8 (8,36)
Over 55 up to and including 70	4 (21,14)	6 (13,29)
Over 70 up to and including 95	2 (33,61)	4 (21,14)

27.7DV.1.3 PROTECTIVE BONDING CONDUCTORS shall comply with the following:

a) Shall pass the resistance test of 27.5, and

b) Shall be no smaller than the minimum conductor sizes in column B of Table 27.7DV.1.2.1; or for components only, be no smaller than the conductors that supply power to the component.

27.7DV.1.4 If the PROTECTIVE BONDING CONDUCTOR is smaller than the conductor supplying power to the component, or smaller than the conductor size in column B of Table 27.7DV.1.2.1, or a printed conductor on a printed circuit board, the protective bonding path shall demonstrate the ability to withstand a limited short circuit.

27.7DV.1.5 Compliance is determined by conducting the limited short circuit test specified in 27.7DV.1.6 and 27.7DV.1.7.

27.7DV.1.6 The protective earthing path is connected to the supply circuit having a capacity in accordance with Table 27.7DV.1.8.1. The capacity is determined without the protective earthing path in the circuit. The supply voltage is the nominal voltage of the a.c. mains supply. The specified over-current PROTECTIVE DEVICE rated no less than specified in 27.7DV.1.8 is connected in series with the protective earthing path.

27.7DV.1.7 During the test, the protective earthing path shall not open and there shall be no damage to any insulation, the failure of which would result in contact between the earth path and a LIVE PART. The integrity of the insulation is checked by the electric strength test of 16.1 by applying the test between LIVE PART and earthed parts.

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict

27.7DV.1.8 The current rating of the overcurrent PROTECTIVE DEVICE shall be the smallest of the following:

a) The current rating of the attachment plug but not less than 20 A; or

b) The rating of an overcurrent PROTECTIVE DEVICE which is specified by the manufacturer for installation in the field to protect the equipment; or

c) The rating of an overcurrent PROTECTIVE DEVICE in the equipment that protects the
circuit or part required to be earthed.

Table 27.7DV.1.8.1 – Short circuit capacity for the limited short circuit test

Maximum rating of the appliance			Horsepower (W)	Volts	Circuit capacity in amperes
Volt-amperes single-phase	Volt-amperes 3-phase	Volt-amperes direct current			
0 – 1 176	0 – 832	0 – 648	0,5 max (373)	0 – 250	200
0 – 1 176	0 – 832	0 – 648	0,5 max (373)	251 – 600	1 000
1 177 – 1 920	833 – 1 496	649 – 1 140	>0,5 (373) to 1 (746)	0 – 600	1 000
1 921 – 4 080	1 497 – 3 990	1 141 – 3 000	>1 (746) to 3 (2 200)	0 – 250	2 000
4 081 – 9 600	3 991 – 9 145	3 001 – 6 960	>3 (2 200) to 7,5 (5 600)	0 – 250	3 500
9 601 or higher	9 146 or higher	6 961 or higher	>7,5 (5 600)	0 – 250	5 000
1 921 or higher	1 497 or higher	1 141 or higher	>1 (746)	251 – 600	5 000

28.2 — 28.2DV D1 Modification:

Delete the second paragraph and its dashed items.

Verdict: N/A

28 — 28.5DV D1 Addition of 28.5DV.1 – 28.5DV.4:

28.5DV.1 Pillar, stud, or screw type protective earthing and protective bonding terminals
shall comply with the minimum size requirements of Table 28.5DV.1.1.

Table 28.5DV.1.1- Sizes of terminals for PROTECTIVE EARTHING CONDUCTORS

Rated Current of Equipment	Minimum Nominal Thread Diameter mm	
A	Pillar Type or Stud	Screw Type
Up to and Including 10	3,0	3,5
Over 10 up to and including 16	3,5	4,0
Over 16 up to and including 25	4,0	5,0
Over 25 up to and including 32	4,0	5,0
Over 32 up to and including 40	5,0	5,0
Over 40 up to and including 63	6,0	6,0

28.5DV.2 Protective bonding terminals which do not comply with Table 28.5DV.1.1 are considered acceptable if they meet the requirements of 27.7DV.1.5.

28.5DV.3 The main protective earthing terminal for permanently connected equipment shall be provided with factory installed studs, screws, or bolts, together

Verdict: N/A

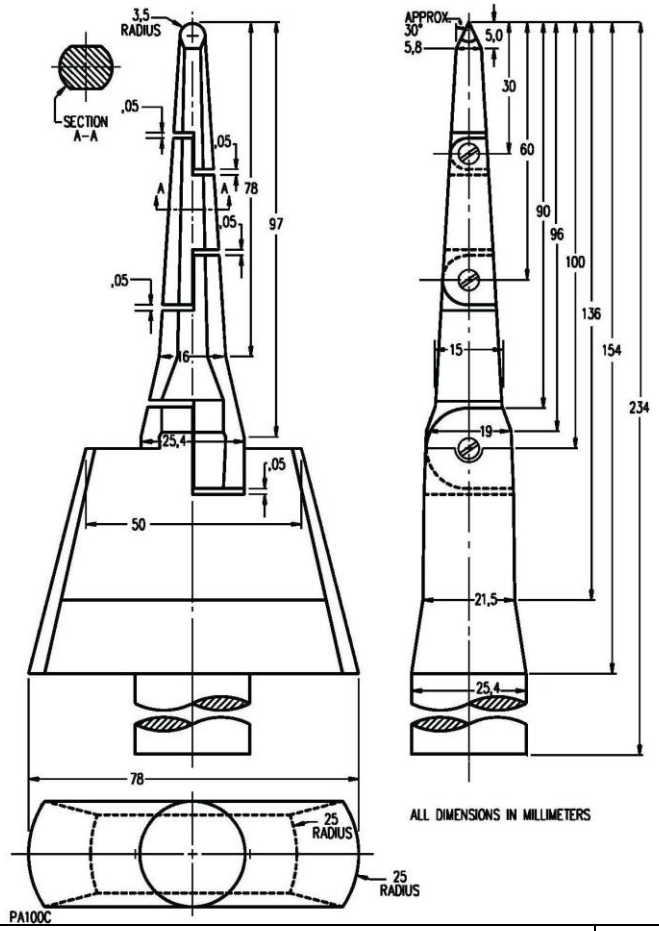
Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict
	with the necessary hardware, if requiring a PROTECTIVE EARTHING CONDUCTOR larger than 10 AWG. 28.5DV.4 Compliance is checked by inspection and measurement.		
29.1	29.1DV.1 D1 Modification to add a 4th row to Table 15 with the following values: >300 and ≤480, – , 4 000, – 29.1DV.2 D1 Modification to add the following footnote “e” to Table 16: [e] The clearances at terminals for the connection of field wiring are increased to 6,4 mm for rated impulse voltage of 1 500 V and 9,5 mm for rated impulse voltages of 2 500 and 4 000 V. 29.1DV.3 D1 Modification to change the fourth line of Table 16 to the following: 1 500, 1,2[c,e] 29.1DV.4 D1 Modification to change the sixth line of Table 16 to the following: 4 000, 3,5		N/A
29.2	29.2DV.1 D1 Modification to add superscript “b” to title of Table 17 and add the following footnote: [b] The creepage distances at terminals for the connection of field wiring are increased to 9,5 mm for working voltages ≤250 volts, and 12,7 mm for voltages >250 and ≤ 600 volts.		N/A
30.1	30.1DV D2 Modification to add the following: As an alternate, the minimum temperature for the ball pressure test for external parts may be 65 °C ± 2 °C if the part complies with the Mould Stress Relief Test of IEC 60695-10-3.		P
30.2	30.2DV D2 Modification to add the following Note: NOTE 3 Additional flammability requirements for external enclosures of stationary appliances are specified in the part 2 standard when necessary.		N/A
30.2.2	30.2.2DV D2 Modification to add the following to the end of 30.2.2: The glow-wire test is not carried out on parts of material classified at least V-1 according to IEC 60695-11-10, at least VTM-1 according to ISO 9773, or having a glow-wire ignition temperature according to IEC 60695-2-13 of at least – 775 °C, for connections which carry a current exceeding 0,5 A during NORMAL OPERATION; – 675 °C, for other connections,		P

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict
	provided that the test sample was no thicker than the relevant part of the appliance.		
30.2.3.1	30.2.3.1DV D2 Modification to replace third paragraph with the following: However, the glow-wire test is not carried out on parts of material classified at least V-1 according to IEC 60695-11-10, or at least VTM-1 according to ISO 9773, or as having a glow-wire flammability index of at least 850 °C according to IEC 60695-2-12. If the glow-wire flammability index is not available for a sample with a thickness within ± 0,1 mm of the relevant part, then the test sample shall have a thickness equal to the nearest preferred value specified in IEC 60695-2-12 that is no thicker than the relevant part.		P
30.2.3.2	30.2.3.2DV.1 D2 Modification to replace the second dashed item of the fourth paragraph with the following: – 675 °C, or shall be classified at least V-1 according to IEC 60695-11-10, or at least VTM-1 according to ISO 9773, for other connections, 30.2.3.2DV.2 D2 Modification to replace the second dashed item of the last paragraph with the following: – parts comprising material classified as V-0 or V-1 according to IEC 60695-11-10 or at least VTM-1 according to ISO 9773 provided that the test sample used for the classification was no thicker than the relevant part of the appliance; or		P
Add Figure 12DV	Figure 12DV D1 Addition: Figure 12DV – Articulated probe with web stop		P

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict
			
A.1	A.1DV D2 Modification in Canada to replace A.1 with A.1DV.1 – A.1DV.1.3: A.1DV.1 Earth continuity test A.1DV.1.1 To ensure reliability, every bond is tested for continuity in accordance with the following clauses, unless the design of a bond is such that it is unreasonable to suppose that it might lack continuity. NOTE It is reasonable to suppose that a bond might lack continuity if either of the following conditions exists: – if any essential part of the bond is not essential for the normal functioning of the equipment or is not an integral part of the equipment structure; or – if any electrical connection between parts that is an essential part of the bond depends on a mechanical contact that is not also essential for a structural or functional purpose. A.1DV.1.2 If it has been determined that a continuity test is required to ensure compliance with the provisions of A.1DV.1.1, the test is		N/A

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict
	made: – at such a point in the manufacturing process that subsequent operations are unlikely to disturb the bond being tested; – using a procedure in accordance with A.1DV.1.3; and – on all units produced or on a percentage of the units produced determined to be sufficient to provide an assurance of reliability. A.1DV.1.3 The test equipment is not required to duplicate the procedure specified in 27.5, but should; – apply to the bonds a potential of not more than 30 V open circuit; and – require the passage of a current of at least 1 A through the bond in order to produce an indication of continuity.		
Add Annex DVA	Annex DVA (informative) Component Standards Cross Reference DVA DC Add a new annex DVA as follows: DVA.1 The following is a cross reference of component standards. The applicable requirements of the subject standards may apply as specified in 2DV.2 and 24DV. DVA.2 For Mexico, IEC standards are considered informative. The Mexican version (NMX) is considered normative. DVA.3 This listing is not intended to be complete. Table DVA.3.1 – Component Standards Cross Reference		P

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict

Clause	Code or Component	IEC/ISO	Standards Cross Reference		
			Canada	Mexico	US
19.11	Protective Electronic Circuit	N/A	C22.2 No. 0.8 – Safety Functions Incorporating Electronic Technology	N/A	UL 991 – Tests for Safety Related Controls Employing Solid State Devices
22.2	Edison-base Lampholders	IEC 60238 – Edison screw lampholders IEC 60400 – Lampholders for tubular fluorescent lamps and starterholders	C22.2 No. 43 – Lampholders	N/A	UL 496 – Lampholders
23.5	Wire and Cables	N/A	CAN/CSA-C22.2 No. 38 – Thermoset-Insulated Wires and Cables	N/A	UL 44 – Thermoset-Insulated Wires and Cables
			C22.2 No. 75 – Thermoplastic-Insulated Wires and Cables	NMX-J-010-ANCE – Thermoplastic-Insulated Wires and Cables	UL 83 – Thermoplastic-Insulated Wires and Cables
			CAN/CSA-C22.2 No. 198.1 – Extruded Insulated Tubing	N/A	UL 224 – Extruded Insulated Tubing
			CSA-C22.2 No. 210.2 – Appliance Wiring Material Products	N/A	UL 758 – Standard for Appliance Wiring Material
			CSA-C22.2 No. 127 – Equipment and Lead Wires	N/A	
			C22.2 No. 197 – PVC Insulating Tape	N/A	UL 510 – Polyvinyl Chloride, Polyethylene and Rubber Insulating Tape

Clause	Code or Component	IEC/ISO	Standards Cross Reference		
			Canada	Mexico	US
24	Surge Suppressors	N/A	Certification Notice No.516 (Where the surge suppressor is relied upon to achieve Overvoltage Category 1, UL 1449 requirements apply)	N/A	UL 1449 – Surge Protective Devices
			C22.2 No. 1 – Audio, Video, and Similar Electronic Equipment		UL 224 – Extruded Insulated Tubing
			C22.2 No. 198.1 – Extruded Insulating Tubing		
24	Printed-Wiring Boards	IEC 61191 – Printed board assemblies	N/A	N/A	UL 796 – Printed Wiring Boards
					UL 746E – Polymeric Materials – Industrial Laminates, Filament Wound Tubing, Vulcanized Fibre, and Materials Used in Printed Wiring Boards
					UL746F – Polymeric Materials – Flexible Dielectric Film Materials For Use In Printed-Wiring Boards and Flexible Materials Interconnect Constructions
24	Tubing	N/A	CAN/CSA-C22.2 No. 198.1 – Extruded Insulating Tubing	N/A	UL 224 – Extruded Insulating Tubing

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict

Clause	Code or Component	IEC/ISO	Standards Cross Reference		
			Canada	Mexico	US
24	Switches	IEC 60730-2 Series – Automatic electrical Controls for household and similar use	C22.2 No. 111 – General-Use Snap Switches	J-NMX-005 (for switches)	UL 20 – General-Use Snap Switches
				J-NMX-508 (for clock operated switches rated up to 30 A, 250 Vac)	
				J-NMX-515 (for clock operated switches above 30A, 250 Vac)	
		N/A	N/A	N/A	UL 98 – Enclosed and Dead-Front Switches
		N/A	CAN/CSA-C22.2 No. 177 – Clock-Operated Switches	N/A	UL 917 – Clock-Operated Switches
		N/A	C22.2 No. 55 – Special Use Switches	N/A	UL 1054 – Special-Use Switches
		IEC 61058-1 – Switches for Appliances - Part 1: General Requirements	CAN/CSA-C22.2 No. 61058-1-05 – Switches for Appliances - Part 1: General Requirements	N/A	UL 61058-1 – Switches for Appliances – Part 1: General Requirements
		N/A	CAN/CSA-E730-2-7-94 – Automatic Electrical Controls for Household and Similar Use – Part 2: Particular Requirements for Timers and Time Switches	N/A	UL 60730-2-7 – Automatic Electrical Controls for Household and Similar Use; Part 2: Particular Requirements for Timers and Time Switches
24	Industrial Control Equipment	IEC 60204 – Safety of machinery – Electrical equipment of machines	CAN/CSA-C22.2 No. 14 – Industrial Control Equipment	N/A	UL 508 – Industrial Control Equipment
24	Circuit Breakers	N/A	CAN/CSA-C22.2 No. 5 – Molded Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures	N/A	UL 489 – Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures
24	Enclosures for Electrical Equipment	IEC 60670 – Boxes and enclosures for electrical accessories for household and similar fixed electrical installations	CAN/CSA-C22.2 No. 94 – Special Purpose Enclosures	N/A	UL 50 – Enclosures for Electrical Equipment
		IEC 60529 – Degrees of protection provided by enclosures (IP code)			

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict

Clause	Code or Component	IEC/ISO	Standards Cross Reference		
			Canada	Mexico	US
24	Insulating Materials	IEC 60085 – Electrical insulation – Thermal classification	CAN/CSA-C22.2 No. 0 – General Requirements – Canadian Electrical Code, Part II	N/A	UL 1446 – Systems of Insulating Materials – General
		IEC 62114 – Electrical insulation systems - Thermal classification			UL746C – Polymeric Materials – Use in Electrical Equipment Evaluations
24	Marking and Labeling	N/A	C22.2 No. 0.15 – Adhesive Labels	N/A	UL 969 – Marking and Labeling Systems
24	Fuseholders	IEC 60127-6 – Miniature fuses – Part 6: Fuse-holders for miniature cartridge fuse-links	C22.2 No. 39 – Fuseholder Assemblies	N/A	UL 4248-1 – Fuseholders – Part 1: General Requirements
					UL 4248-4 – Fuseholders – Part 4: Class CC
					UL 4248-5 – Fuseholders – Part 5: Class G
					UL 4248-6 – Fuseholders – Part 6: Class H
					UL 4248-8 – Fuseholders – Part 8: Class J
					UL 4248-9 – Fuseholders – Part 9: Class K
					UL 4248-11 – Fuseholders – Part 11: Type C (Edison Base) and Type S Plug Fuse
					UL 4248-12 – Fuseholders – Part 12: Class R
					UL 4248-15 – Fuseholders – Part 15: Class T
24, 25	Direct Plug-in and External Power Supplies	N/A	CAN/CSA-C22.2 No. 223 – Power Supplies With Extra-Low-Voltage Class 2 Outputs (Mechanical Assembly Requirements Only)	N/A	UL 1310 – Class 2 Power Units
24, 25	Power Supplies	IEC 60335-2-29 – Particular requirements for battery chargers	CAN/CSA-E60335-2-29 – Household and Similar Electrical Appliances – Safety – Part 2-29: Particular requirements for battery chargers	N/A	

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict

Clause	Code or Component	IEC/ISO	Standards Cross Reference		
			Canada	Mexico	US
24	Fuses	IEC 60127-1 – Miniature Fuses – Part 1 Definitions for miniature fuses and general requirements for miniature fuse-links	CAN/CSA-C22.2 No. 248.1 – Low-Voltage Fuses – Part 1: General Requirements	NMX-J-009/248/1 – Low-Voltage Fuses – Part 1: General Requirements	UL 248-1 – Low-Voltage Fuses – Part 1: General Requirements
		N/A	CAN/CSA-C22.2 No. 248.2 – Low-Voltage Fuses – Part 2: Class C Fuses	NMX-J-009/248/2 – Low-Voltage Fuses – Part 2: Class C Fuses	UL 248-2 – Low-Voltage Fuses – Part 2: Class C Fuses
		N/A	CAN/CSA-C22.2 No. 248.3 – Low-Voltage Fuses – Part 3: Class CA and CB Fuses	NMX-J-009/248/3 – Low-Voltage Fuses – Part 3: Class CA and CB Fuses	UL 248-3 – Low-Voltage Fuses – Part 3: Class CA and CB Fuses
		N/A	CAN/CSA-C22.2 No. 248.4 – Low-Voltage Fuses – Part 4: Class CC Fuses	NMX-J-009/248/4 – Low-Voltage Fuses – Part 4: Class CC Fuses	UL 248-4 – Low-Voltage Fuses – Part 4: Class CC Fuses
		N/A	CAN/CSA-C22.2 No. 248.5 – Low-Voltage Fuses – Part 5: Class G Fuses	NMX-J-009/248/5 – Low-Voltage Fuses – Part 5: Class G Fuses	UL 248-5 – Low-Voltage Fuses – Part 5: Class G Fuses
		N/A	CAN/CSA-C22.2 No. 248.6 – Low-Voltage Fuses – Part 6: Class H Non-Renewable Fuses	NMX-J-009/248/6 – Low-Voltage Fuses – Part 6: Class H Non-Renewable Fuses	UL 248-6 – Low-Voltage Fuses – Part 6: Class H Non-Renewable Fuses
		N/A	CAN/CSA-C22.2 No. 248.7 – Low-Voltage Fuses – Part 7: Class H Renewable Fuses	NMX-J-009/248/7 – Low-Voltage Fuses – Part 7: Class H Renewable Fuses	UL 248-7 – Low-Voltage Fuses – Part 7: Class H Renewable Fuses
		N/A	CAN/CSA-C22.2 No. 248.8 – Low-Voltage Fuses – Part 8: Class J Fuses	NMX-J-009/248/8 – Low-Voltage Fuses – Part 8: Class J Fuses	UL 248-8 – Low-Voltage Fuses – Part 8: Class J Fuses
		N/A	CAN/CSA-C22.2 No. 248.9 – Low-Voltage Fuses – Part 9: Class K Fuses	NMX-J-009/248/9 – Low-Voltage Fuses – Part 9: Class K Fuses	UL 248-9 – Low-Voltage Fuses – Part 9: Class K Fuses
		N/A	CAN/CSA-C22.2 No. 248.10 – Low-Voltage Fuses – Part 10: Class L Fuses	NMX-J-009/248/10 – Low-Voltage Fuses – Part 10: Class L Fuses	UL 248-10 – Low-Voltage Fuses – Part 10: Class L Fuses

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict

Clause	Code or Component	IEC/ISO	Standards Cross Reference		
			Canada	Mexico	US
24	Fuses (continued)	N/A	CAN/CSA-C22.2 No. 248.11 – Low-Voltage Fuses – Part 11: Plug Fuses	NMX-J-009/248/11 – Low-Voltage Fuses – Part 11: Plug Fuses	UL 248-11 – Low-Voltage Fuses – Part 11: Plug Fuse
		N/A	CAN/CSA-C22.2 No. 248.12 – Low-Voltage Fuses – Part 12: Class R Fuses	NMX-J-009/248/12 – Low-Voltage Fuses – Part 12: Class R Fuses	UL 248-12 – Low-Voltage Fuses – Part 12: Class R Fuses
		N/A	CAN/CSA-C22.2 No. 248.13 – Low-Voltage Fuses – Part 13: Semiconductor Fuses	NMX-J-009/248/13 – Low-Voltage Fuses – Part 13: Semiconductor Fuses	UL 248-13 – Low-Voltage Fuses – Part 13: Semiconductor Fuses
		N/A	CAN/CSA-C22.2 No. 248.14 – Low-Voltage Fuses – Part 14: Supplemental Fuses	NMX-J-009/248/14 – Low-Voltage Fuses – Part 14: Supplemental Fuses	UL 248-14 – Low-Voltage Fuses – Part 14: Supplemental Fuses
		N/A	CAN/CSA-C22.2 No. 248.15 – Low-Voltage Fuses – Part 15: Class T Fuses	NMX-J-009/248/15 – Low-Voltage Fuses – Part 15: Class T Fuses	UL 248-15 – Low-Voltage Fuses – Part 15: Class T Fuses
		N/A	CAN/CSA-C22.2 No. 248.14 – Low-Voltage Fuses - Part 14: Supplemental Fuses	N/A	UL 1417 – Special Fuses for Radio- and Television- Type Appliances
24	Supplementary Protectors	N/A	C22.2 No. 235 – Supplementary Protectors	N/A	UL 1077 – Supplementary Protectors for Use in Electrical Equipment
24	Electric Actuators	60730-2-14 – Automatic Electrical Controls for Household and Similar Use – Part 2-14: Particular requirements for electric actuators	N/A	N/A	UL 60730-2-14 – Automatic Electrical Controls for Household and Similar Use; Part 2: Particular Requirements for Electric Actuators
24	Limit Controls	N/A	C22.2 No. 24 – Temperature-Indicating and Regulating Equipment	N/A	UL 353 – Limit Controls
24	Solid-State Controls	N/A	C22.2 No. 156 – Solid-State Speed Controls	N/A	UL 244A – Solid-State Controls for Appliances

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict

Clause	Code or Component	IEC/ISO	Standards Cross Reference		
			Canada	Mexico	US
24	Capacitors	IEC 60384-14 – Fixed Capacitors for Use in Electronic Equipment - Part 14: Sectional Specification: Fixed Capacitors for Electromagnetic Interference Suppression and Connection to the Supply Mains	N/A	N/A	UL 810 – Capacitors
		IEC 60384-14-1 – Fixed Capacitors for Use in Electronic Equipment - Part 14-1: Blank Detail Specification: Fixed Capacitors for Electromagnetic Interference Suppression and Connection to the Supply Mains - Assessment Level D			
		IEC 60384-14-2 – Fixed Capacitors for Use in Electronic Equipment Part 14-2: Blank Detail Specification-Fixed Capacitors for Electromagnetic Interference Suppression and Connection to the Supply Mains - Safety Tests Only			
		IEC 60384-14-3 – Fixed Capacitors for Use in Electronic Equipment- Part 14-3 Blank Detail Specification - Fixed Capacitors for Electromagnetic Interference Suppression and Connection to the Supply Mains - Assessment Level DZ			
24	Double Insulation	N/A	C22.2 No. 0.1-M1985 – General Requirements for Double-Insulated Equipment	N/A	UL 1097 – Double Insulation Systems for Use in Electrical Equipment

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict

Clause	Code or Component	IEC/ISO	Standards Cross Reference		
			Canada	Mexico	US
24	Attachment Plugs, Receptacles, Connectors, and Socket Outlets	IEC 60084 – Plugs and socket-outlets for household and similar purposes	C22.2 No. 42 – General Use Receptacles, Attachment Plugs, and Similar Wiring Devices	N/A	UL 498 – Attachment Plugs and Receptacles
		IEC 60309 – Plugs, socket-outlets and couplers for industrial purposes	C22.2 No. 182.1 – Plugs, Receptacles, and Connectors of the Pin and Sleeve Type		
		IEC 60320 – Appliance couplers for household and similar general purposes	C22.2 No. 182.2 – Industrial Locking Type, Special Use Attachment Plugs, Receptacles, and Connectors		
			C22.2 No. 182.3 – Special Use Attachment Plugs, Receptacles, and Connectors		
25.7	Cord Sets and Power Supply Cords	N/A	C22.2 No. 21 – Cord Sets and Power Supply Cords ("solid green" protective earthing conductor acceptable)	N/A	UL 817 – Cord Sets and Power-Supply Cords
25.7	Flexible Cords and Cable	N/A	C22.2 No. 49 – Flexible Cords and Cables	N/A	UL 62 – Flexible Cords and Cables
			C22.2 No. 96 – Portable Power Cables		
24	Quick Connect Terminals	IEC 60998 – Connecting devices for low-voltage circuits for household and similar purposes	C22.2 No. 153-M1981 – Quick Connect Terminals	N/A	UL 310 – Electrical Quick-Connect Terminals
24, 26	Wire Connectors (including connectors for field wiring)	N/A	C22.2 No. 65-03 – Wire Connectors	N/A	UL 486A-486B – Wire Connectors
			C22.2 No. 65-03 – Wire Connectors		
			N/A		UL 486C – Splicing Wire Connectors
			C22.2 No. 65-03 – Wire Connectors		UL 486E – Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors

Clause	Code or Component	IEC/ISO	Standards Cross Reference		
			Canada	Mexico	US
24	Enclosure Materials	N/A	CAN/CSA-C22.2 No. 0.17 – Evaluation of Properties of Polymeric Materials	N/A	UL746C – Polymeric Materials – Use in Electrical Equipment Evaluations
					UL 723 – Test for Surface Burning of Building Materials
24	Thermal Cutoffs	IEC 60730-1 – Automatic electrical controls for household and similar use: Part 1 General requirements	C22.2 No. 209-M1985 – Thermal Cut-Offs	N/A	UL 60691 – Thermal Links – Requirements and Application Guide
		IEC 60730-2-3 – Automatic electrical controls for household and similar use: Part 2 Particular requirements for thermal protectors for ballasts for tubular fluorescent lamps			

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict

Clause	Code or Component	IEC/ISO	Standards Cross Reference		
			Canada	Mexico	US
24	Thermostats	N/A	C22.2 No. 24 – Temperature-Indicating and Regulating Equipment	N/A	UL 873 – Temperature-Indicating and Regulating Equipment
		IEC 60730-1 – Automatic Electrical Controls for Household and Similar Use – Part 1: General Requirements	CAN/CSA-E60730-1-02 – Automatic Electrical Controls for Household and Similar Use – Part 1: General Requirements		UL 60730-1A – Automatic Electrical Controls for Household and Similar Use – Part 1: General Requirements
		IEC 60730-2-4 – Automatic Electrical Controls for Household and Similar Use – Part 2: Particular Requirements for Thermal Motor Protectors for Motor-Compressors of Hermetic and Semi-Hermetic Type	CAN/CSA-E730-2-4-94 – Automatic Electrical Controls for Household and Similar Use – Part 2: Particular Requirements for Thermal Motor Protectors for Motor-Compressors of Hermetic and Semi-Hermetic Type		UL 60730-2-4 – Automatic Electrical Controls for Household and Similar Use – Part 2: Particular Requirements for Thermal Motor Protectors for Motor-Compressors of Hermetic and Semi-Hermetic Type
		IEC 60730-2-9 – Automatic Electrical Controls for Household and Similar Use – Part 2: Particular Requirements for Temperature Sensing Controls	CAN/CSA-E60730-2-9-01 – Automatic Electrical Controls for Household and Similar Use – Part 2: Particular Requirements for Temperature Sensing Controls		UL 60730-2-9 – Automatic Electrical Controls for Household and Similar Use – Part 2: Particular Requirements for Temperature Sensing Controls
24	Relays	IEC 60730-2-10 – Automatic electrical controls for household and similar use – Part 2-10: Particular requirements for motor-starting relays	CAN/CSA-C22.2 No. 14 – Industrial Control Equipment	N/A	UL 873 – Temperature-Indicating and Regulating Equipment
			C22.2 No 24 – Temperature Indicating and Regulating equipment		

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict

Clause	Code or Component	IEC/ISO	Standards Cross Reference		
			Canada	Mexico	US
24	Communication Circuits	N/A	CAN/CSA C22.2 No. 226-92 – Protectors in Telecommunication Networks	N/A	UL 497 – Protectors for Paired-Conductor Communication Circuits
			CAN/CSA C22.2 No. 226-92 – Protectors in Telecommunication Networks		UL 497A – Secondary Protectors for Communication Circuits
			CAN/CSA C22.2 No. 226-92 – Protectors in Telecommunication Networks		UL 497B – Protectors for Data Communication and Fire Alarm Circuits
			CAN/CSA C22.2 No. 233-M89 – Cords and Cord Sets for Communication Systems		UL 1863 – Communication Circuit Accessories
			CAN/CSA C22.2 No. 182.4-M90 – Plugs, Receptacles, and Connectors for Communication Systems		
24.1.7	Telecommun-ications Networks	IEC 62151 – Safety of Equipment Electrically Connected to a Telecommunication Network	CAN/CSA C22.2 No. 60950-1-07 – Information Technology Equipment Safety – Part 1: General Requirements	N/A	UL 60950-1 – Information Technology Equipment Safety – Part 1: General Requirements
24	Lithium Batteries	N/A	N/A	N/A	UL 1642 – Lithium Batteries
24	EMI Filters	N/A	C22.2 No. 8-M1986 – Electromagnetic Interference (EMI) Filters	N/A	UL 1283 – Electromagnetic Interference Filters
24	Motor Construction	N/A	C22.2 No. 100-04 – Motors and Generators	N/A	UL 1004 – Electric Motors
			C22.2 No. 113-M1984 – Fans and Ventilators		UL 507 – Electric Fans
24	Optical Isolators	N/A	Certification Notice, Component Acceptance Service No. 5A (Announcement of Extension of the Component Acceptance Service for Optocouplers and Related Devices)	N/A	UL 1577 – Optical Isolators

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict

Clause	Code or Component	IEC/ISO	Standards Cross Reference		
			Canada	Mexico	US
24	Transformers	IEC 61558-1 – Safety of power transformers, power supply units and similar Part 1 General requirements and tests	CAN/CSA-C22.2 No. 223-M91 – Power Supplies with Extra-Low Voltage Class 2 Outputs	N/A	UL 1310 – Class 2 Power Units
		IEC 61558-2-4 – Part 2: Particular requirements for isolating transformers for general use			
		IEC 61558-2-6 – Part 2: Particular requirements for safety isolating transformers for general use			
		N/A	CSA C22.2 No. 66.1 – Low Voltage Transformers – Part 1: General Requirements		UL 5085-1 – Low Voltage Transformers – Part 1: General Requirements
		N/A	CSA C22.2 No. 66.3 – Low Voltage Transformers – Part 3: Class 2 and Class 3 Transformers		UL 5085-3 – Low Voltage Transformers – Part 3: Class 2 and Class 3 Transformers
24	High-Voltage Components	N/A	C22.2 No. 1-04 – Audio, Video, and Similar Electronic Equipment	N/A	UL 1413 – High-Voltage Components for Television-Type Appliances
24	Double-Protection Capacitors	N/A	C22.2 No. 1-04 – Audio, Video, and Similar Electronic Equipment	N/A	UL 1414 – Capacitors and Suppressors for Radio- and Television-Type Appliances
24	Fusing Resistors	N/A	C22.2 No. 1-04 – Audio, Video and Similar Electronic Equipment	N/A	UL 1412 – Fusing Resistors and Temperature-Limited Resistors for Radio- and Television-Type Appliances
24	Outlet Boxes	N/A	CAN/CSA-C22.2 No. 18.1-04 – Metallic Outlet Boxes	NMX-J-023/1-ANCE – Metallic Outlet Boxes	UL 514A – Metallic Outlet Boxes
			CAN/CSA-C22.2 No. 18.3 – Conduit, Tubing, and Cable Fittings	NMX-J-017-ANCE – Conduit, Tubing, and Cable Fittings	UL 514B – Conduit, Tubing, and Cable Fittings
			CAN/CSA-C22.2 No. 85-M89 – Rigid PVC Boxes and Fittings	N/A	UL 514C – Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict

Clause	Code or Component	IEC/ISO	Standards Cross Reference		
			Canada	Mexico	US
24	Terminal Blocks	N/A	C22.2 No. 158-1987 – Terminal Blocks	N/A	UL 1059 – Terminal Blocks
24	Adhesives and Coatings	N/A	N/A	N/A	UL 746C – Polymeric Materials – Use in Electrical Equipment Evaluations
24 and 30	Polymeric Materials	N/A	CAN/CSA-C22.2 No. 0.17 – Evaluation of Properties of Polymeric Materials	N/A	UL 746A – Polymeric Materials – Short Term Property Evaluations
					UL 746B – Polymeric Materials – Long Term Property Evaluations
					UL 746C – Polymeric Materials – Use in Electrical Equipment Evaluations
					UL 746D – Polymeric Materials – Fabricated Parts
24	Gasket and Seal Materials	N/A	N/A	N/A	UL 157 – Gaskets and Seals
24	Air Filter Units	N/A	N/A	N/A	UL 900 – Air Filter Units
24	Flammability of Plastic Materials 5VA, 5VB, V-0, V-1, V-2, HF-1, HF-2, HB-F, and HB	N/A	CAN/CSA-C22.2 No. 0.17 – Evaluation of Properties of Polymeric Materials	N/A	UL 94 – Tests for Flammability of Plastic Materials for Parts in Devices and Appliances
24	Motor Protection	N/A	C22.2 No. 77 – Motors with Inherent Overheating Protection	N/A	UL 2111 – Overheating Protection for Motors
			C22.2 No. 100 – Motors and Generators		
24	Flammability of Liquids	N/A	N/A	N/A	UL 340 – Test for Comparative Flammability of Liquids
24	Arc Fault Circuit Interrupters and Leakage Current Detection Interrupters	N/A	TIL M02A	N/A	UL1699 – Arc Fault Circuit Interrupters
Annex B	Ground-Fault Circuit Interrupters	N/A	CAN/CSA C22.2 No. 144-M91 – Ground Fault Circuit Interrupters	N/A	UL 943 – Ground-Fault Circuit Interrupters

Add Annex DVC

Annex DVC
(Normative)
Mechanical requirements for direct plug in appliances

DVC DC Add a new annex DVC as follows:

DVC.1 Maximum tipping moment

DVC.1.1 A device shall comply with the maximum tipping moment requirement specified in DVC.1.2, Table DVC.1.2.1 and Figure DVC.1.2.1.

DVC.1.2 The limits specified in Table DVC.1.2.1 shall be determined as follows:

a) a directly-mounted accessory shall be in place; and

b) a removable part shall be in place.

Table DVC.1.2.1 — Maximum Tipping Moment (See Clauses DVC.1.1 and DVC.1.2.)

Algebraic quantity	Maximum acceptable value

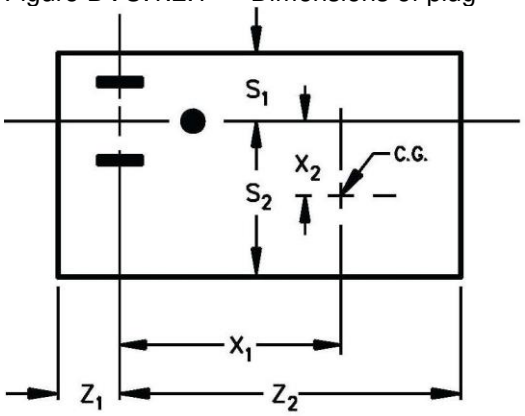
N/A

Attachment No. 1

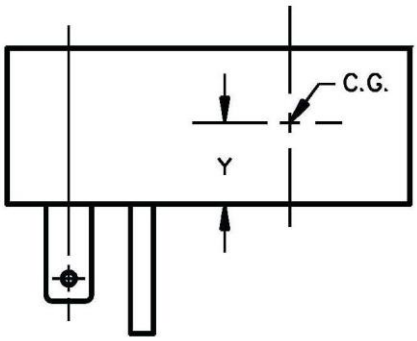
NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict

W	0,79 kg (28 oz)
WY/Z	1,36 kg (48 oz)
WY/S	1,36 kg (48 oz)
WgX (WX)	0,56 N·m (80 oz-in)
In this table the variables are defined as follows:	
W = the weight of the device in kg (oz) and is considered to be a force equal to the device mass of kg (oz) as measured on a scale or balance.	
Y = the distance, in meters (inches), illustrated in Figure DVC.1.2.1.	
Z = the shorter distance, in meters (inches), of Z1 or Z2, illustrated in Figure DVC.1.2.1.	
S = the shorter distance, in meters (inches), of S1 or S2, illustrated in Figure DVC.1.2.1.	
g = acceleration due to gravity, 9,806 meters/sec^2	
X = the longer distance, in meters (inches), of X1 or X2, illustrated in Figure DVC.1.2.1.	

Figure DVC.1.2.1 — Dimensions of plug



FRONT VIEW



SIDE VIEW

C.G. = Center of Gravity

CP100A

Korea, Republic Of			**KR**
	Limitations		P

Attachment No. 1

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict
	(Voltage Rating) As national supply voltage is subject to be increased to 220V, only is to be allowed to obtain type approval in Korea. Either an appliance rated 110V or 220/110V is not allowed. When an appliance is supplied in Korea, it shall be set to and marked with 220V.		P
	(Frequency) Only appliances having supply frequency of 60Hz or a frequency range including 60Hz are accepted. When an appliance is supplied in Korea, it shall be set to and marked with 60Hz.		P
	(Instruction) Instruction manuals and appliance marking related safety, including nameplate shall be in Korean or graphical symbols in IEC Pub. 417. More details are available from KTL (c/o KTL) on request.	Should be evaluated during national approval	N/A
14	Addition Radio frequency Interference The apparatus shall comply with the relevant CISPR requirement.	Should be evaluated during national approval	N/A
24.4	Plugs for the connection of the apparatus to the supply main shall comply with the Korean requirement(KSC 8305).	Should be evaluated during national approval	N/A
24.5	Plugs for the connection of the apparatus to the supply main shall comply with the Korean requirement(KSC 8305).	Should be evaluated during national approval	N/A
Saudi Arabia			**SA**
General requirements	- When any HOUS standards (including all parts of this standard) refer to this standard (IEC 60335-1), you need to consider this Saudi national differences . - Electrical Appliances which are fitted with a plug , the Plug shall comply with SASO 2204 and IEC 60083:2006 (SA2 only) - The standard voltages and frequency in Saudi Arabia are 220V ac and 230V ac , 60 Hz . . - Markings on the name plate shall be either in Arabic or English language. - Safety instructions and Manuals shall be in Arabic language. - Country of origin shall be shown on the marking plate.		N/A

Attachment No. 2

IEC 60335-2-29 4th edition (2002) + Amendment 1 (2004) + Amendment 2 (2009)

as per IEC Bulletin

Particular requirements for battery chargers, should be used in conjunction with 60335-1, 4th ed (2001)

Country	CENELEC Group differ. (see separate attachment)	National differ.	Base standard	National standard	Tested
AR Argentina	-	Yes	IEC 60335-2-29 ed4+A1		Yes
AU Australia	-	Yes	IEC 60335-2-29 ed4+A1+A2	AS/NZS 60335.2.29:2004+ AMD1+AMD2	Yes
CA Canada	-	Yes	IEC 60335-2-29 ed4+A1+A2	CAN/CSA-E60335-2-29:06	Yes
FI Finland	-	Yes	IEC 60335-2-29 ed4+A1		Yes
JP Japan	-	Yes	IEC 60335-2-29 ed4+A1+A2	J60335-2-29(H20)	Yes
NZ New Zealand	-	Yes	IEC 60335-2-29 ed4+A1+A2	AS/NZS 60335.2.29:2004+ AMD1+AMD2	Yes

Attachment No. 2

Note: Before placing the products in the different countries, the manufacturer must ensure that:

1. Operating Instructions, Ratings Labels and Warnings Labels are in an Accepted or Official Language of the country in question.
2. The equipment complies with the National Standards and/or Electrical Codes of the country, province or city in question.

Attachment No. 2

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict
Argentina			**AR**
	- Ratings shall cover 220 Vac - 50 Hz		P
	- Class 0 and Class 0I appliances are not allowed		N/A
	- Safety instructions and manuals shall be written in Spanish language (Resolution 92/98)		N/A
	- Country of origin shall be shown on the marking plate or, if not possible, in the primary packaging (Resolution 92/98)		P
	- Address of the importer in Argentina shall be shown on the product or on the primary packaging (Resolution 92/98)		N/A
	- Class I appliances provided with plugs shall be provided with the label specified in sheet "Class I" (Disposition 731/87)		N/A
	- Class II appliances provided with plugs shall be provided with the label specified in sheet "Class II" (Disposition 731/87)		N/A
	- Plugs shall be in conformity with IRAM 2063 Standard for Class II appliances and IRAM 2073 Standard for Class I appliances (Resolution 524/98)		N/A
	- Adaptors/Transformers provided with integrated plugs shall be provided with blades which shall meet the geometry of IRAM 2063 standard for Class II appliances or IRAM 2073 standard for Class I appliances (Resolution 524/98)		N/A
	- Appliances certified under System Nº 4 (Type Certification scheme) shall be marked with the symbol specified in sheet "St Mark" (Resolution 197/04)		N/A
	- Appliances certified under System Nº5 (Mark of Conformity Certification scheme) shall be marked with the symbols specified in sheet "S Mark" (Resolution 799/99)		N/A
Australia/New Zealand			**AU/NZ**
7.1	Insert after the seventh dash item of the first paragraph, the following variation: - The types of battery that are intended to be charged in the battery charger.		P
7.14	Insert the following variation: Addition: The marking concerning the types of battery that are intended to be charged in 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.		P
AMD1: 2004 Annex AA (normative) Battery chargers for use by children			
5	General conditions for the tests		N/A
5.201	When batteries are used, the generally available rechargeable batteries giving the most unfavourable conditions are used.		N/A
6	Classification		N/A

Attachment No. 2

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict
6.1	Modification: Battery chargers suitable for outdoor use shall be **class III**. Other battery chargers shall be **class II or class III.**		N/A
6.2	Addition: Battery chargers suitable for outdoor use shall be at least IPX7.		N/A
6.201	Enclosures shall be classified at least IP3X with regard to protection against ingress of solid foreign objects. Compliance is checked by inspection.		N/A
7	Marking and instructions		N/A
7.1	Battery chargers for indoor use only shall be marked with symbol 59571) of IEC 60417 or with the substance of the following: For indoor use only Battery chargers shall be marked with the IP number according to the degree of protection against ingress of solid foreign objects. Battery chargers shall be marked with the smiling face symbol together with 8+.		N/A
7.6	Addition:  [future symbol 59572) of IEC 60417] for indoor use only 8+  [smiling face] suitable for use by children at least 8 years old		N/A
7.12	Addition: The instructions shall include the substance of the following: – CAUTION: Only allow children at least 8 years old to use the battery charger. Give sufficient instruction so that the child is able to use the battery charger in a safe way and explain that it is not a toy and must not be played with. – instruct the child not to try and recharge non-rechargeable batteries because of the danger of eruption; – examine the battery charger regularly for damage, especially the cord, plug and enclosure. If the battery charger is damaged, it must not be used until it has been repaired. The instructions for class III battery chargers shall state that they must be supplied from a transformer for toys.		N/A

Attachment No. 2

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict
7.14	Addition: The height of symbols marked on the appliance shall be at least 10 mm. The height of lettering shall be at least 3 mm. Compliance is checked by measurement.		N/A
8	Protection against access to live parts		N/A
8.1.1	Modification: It shall not be possible to gain access to live parts or to metal parts separated from live parts by basic insulation only, even after a tool has been used to remove parts of the enclosure. Test probe 18 of IEC 61032 is also applied, as specified for test probe B.		N/A
10	Power input and current		N/A
10.101	Addition: The output voltage shall not exceed 42,4 V peak.		N/A
11	Heating		N/A
11.8	Addition: The temperature rises of parts that can be touched by test probe 18 of IEC 61032 shall not exceed the following values: – 25 K, if of metal; – 35 K, if of other material. NOTE 201 The temperature rise limit for metal applies to the surface of the batteries.		N/A
17	Overload protection of transformers and associated circuits Addition: The temperature rises of parts that can be touched by test probe 18 of IEC 61032 shall not exceed the following values: – 45 K, if of metal; – 55 K, if of other material.		N/A
19	Abnormal operation		N/A
19.13	Addition: The temperature rises of parts that can be touched by test probe 18 of IEC 61032 shall not exceed the following values: – 45 K, if of metal; – 55 K, if of other material.		N/A
21	Mechanical strength		N/A

Attachment No. 2

NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict
21.1	Addition: Compliance is also checked by the test of 21.201.		N/A
21.201	The battery charger is subjected to test Eha in accordance with IEC 60068-2-75. The impact energy shall be 2 J. For rectangular shaped battery chargers, the four sides and four edges are subjected to an impact. For other battery chargers, the enclosure is subjected to eight impacts equally spaced over the periphery. The battery charger is then subjected to test Ed, Procedure 1 – Free fall, in accordance with IEC 60068-2-32. The height of the fall is 500 mm. The battery charger is orientated in its normal position of use prior to being dropped. The battery charger shall not be damaged to such an extent that compliance with this standard is impaired; in particular, live parts shall not become accessible.		N/A
22	Construction		N/A
22.201	Battery chargers shall have only one rated voltage or rated voltage range. They shall not incorporate means for manually adjusting the output voltage. Compliance is checked by inspection.		N/A
22.202	Battery chargers shall be constructed so that reverse charging is prevented, regardless of the state of charge of the battery. This applies even if the battery is inserted with the wrong polarity. Compliance is checked by inspection and by measurement.		N/A
24	Components		N/A
24.201	The relevant standard for transformers for toys is IEC 61558-2-7. If they have to be tested, they are tested in accordance with subclauses 7.2, 20.5.1 and 20.101 and Clause 15 of IEC 61558-2-7.		N/A
25	Supply connection and external flexible cords		N/A
25.1	Modification: Battery chargers shall not be provided with an appliance inlet.		N/A
25.5	Modification: Battery chargers shall have type Y attachment or type Z attachment.		N/A
AMD2: 2010			
7	Marking and instructions		P

Attachment No. 2

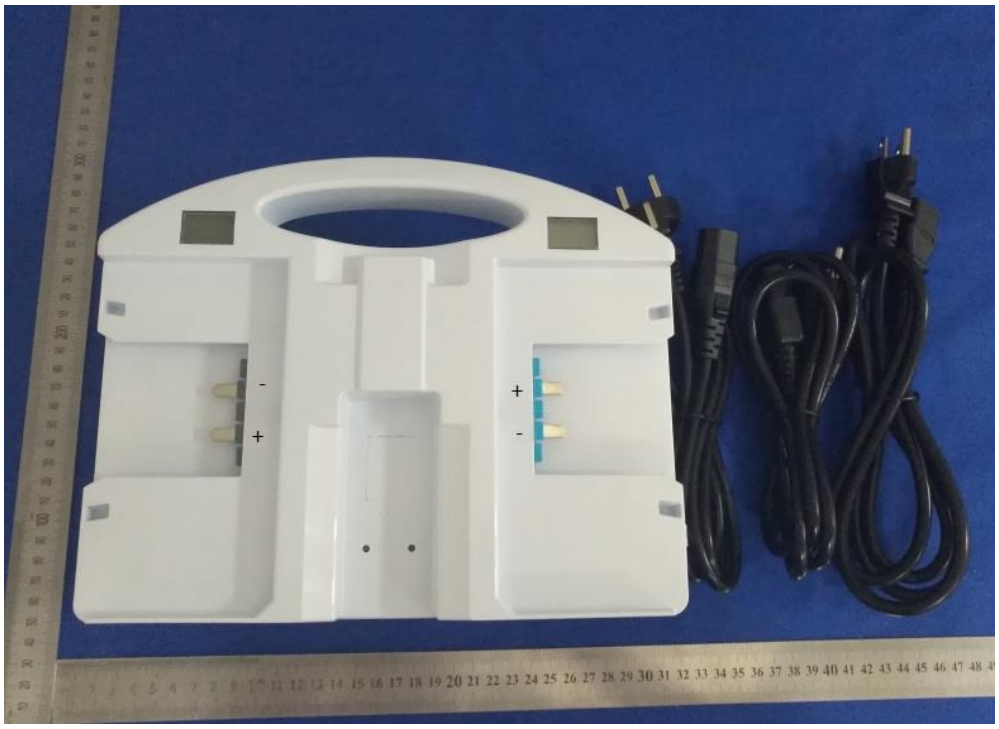
NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict
7.1	Replace the fourth dashed item by the following: – the polarity of the output terminals. The positive terminal shall be indicated by symbol IEC 60417-5005 (2002-10) and the negative terminal by symbol IEC 60417-5006 (2002-10); Add the following subclause:		P
7.6	┼ [Symbol IEC 60417-5005 (2002-10)] plus; positive polarity ▬ [Symbol IEC 60417-5006 (2002-10)] minus; negative polarity		P
19	Abnormal operation		P
19.13	Add the following to the addition: There shall be no rupture of the battery.		P
22	Construction		P
22.101	Replace the text by “Void”		P
Annex ZZ	In the title replace “:2003” by “Ed 4.2” In the first paragraph replace “:2003” by “Ed 4.2” and “Australia” by “Australia and New Zealand”		P
Canada			**CA**
	CAN/CSA-E60335-2-29:06 is an adoption with deviations of IEC 60335-2-29 edition 4.0. The NCB will, however, accept use of IEC 60335-2-29 edition 4.2 for the purpose of demonstration of compliance with CAN/CSA-E60335-2-29:06, provided that the following National Deviations are addressed. When this document is used, the requirements of IEC 60335-2-29 edition 4.2 apply except as modified below; it is not acceptable to revert to requirements in earlier editions of IEC 60335-2-29, unless otherwise specified.		P
7.12	*[Add the following)* The instructions shall state the substance of the following: This appliance is not intended for use by children and other persons whose physical, sensory, or mental capabilities or lack of experience and knowledge prevents them from using the appliance safely without supervision or instruction by a responsible person to ensure that they can use the appliance safely. Children should be supervised by a responsible person to ensure that they do not play with the appliance.		P
Finland			**FI**
25.7	Polyvinyl chloride sheatted cords are not allowed for battery chargers for charging automobile batteries in outdoor use or in locations where the temerature is equal to the outdoor temperature		N/A

Attachment No. 2

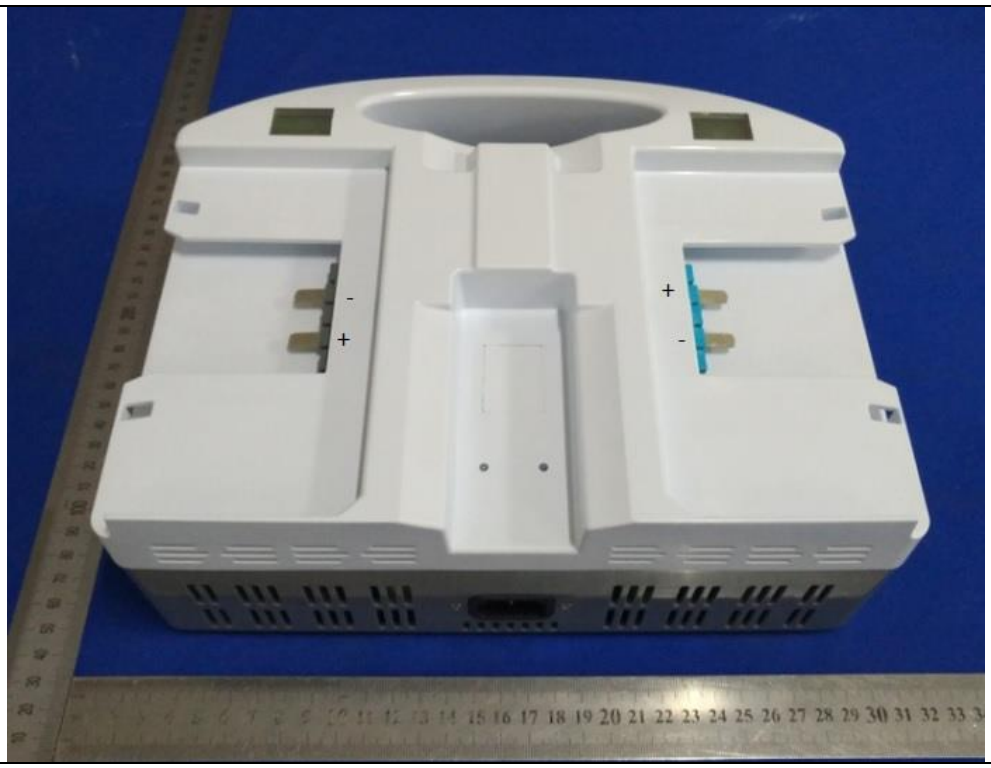
NATIONAL DIFFERENCES			
Clause	Requirement –Test	Result - Remark	Verdict
Japan			**JP**
3.1.9	Addition NOTE 101 Batteries are considered to be discharged when – for nickel-cadmium batteries, the voltage per cell is less than 0,9 V.（power on）		N/A
10.102	Modification The arithmetic mean value of the output current shall not deviate from the **rated d.c. output current** by more than ±10 %.		P
22.26	Deletion Not applicable		P

Attachment No. 3

Details of: External view

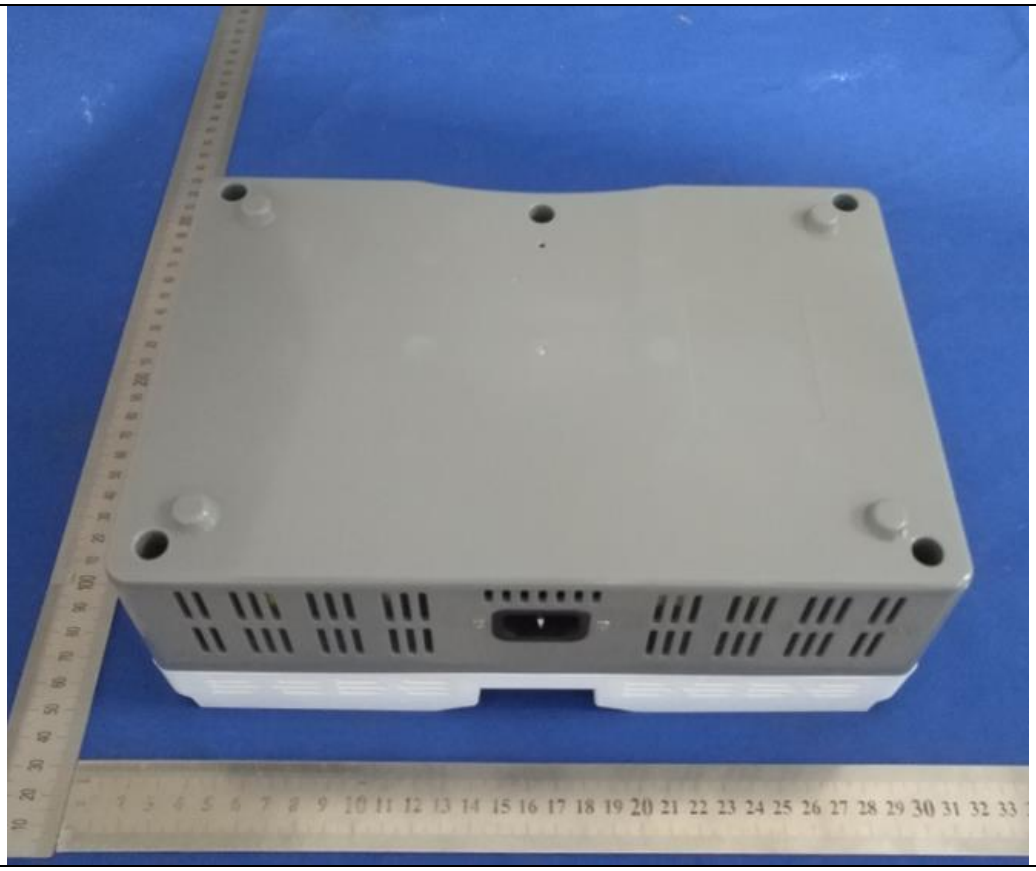


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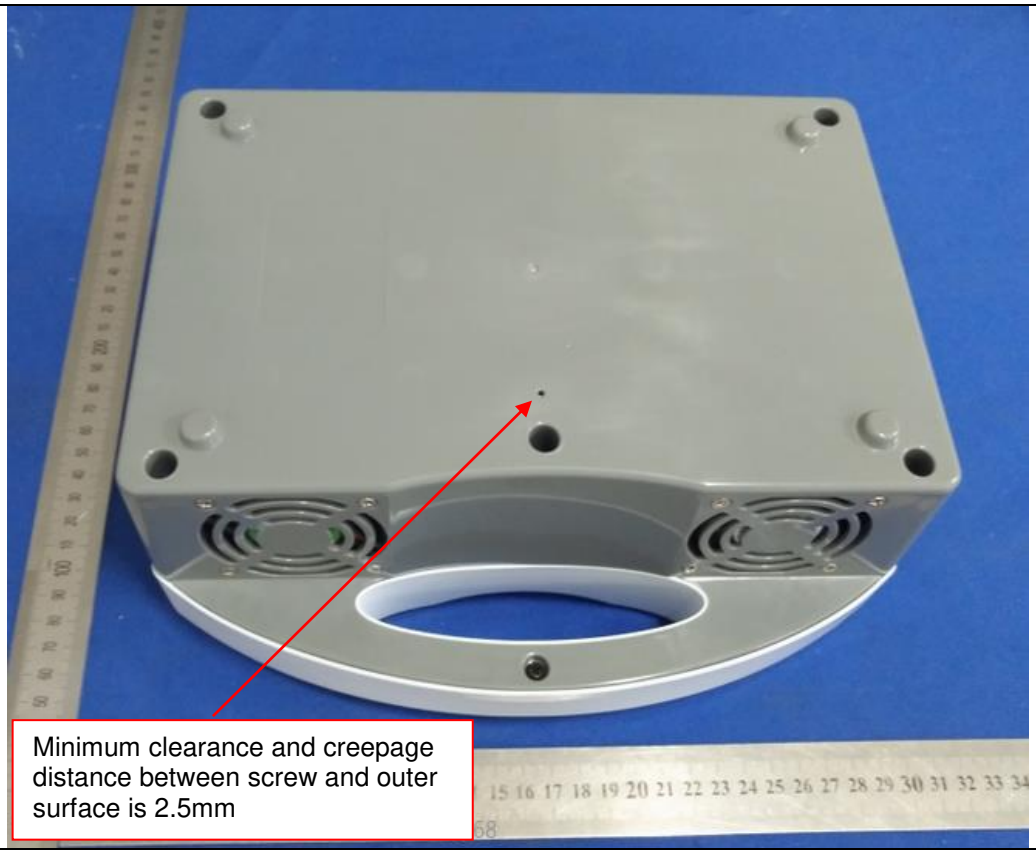


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Details of: External view

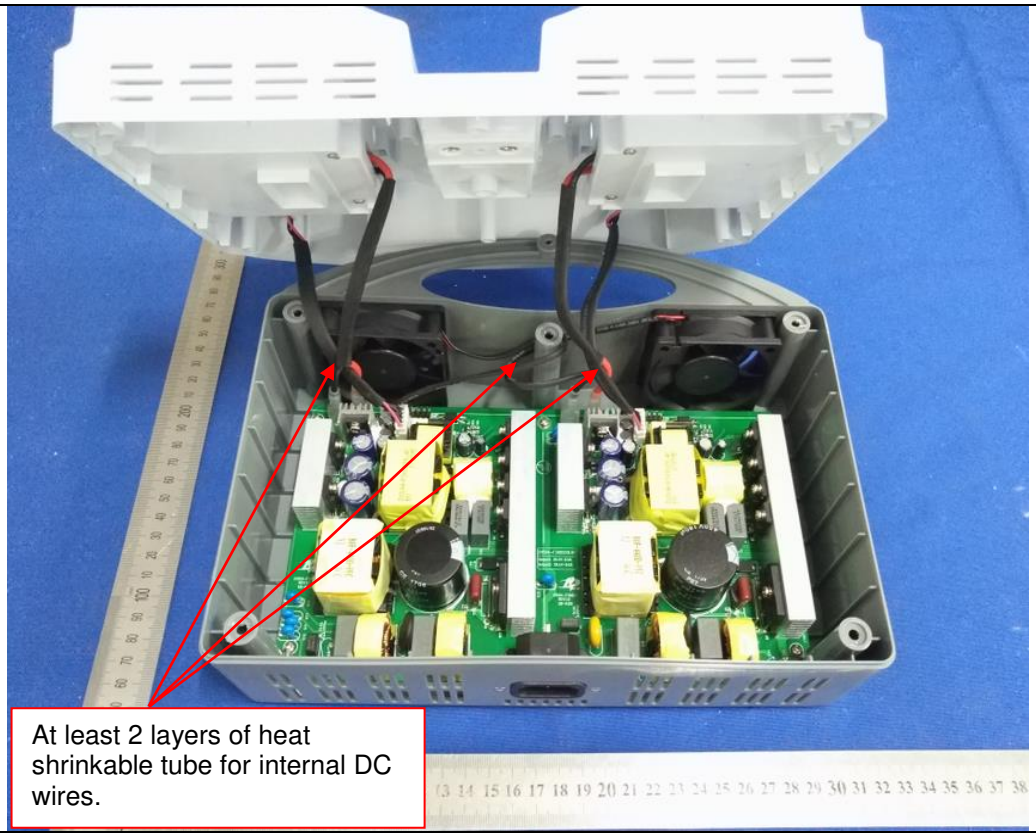


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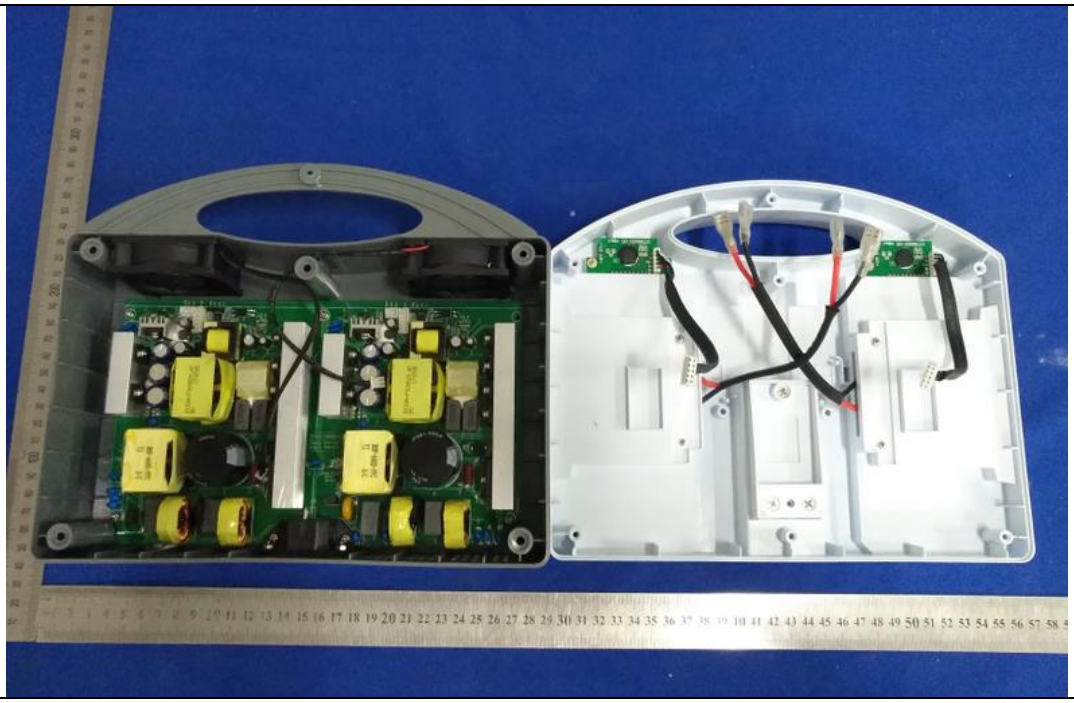


Attachment No. 3

Details of: Inside view

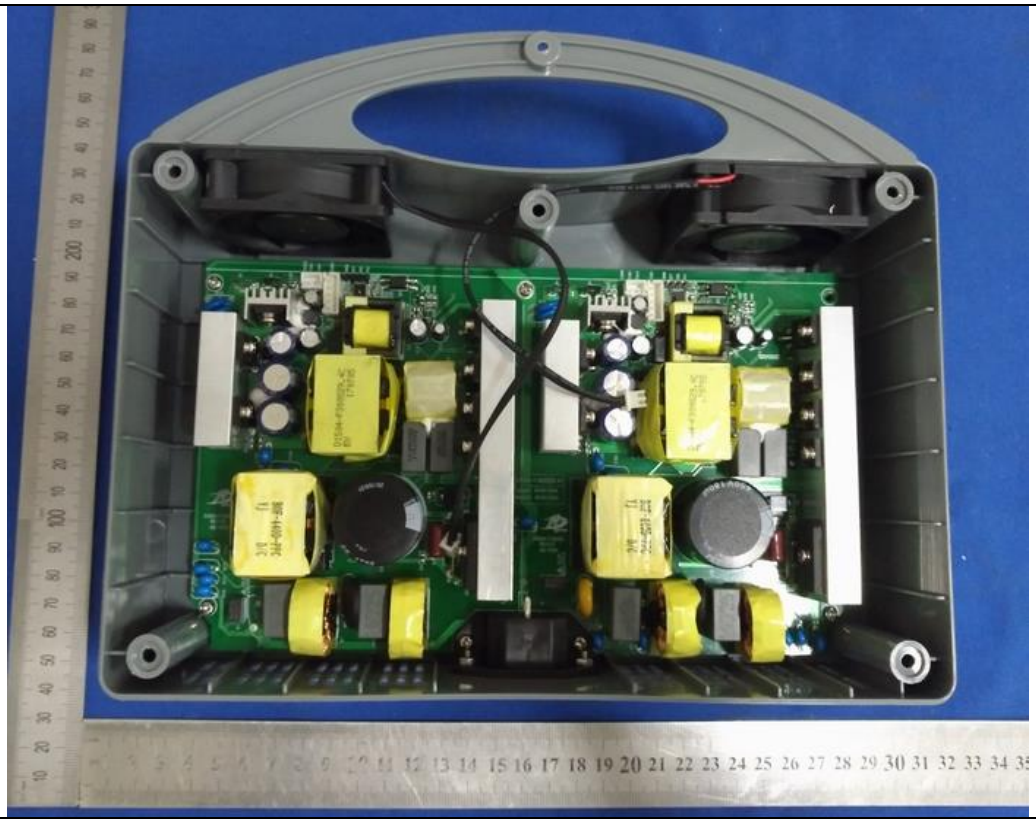


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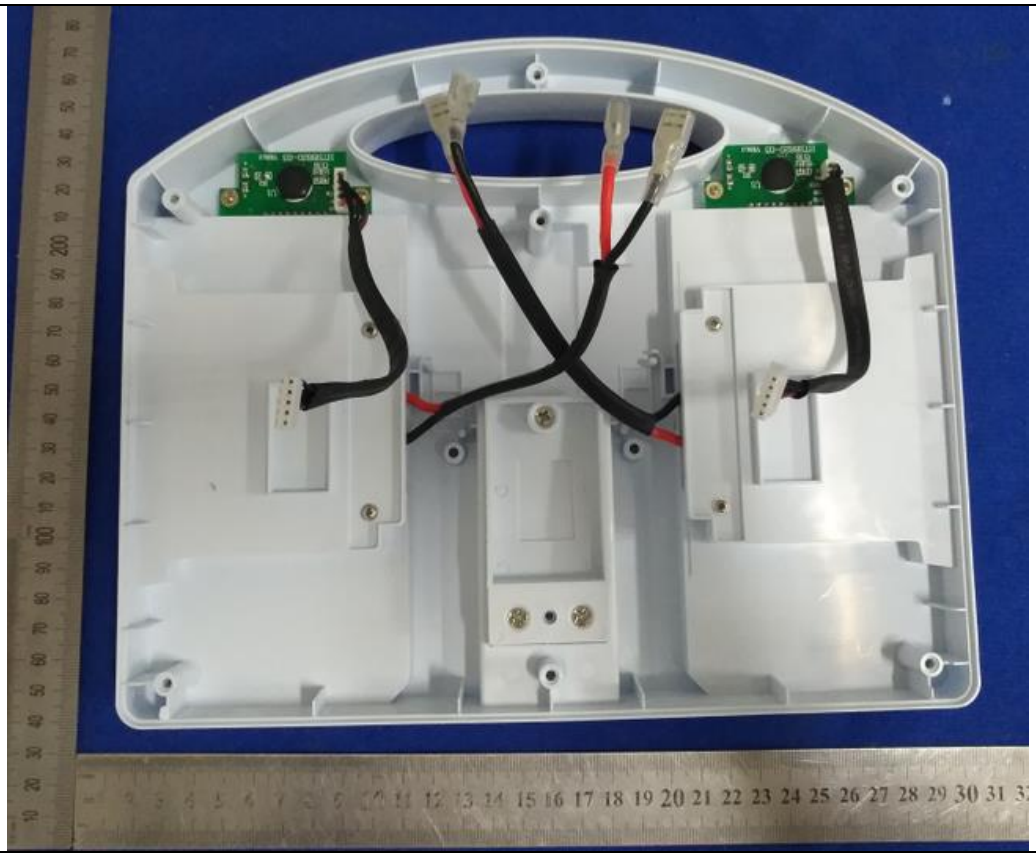


Attachment No. 3

Details of: Inside view

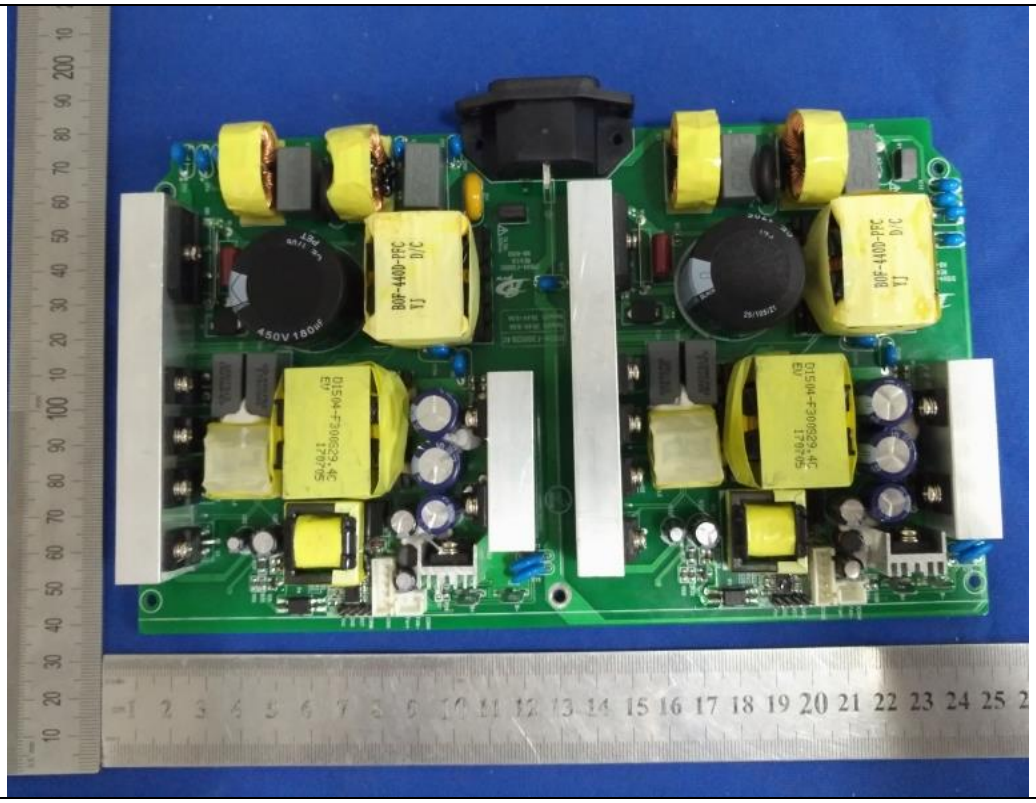


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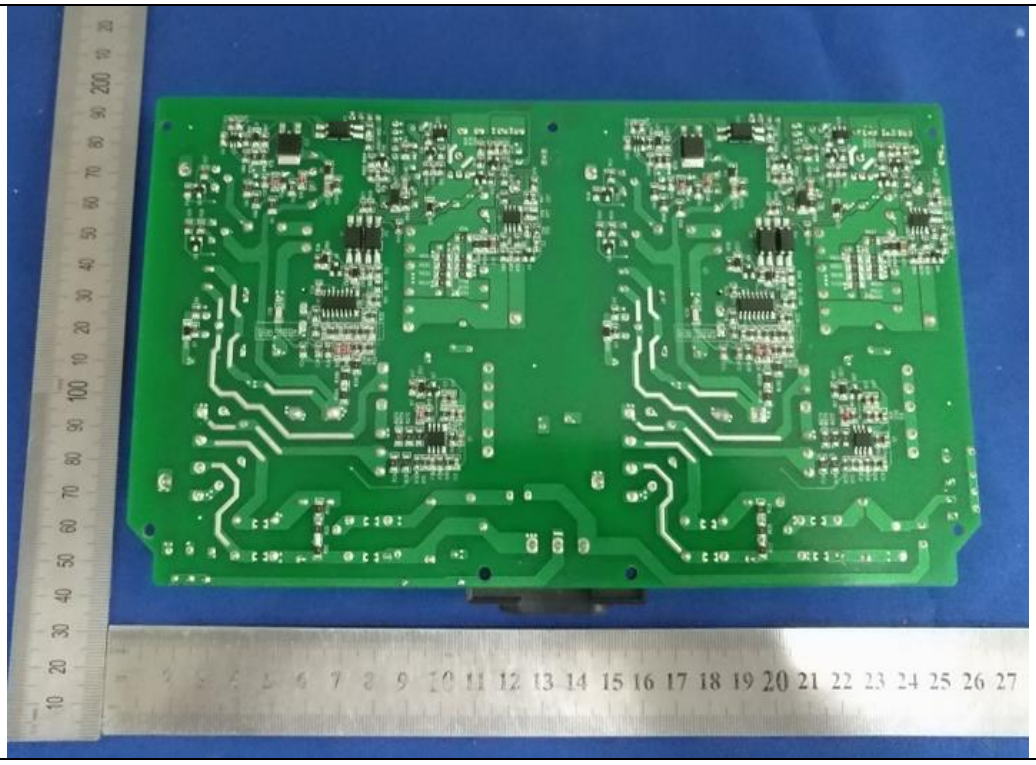


Attachment No. 3

Details of: Top view of PCB

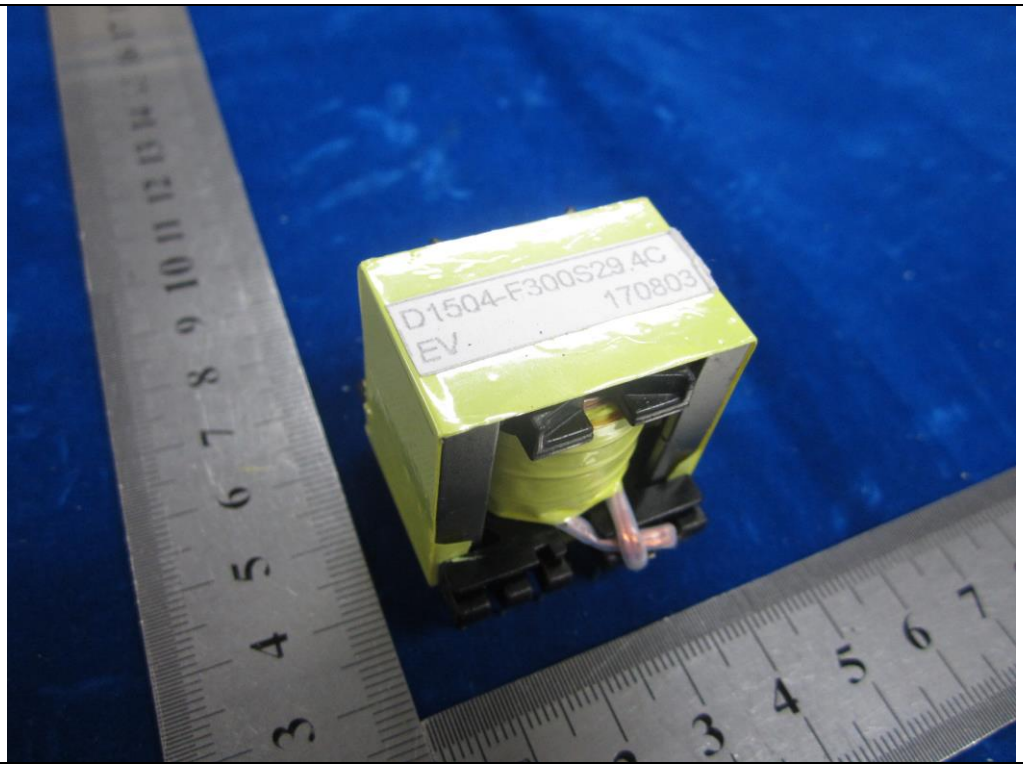


Details of: Bottom view of PCB

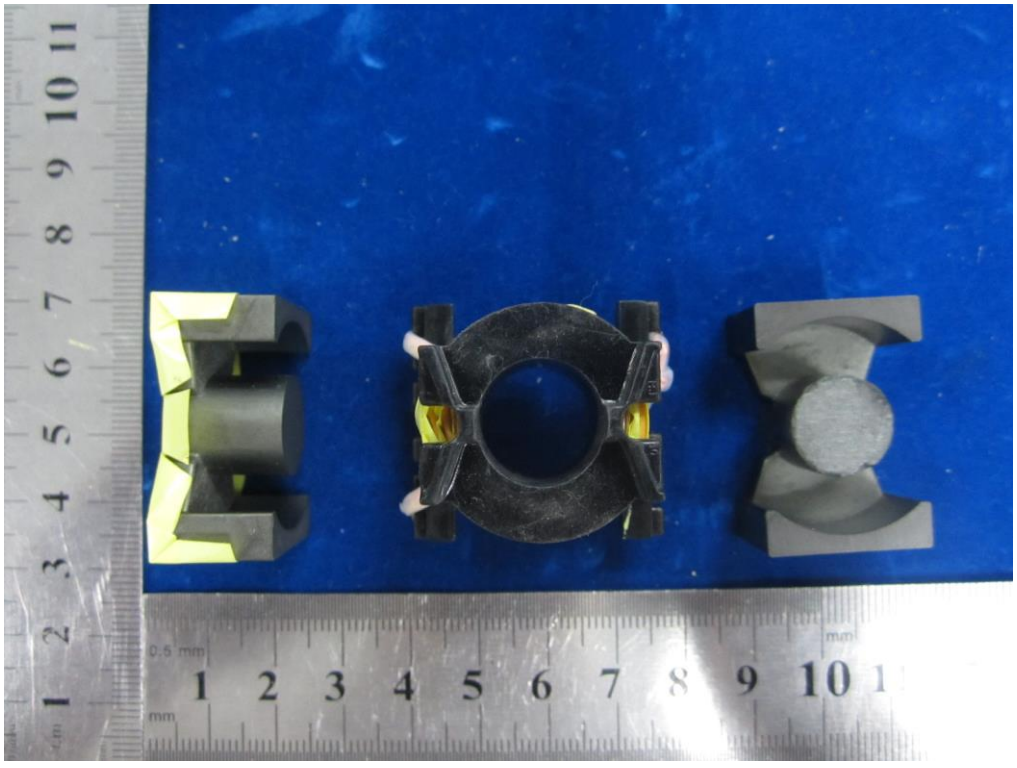


Attachment No. 3

Details of: Transformer (T1/1T1)

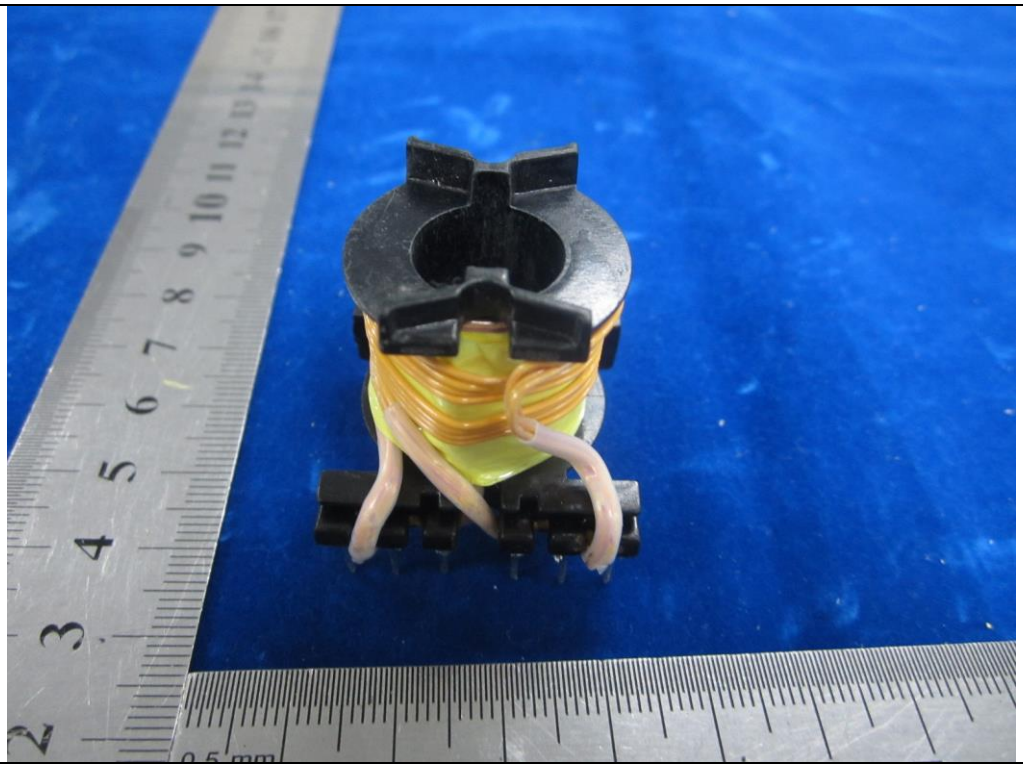


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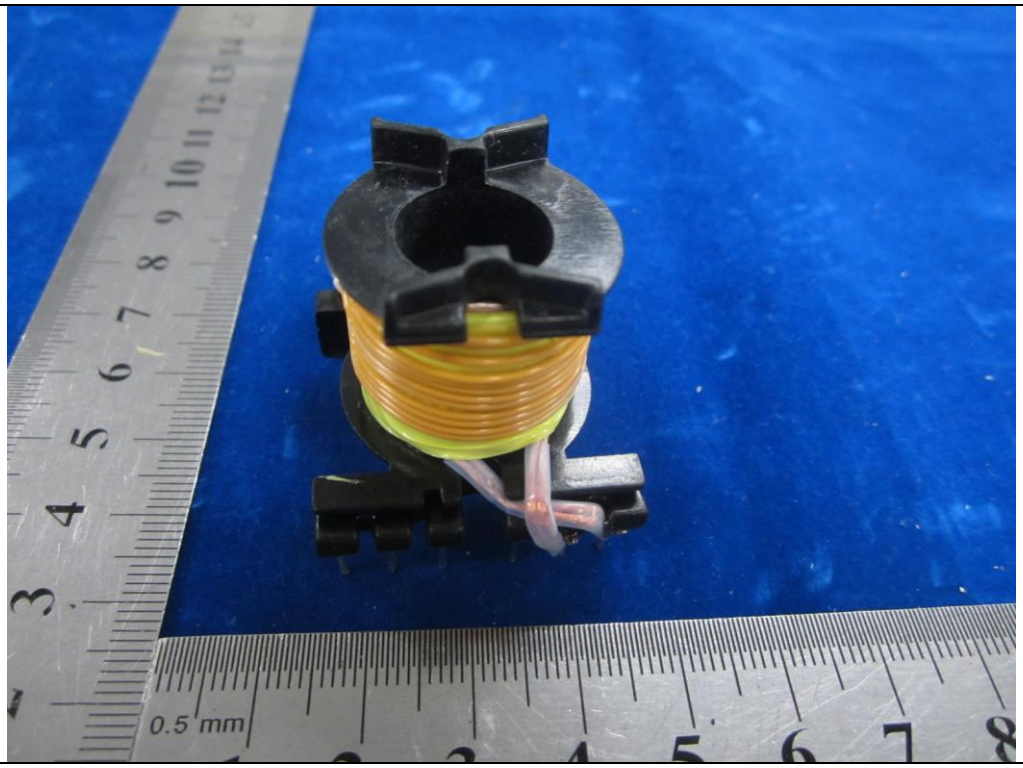


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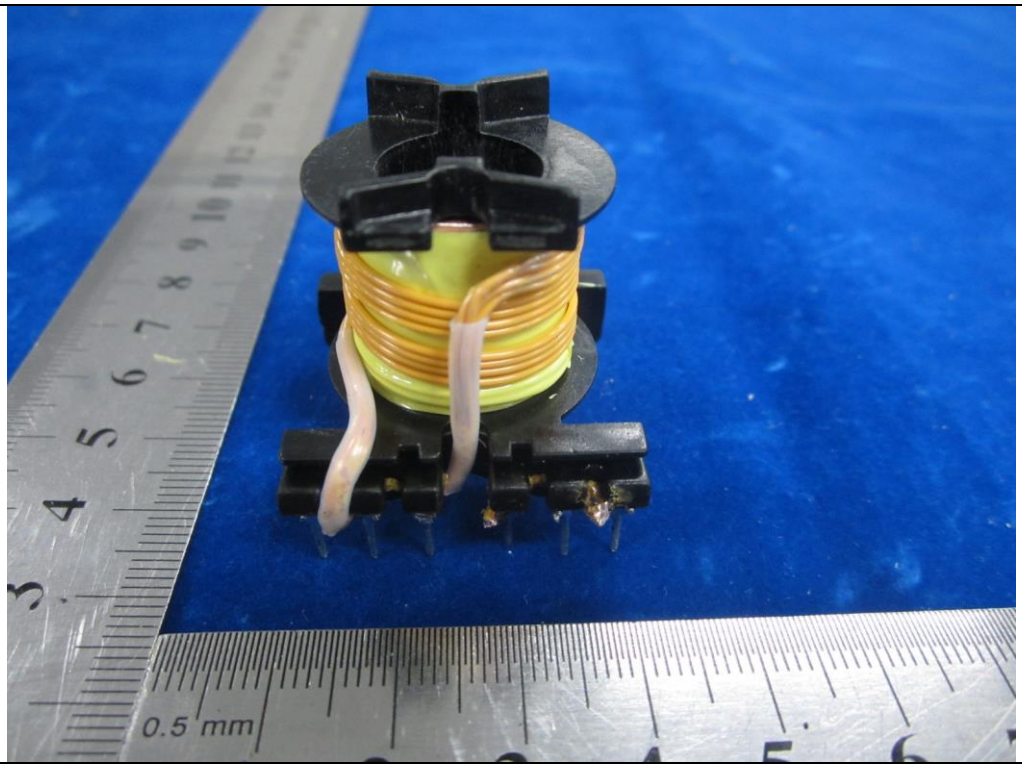


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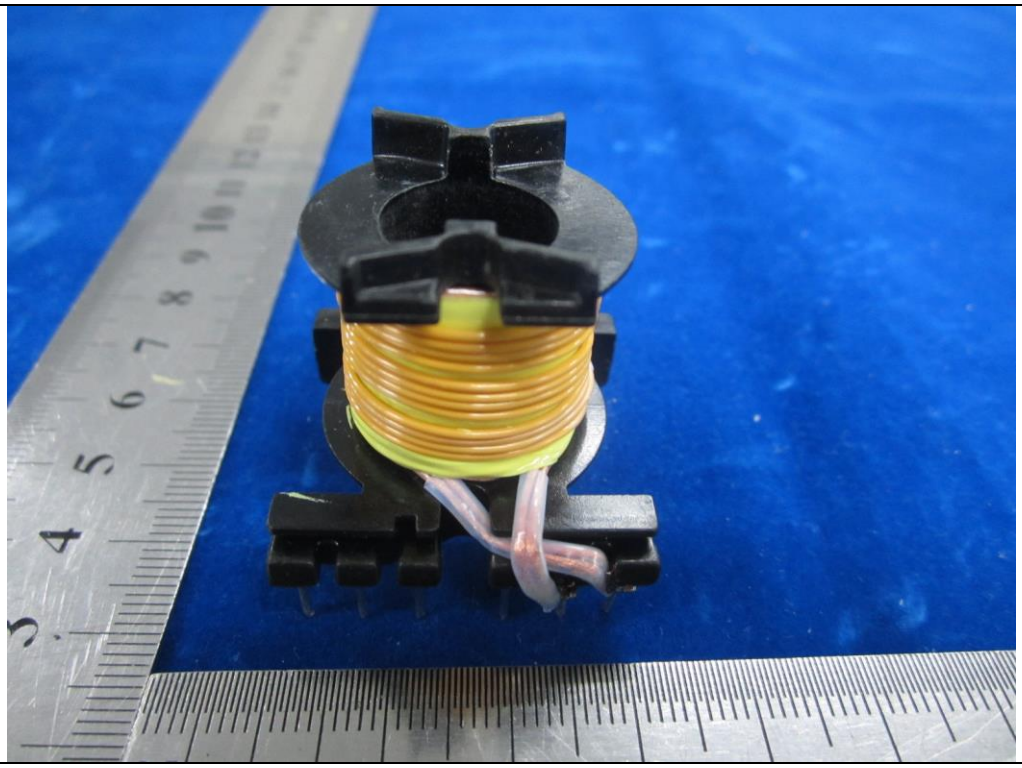


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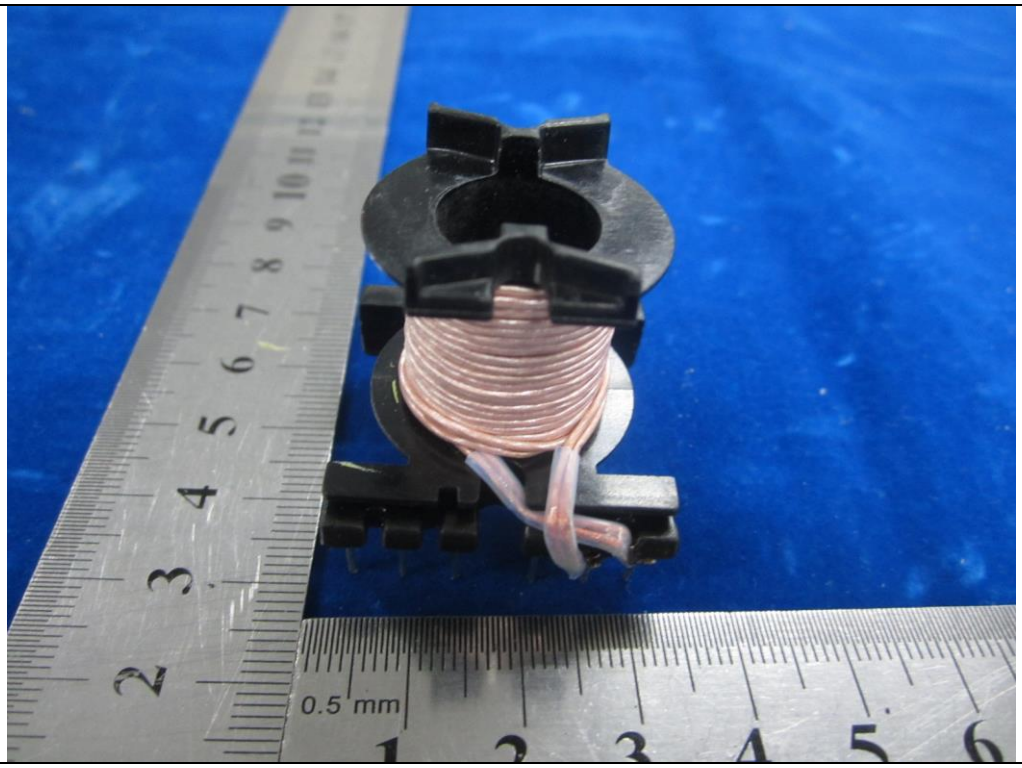


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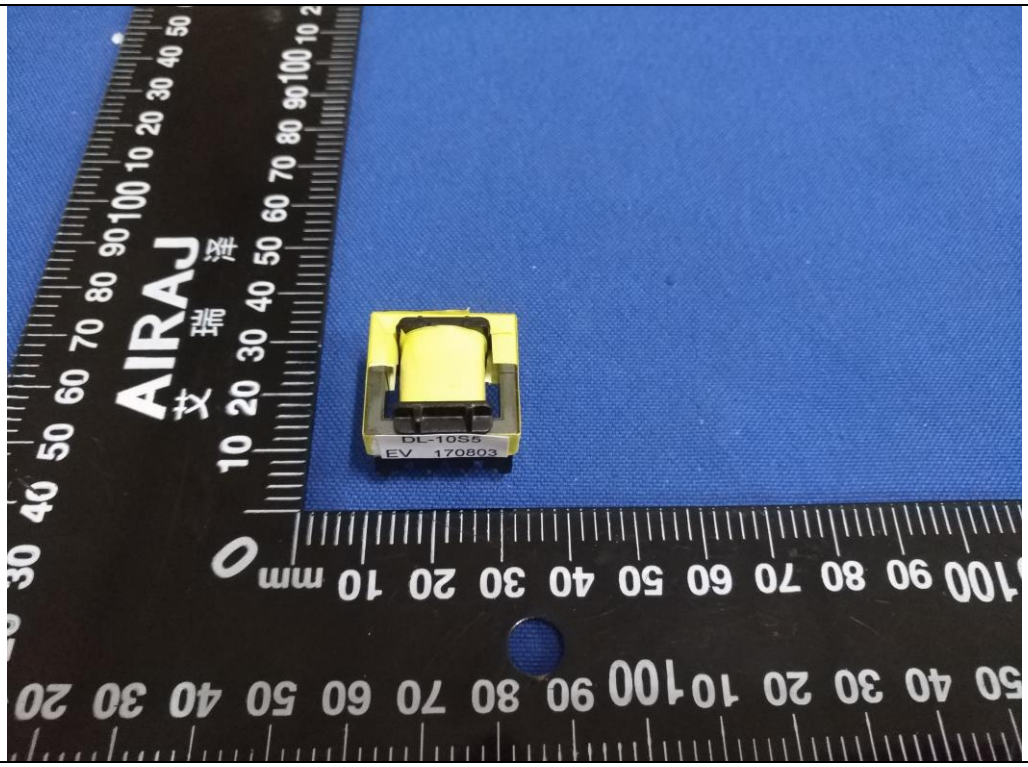


Attachment No. 3

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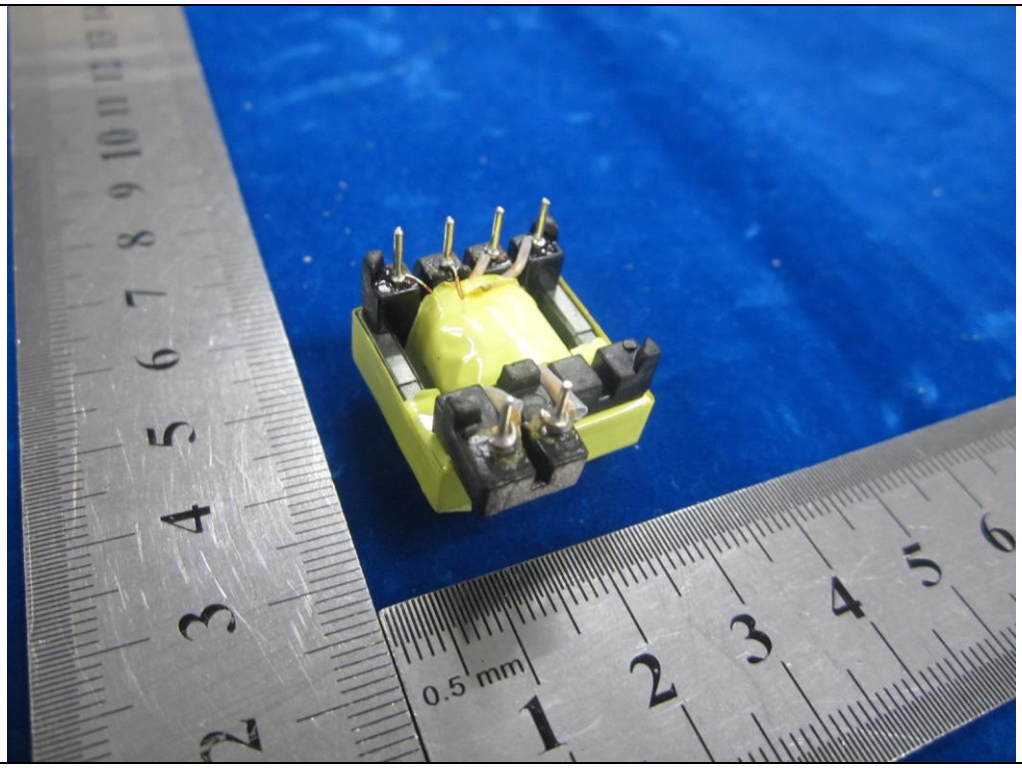


Details of: Transformer (T2/1T2)

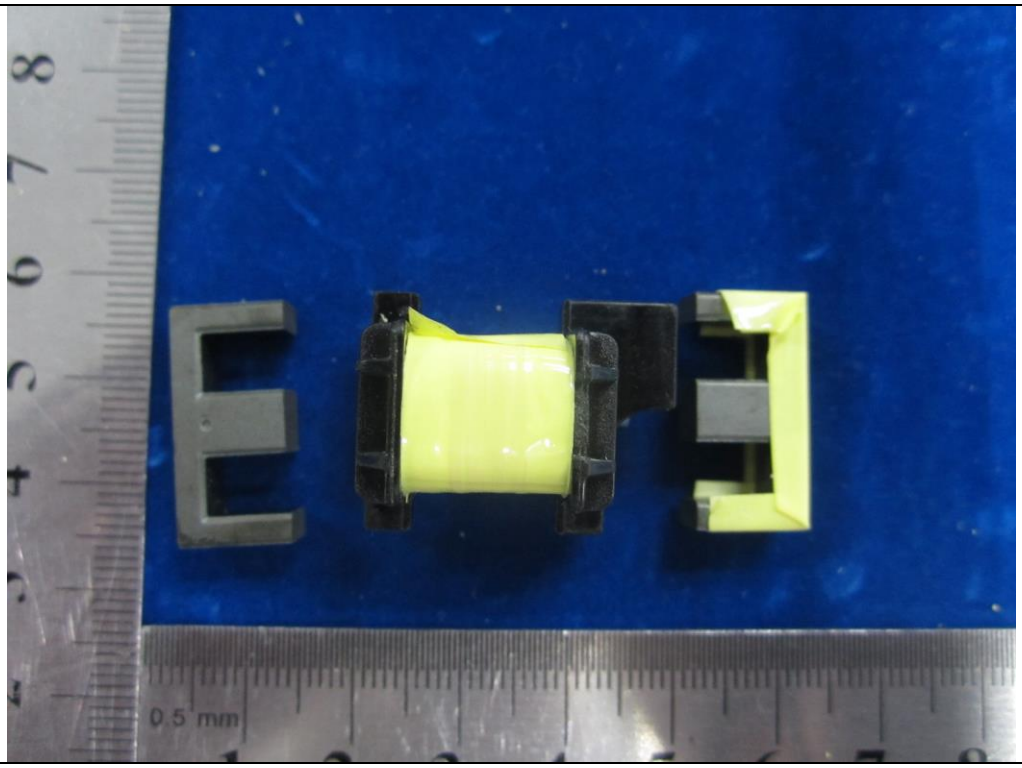


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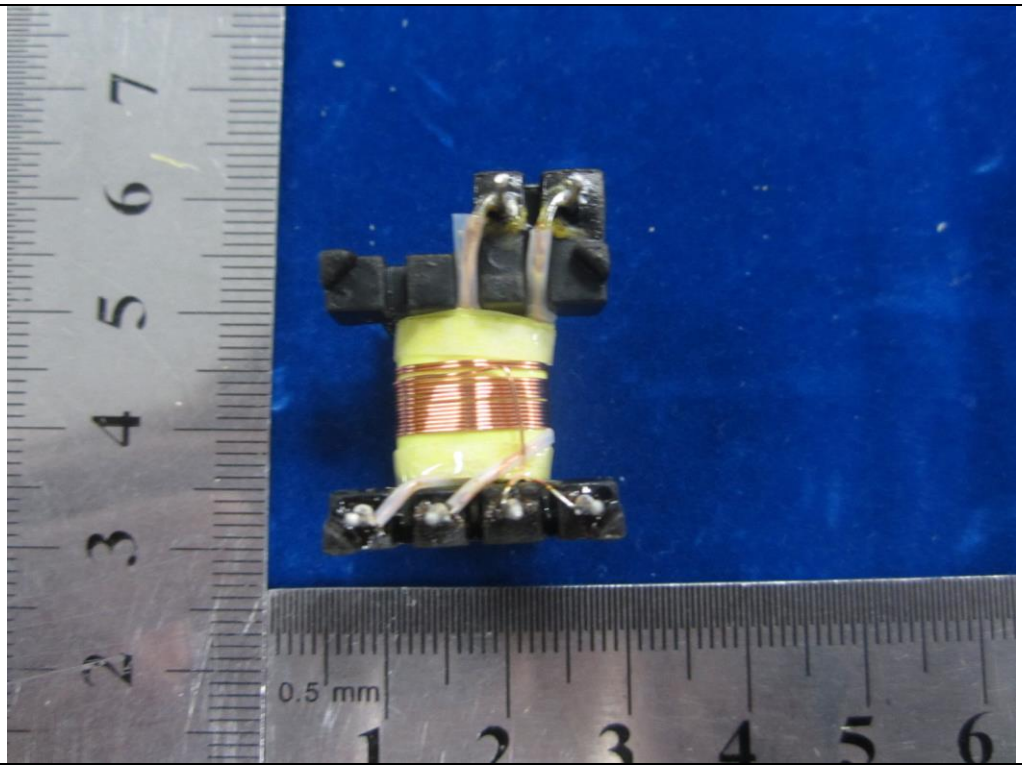
Details of: Transformer (T2/1T2)



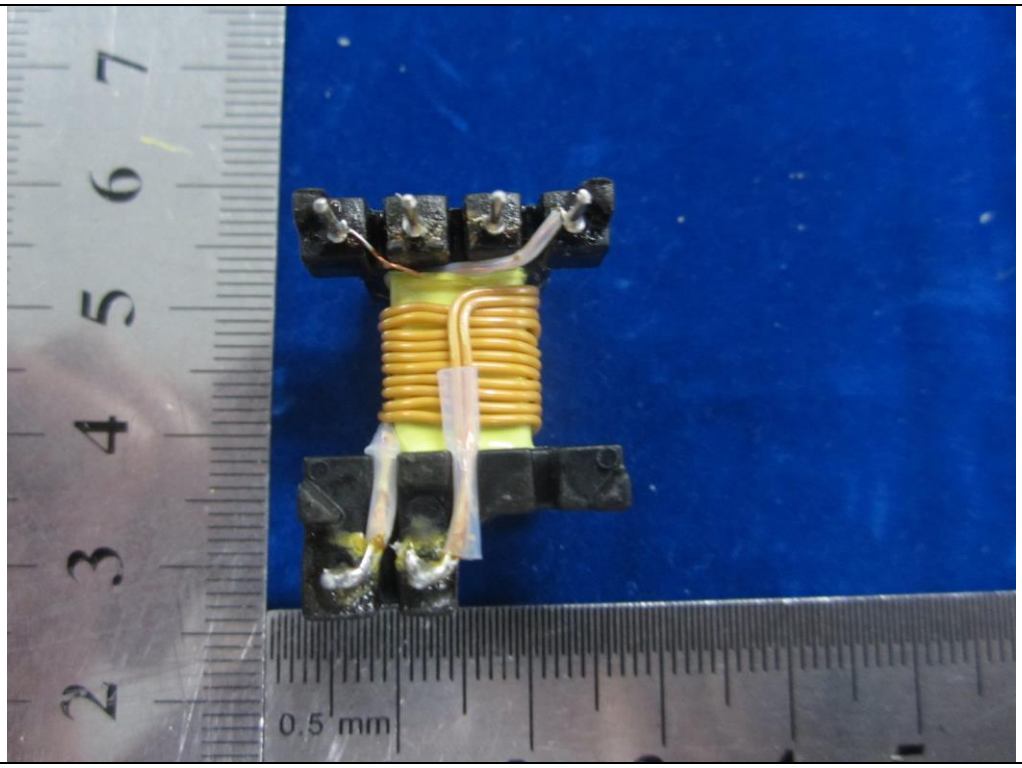
Details of: Transformer (T2/1T2)



Details of: Transformer (T2/1T2)



Details of: Transformer (T2/1T2)



Attachment No. 3

Details of: Transformer (T2/1T2)

