

Reference No. : WTF19F06037356E

Applicant : New Seek Electronic Dongguan Co., Ltd

Address : 5th Building, Haiyong Scien-tech Park, Fenggang Town, Dongguan City, China

Manufacturer : The same as above

Address : The same as above

Product : Battery Charger

Model No. : C802 ,C802B, C808W, C808BW, C816, C816B, C812, C812B, C818, C825, C825B, C826, C826B, C903W, C893W, C894, C896, C898, C871, C821BW, C806, C806B, C807, C807B, C809, C809B, C704A4, C704A3, C704A1, C704A2, C702C2, C702C1, C704C2, C704C1, C706C2, C706C1, C708C2, C708C1, C710C2, C710C1, C712C2, C712C1, C716C2, C716C1 , C701D, C702E, C7XX, C8XX, C9XX, C801, C801B, C876, C872, C884G, C885G, C712F, C708H, C708Q, C702M, C802M, V202+, V407

Technical data : Input: AC 100-240V, 50/60Hz, Max 0.5A;
Output: DC 2.4V, 400mA or DC 8.4V, 35mA

Test Standards:

EN 55014-1:2017

EN 55014-2:2015

EN 61000-3-2:2014

EN 61000-3-3:2013

The above product has been tested by us with the listed standards and found in compliance with the European Electromagnetic Compatibility Directive 2014/30/EU. It is possible to use CE marking to demonstrate the compliance with this EMC Directive.

EN 55014-1: Electromagnetic Compatibility — Requirements for household appliances, electric tools and similar apparatus — Part 1: Emission

EN 55014-2: Electromagnetic Compatibility - Requirements For Household Appliances, Electric Tools And Similar Apparatus - Part 2: Immunity Product Family Standard

EN 61000-3-2: Electromagnetic Compatibility (EMC) Part 3-2: Limits for harmonic current emissions(Equipment input current up to and including 16A per phase)

EN 61000-3-3: Electromagnetic Compatibility (EMC) Part 3-3: Limitation of voltage supply systems for equipment with rated current $\leq 16A$ per phase and not subject to conditional connection

The referred test report(s) show that the product complies with standard(s) recognized as giving presumption of compliance with the essential requirements in the above mentioned EU Directive. Other relevant Directives have to be observed.

After preparation of the necessary technical documentation as well as the conformity declaration, the CE marking as shown below can be affixed on the equipment.



The statement is based on a single evaluation of the sample of above mentioned product. It does not imply an assessment of the whole production.

Waltek Services (Foshan) Co., Ltd.

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TEST REPORT

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Standards : EN 55014-1:2017
EN 55014-2:2015
EN 61000-3-2:2014
EN 61000-3-3:2013

Date of Receipt sample : ---

Date of Test : ---

Date of Issue : 2019-06-13

Test Report Form No. : WEH-55014A-01B

Test Result : Pass

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:

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Compiled by:

Janice Lu

Janice Lu / Project Engineer

Approved by:



Yellow Huang

Yellow Huang / Manager

1 Test Summary

| EMISSION | | | | |
|--------------------------------------------------------|---------------------|------------------------------------|----------------------|---------|
| Test Item | Test Standard | | Class / Severity | Result |
| Mains Terminal Disturbance Voltage, 148.5kHz to 30MHz | EN 55014-1:2017 | | Clause 4.3.3 | Pass |
| Disturbance Power, 30MHz to 300MHz | EN 55014-1:2017 | | Clause 4.3.4 | Pass |
| Discontinuous Disturbance (Click) | EN 55014-1:2017 | | Clause 4.4 | N/A** |
| Radiated Emission, 30MHz to 1000MHz | EN 55014-1:2017 | | Clause 4.3.4 | N/A |
| Harmonic Current emission | EN 61000-3-2:2014 | | Class A | Pass*** |
| Voltage Fluctuation and Flicker | EN 61000-3-3:2013 | | Clause 5 | Pass |
| IMMUNITY (EN 55014-2:2015) | | | | |
| Test Item | Test Method | Class / Severity | Performance Criteria | Result |
| Electrostatic Discharge(ESD) | IEC 61000-4-2:2008 | ±4 kV Contact ±8 kV Air | B | Pass |
| Radio-frequency electromagnetic fields (80MHz to 1GHz) | IEC 61000-4-3:2010 | 3V/m, 80%, 1kHz, Amp. Mod. | A | N/A |
| Electrical Fast Transients (EFT) | IEC 61000-4-4:2012 | AC ±1.0kV DC ±0.5kV | B | Pass |
| Surge | IEC 61000-4-5:2005 | ±1kV D.M.† ±2kV C.M.‡ | B | Pass |
| Injected Currents, 0.15MHz to 230MHz | IEC 61000-4-6:2013 | 3Vr.m.s.(emf), 80%, 1kHz Amp. Mod. | A | Pass |
| Voltage Dips and Interruptions | IEC 61000-4-11:2004 | 0 % U _T * for 0.5per | C | Pass |
| | | 40 % U _T * for 10per | | Pass |
| | | 70 % U _T * for 25per | | Pass |

Remark:

Pass Test item meets the requirement

Fail Test item does not meet the requirement

N/A Test case does not apply to the test object

A.M Amplitude Modulation

\dagger Differential Mode

\ddagger Common Mode

* U_T is the nominal supply voltage

** According to the electrical characteristics and usage of the equipment, the EUT does not produce discontinuous radio interference voltages on AC Mains. Therefore this test item has been skipped.

*** According to EN61000-3-2 which states: "For the following categories of equipment limits are not specified in this edition of the standard. Equipment with a rated power of 75W or less, other than lighting equipment" Therefore there is no need for harmonics test to be performed on this product and deemed to fulfil emission requirements without testing.

2 Contents

| | Page |
|-----------------------------------------------------------------|-----------|
| COVER PAGE | 1 |
| 1 TEST SUMMARY | 2 |
| 2 CONTENTS | 3 |
| 3 GENERAL INFORMATION | 5 |
| 3.1 GENERAL DESCRIPTION OF E.U.T. | 5 |
| 3.2 DETAILS OF E.U.T. | 5 |
| 3.3 DESCRIPTION OF SUPPORT UNITS | 5 |
| 3.4 STANDARDS APPLICABLE FOR TESTING..... | 5 |
| 3.5 TEST FACILITY..... | 6 |
| 3.6 SUBCONTRACTED..... | 6 |
| 3.7 ABNORMALITIES FROM STANDARD CONDITIONS..... | 6 |
| 3.8 OTHER..... | 6 |
| 4 EQUIPMENT USED DURING TEST..... | 7 |
| 4.1 MEASUREMENT UNCERTAINTY | 7 |
| 5 EMISSION TEST RESULTS..... | 9 |
| 5.1 MAINS TERMINALS DISTURBANCE VOLTAGE, 148.5kHz TO 30MHz..... | 9 |
| 5.1.1 E.U.T. Operation | 9 |
| 5.1.2 Block Diagram of Test Setup..... | 9 |
| 5.1.3 Measurement Data | 10 |
| 5.1.4 Mains Terminals Disturbance Voltage Test Data | 10 |
| 5.2 DISTURBANCE POWER, 30MHz TO 300MHz | 12 |
| 5.2.1 E.U.T. Operation | 12 |
| 5.2.2 Block Diagram of Test Setup..... | 12 |
| 5.2.3 Measurement Data | 13 |
| 5.2.4 Disturbance Power Test Results on AC Line..... | 13 |
| 5.3 VOLTAGE FLUCTUATION AND FLICKER | 14 |
| 5.3.1 E.U.T. Operation | 14 |
| 5.3.2 Block Diagram of Setup..... | 14 |
| 5.3.3 Voltage Fluctuation and Flicker Test Data..... | 15 |
| 6 IMMUNITY TEST RESULTS..... | 16 |
| 6.1 PERFORMANCE CRITERIA | 16 |
| 6.2 ELECTROSTATIC DISCHARGE (ESD)..... | 16 |
| 6.2.1 E.U.T. Operation | 17 |
| 6.2.2 Block Diagram of Setup..... | 17 |
| 6.2.3 Direct Discharge Test Results..... | 18 |
| 6.2.4 Indirect Discharge Test Results..... | 18 |
| 6.3 ELECTRICAL FAST TRANSIENTS (EFT) | 18 |
| 6.3.1 E.U.T. Operation | 19 |
| 6.3.2 Block Diagram of Setup..... | 19 |
| 6.3.3 Test Results..... | 19 |
| 6.4 SURGE..... | 20 |
| 6.4.1 E.U.T. Operation | 20 |
| 6.4.2 Block Diagram of Setup..... | 20 |
| 6.4.3 Test Results..... | 21 |
| 6.5 INJECTED CURRENTS IMMUNITY, 0.15MHz TO 230MHz | 21 |
| 6.5.1 E.U.T. Operation | 21 |
| 6.5.2 Block Diagram of Setup..... | 22 |
| 6.5.3 Test Results..... | 22 |
| 6.6 VOLTAGE DIPS AND INTERRUPTIONS | 23 |

| | | |
|----------|-----------------------------------------------------------------------|-----------|
| 6.6.1 | <i>E.U.T. Operation</i> | 23 |
| 6.6.2 | <i>Block Diagram of Setup</i> | 23 |
| 6.6.3 | <i>Test Results</i> | 24 |
| 7 | PHOTOGRAPHS – TEST SETUP | 25 |
| 7.1 | PHOTOGRAPH – MAINS TERMINAL DISTURBANCE VOLTAGE TEST SETUP | 25 |
| 7.2 | PHOTOGRAPH – DISTURBANCE POWER TEST SETUP | 25 |
| 7.3 | PHOTOGRAPH – VOLTAGE FLUCTUATION AND FLICKER TEST SETUP | 26 |
| 7.4 | PHOTOGRAPH – ESD IMMUNITY TEST SETUP | 26 |
| 7.5 | PHOTOGRAPH – EFT IMMUNITY TEST SETUP | 27 |
| 7.6 | PHOTOGRAPH – SURGE IMMUNITY TEST SETUP | 27 |
| 7.7 | PHOTOGRAPH – INJECTED CURRENTS IMMUNITY TEST SETUP | 28 |
| 7.8 | PHOTOGRAPH – VOLTAGE DIPS AND INTERRUPTIONS IMMUNITY TEST SETUP | 28 |
| 8 | PHOTOGRAPHS – CONSTRUCTIONAL DETAILS | 29 |
| 8.1 | EUT – EXTERNAL VIEW | 29 |

3 General Information

3.1 General Description of E.U.T.

Product Name : Battery Charger

Model No. : C802 ,C802B, C808W, C808BW, C816, C816B, C812, C812B, C818, C825, C825B, C826, C826B, C903W, C893W, C894, C896, C898, C871, C821BW, C806, C806B, C807, C807B, C809, C809B, C704A4, C704A3, C704A1, C704A2, C702C2, C702C1, C704C2, C704C1, C706C2, C706C1, C708C2, C708C1, C710C2, C710C1, C712C2, C712C1, C716C2, C716C1 , C701D, C702E, C7XX, C8XX, C9XX, C801, C801B, C876, C872, C884G, C885G, C712F, C708H, C708Q, C702M, C802M, V202+, V407

Remark..... : All modes are identical products except their appearance. Therefore the full EMC tests were performed on model C802B.

3.2 Details of E.U.T.

Technical Data..... : Input: AC 100-240V, 50/60Hz, Max 0.5A;
Output: DC 2.4V, 400mA or DC 8.4V, 35mA

3.3 Description of Support Units

The EUT has been tested as an independent unit. C802B is the test sample. The DV,DP tests were performed in the condition of AC240V/50Hz input. The other tests were performed in the condition of AC 230V/50Hz input.

3.4 Standards Applicable for Testing

The tests were performed according to following standards:

| | |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EN 55014-1:2017 | Electromagnetic compatibility-Requirements for household appliances, electric tools and similar apparatus-Part 1:Emission |
| EN 55014-2:2015 | Electromagnetic compatibility Requirements for household appliances, Part 2: Immunity Product family. |
| EN 61000-3-2:2014 | Electromagnetic compatibility (EMC) -- Part 3-2: Limits - Limits for harmonic current emissions (equipment input current up to and including 16 A per phase). |
| EN 61000-3-3:2013 | Electromagnetic compatibility (EMC) -- Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection. |

3.5 Test Facility

The test facility has a test site registered with the following organizations:

- **ISED – Registration No.: 21895**

Waltek Services (Foshan) Co., Ltd. has been registered and fully described in a report filed with the Innovation, Science and Economic Development Canada (ISED). The acceptance letter from the ISED is maintained in our files. Registration ISED number: 21895, March 12, 2019

- **FCC – Registration No.: 820106**

Waltek Services (Foshan) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 820106, August 16, 2018

- **NVLAP – Lab Code: 600191-0**

Waltek Services (Foshan) Co., Ltd. EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 600191-0.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

3.6 Subcontracted

Whether parts of tests for the product have been subcontracted to other labs:

☐ Yes ☒ No

If Yes, list the related test items and lab information:

Test items:---

Lab information:---

3.7 Abnormalities from Standard Conditions

None.

3.8 Other

This report is based on project No. WTF16F0653449R1X1E for model supplement and standard updated. The new models are identical product with the original models only except for their appearance. And the updated standards do not affect the EMC test items. Therefore they do not affect the EMC test items for the updated standards and supplemented model, the EUT is deemed to fulfill all the requirements and no further test has been performed. For more detail test results please refer to the report No. WTF16F0653449R1X1E.

4 Equipment Used during Test

| Mains Terminal Disturbance Voltage (Conducted Emission) | | | | | |
|---------------------------------------------------------|----------------------------------------|--------------|------------|------------|--------------------|
| Item | Equipment | Manufacturer | Model No. | Serial No. | Calibration Status |
| 1. | EMI Test Receiver | R&S | ESCI | 101178 | Valid |
| 2. | LISN | R&S | ENV216 | 101215 | Valid |
| 3. | LISN | SCHWARZBECK | NSLK 8128 | 8128-289 | Valid |
| 4. | Cable | HUBER+SUHNER | CBL2-NN-3M | 2230300 | Valid |
| 5. | Switch | ESE | RSU/M2 | --- | Valid |
| Disturbance Power | | | | | |
| Item | Equipment | Manufacturer | Model No. | Serial No. | Calibration Status |
| 1. | EMI Test Receiver | R&S | ESCI | 101178 | Valid |
| 2. | Absorbing Clamp | LUTHI | MDS21 | 4067 | Valid |
| 3. | Cable | HUBER+SUHNER | CBL2-NN-9M | 2230900 | Valid |
| 4. | Switch | ESE | RSU/M2 | --- | Valid |
| Harmonics and Flicker Measuring System | | | | | |
| Item | Equipment | Manufacturer | Model No. | Serial No. | Calibration Status |
| 1. | Harmonics and Flicker Measuring System | TESEQ | CCN1000-1 | 1133A01498 | Valid |
| ESD | | | | | |
| Item | Equipment | Manufacturer | Model No. | Serial No. | Calibration Status |
| 1. | ESD Simulator | TESEQ | NSG437 | 521 | Valid |
| EFT & Voltage Dips and Interruptions | | | | | |
| Item | Equipment | Manufacturer | Model No. | Serial No. | Calibration Status |
| 1. | EMS test system | TESEQ | NSG3040 | 0319 | Valid |
| 2. | Clamp | TESEQ | CDN8014 | 31405 | Valid |
| Surge | | | | | |
| Item | Equipment | Manufacturer | Model No. | Serial No. | Calibration Status |
| 1. | Surge Simulator | TESEQ | NSG3060 | 1395 | Valid |
| Injected Currents | | | | | |
| Item | Equipment | Manufacturer | Model No. | Serial No. | Calibration Status |
| 1. | Conducted Immunity test system | TESEQ | NSG4070-75 | 31469 | Valid |
| 2. | CDN | TESEQ | M016 | 31586 | Valid |
| 3. | Clamp | TESEQ | KEMZ801 | 32362 | Valid |

4.1 Measurement Uncertainty

| Test Item | Frequency Range | Uncertainty | Note |
|--------------------|-----------------|-------------|------|
| Conducted Emission | 150kHz~30MHz | ±2.66dB | (1) |

| | | | |
|-------------------|--------------|---------------------|-----|
| Disturbance Power | 30MHz~300MHz | $\pm 3.21\text{dB}$ | (1) |
|-------------------|--------------|---------------------|-----|

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

5 Emission Test Results

5.1 Mains Terminals Disturbance Voltage, 148.5kHz to 30MHz

Test Requirement..... : EN 55014-1
Test Method..... : EN 55014-1
Test Result..... : Pass
Frequency Range..... : 148.5kHz to 30MHz
Class/Severity..... : Table 5 of EN55014-1

5.1.1 E.U.T. Operation

Operating Environment:

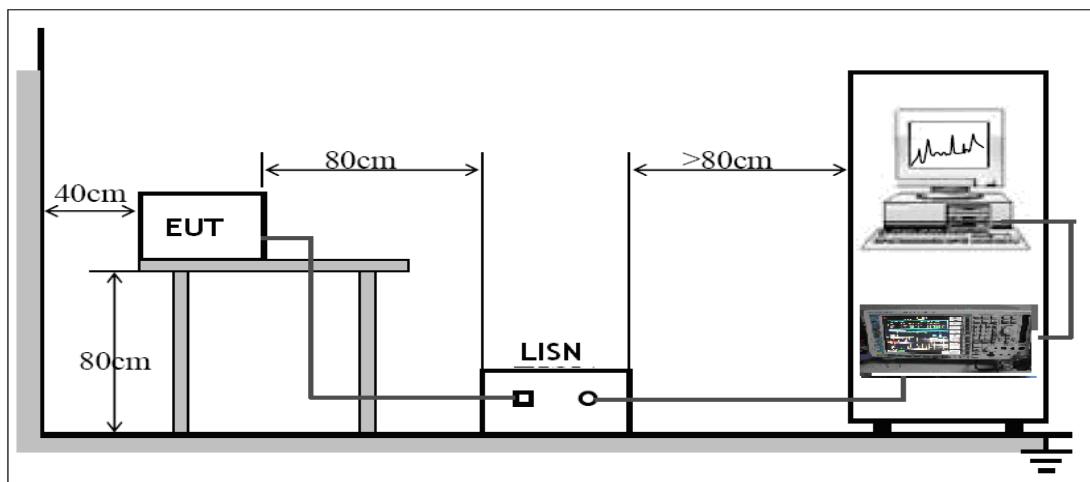
Temperature : 24.8°C
Humidity..... : 49.3%RH
Atmospheric Pressure..... : 101.2kPa

EUT Operation:

Input Voltage : AC 240V/50Hz
Operating Mode..... : Charging mode

5.1.2 Block Diagram of Test Setup

The Mains Terminals Disturbance Voltage tests were performed in accordance with the EN 55014-1.

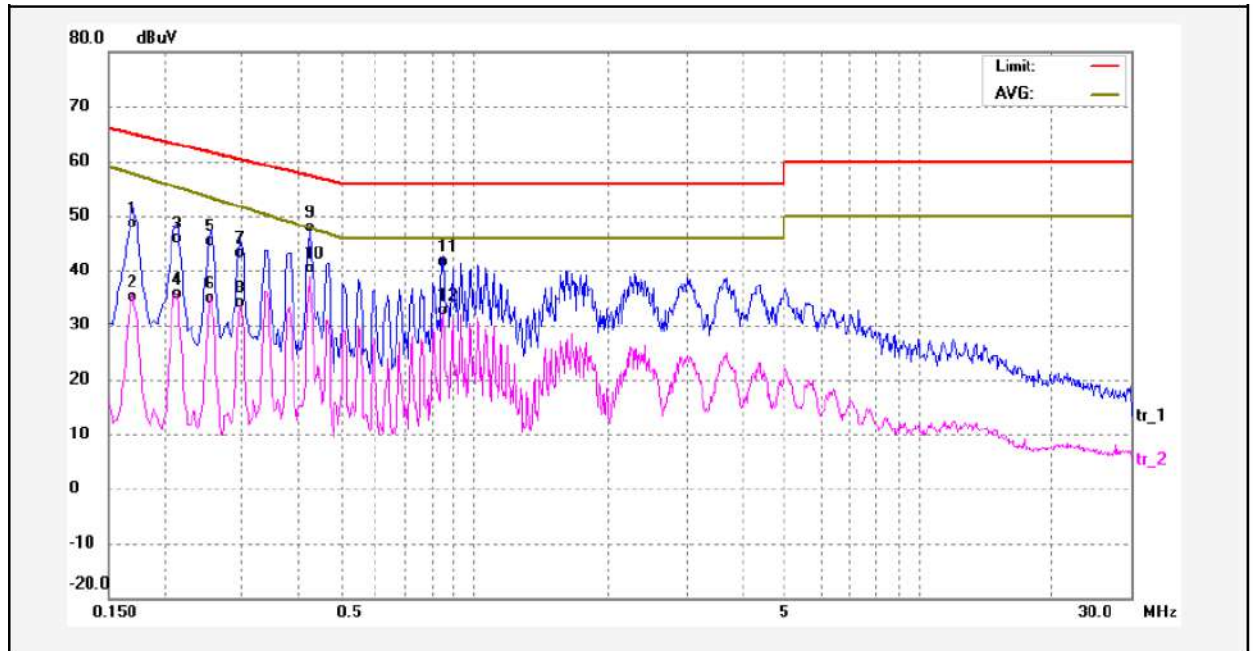


5.1.3 Measurement Data

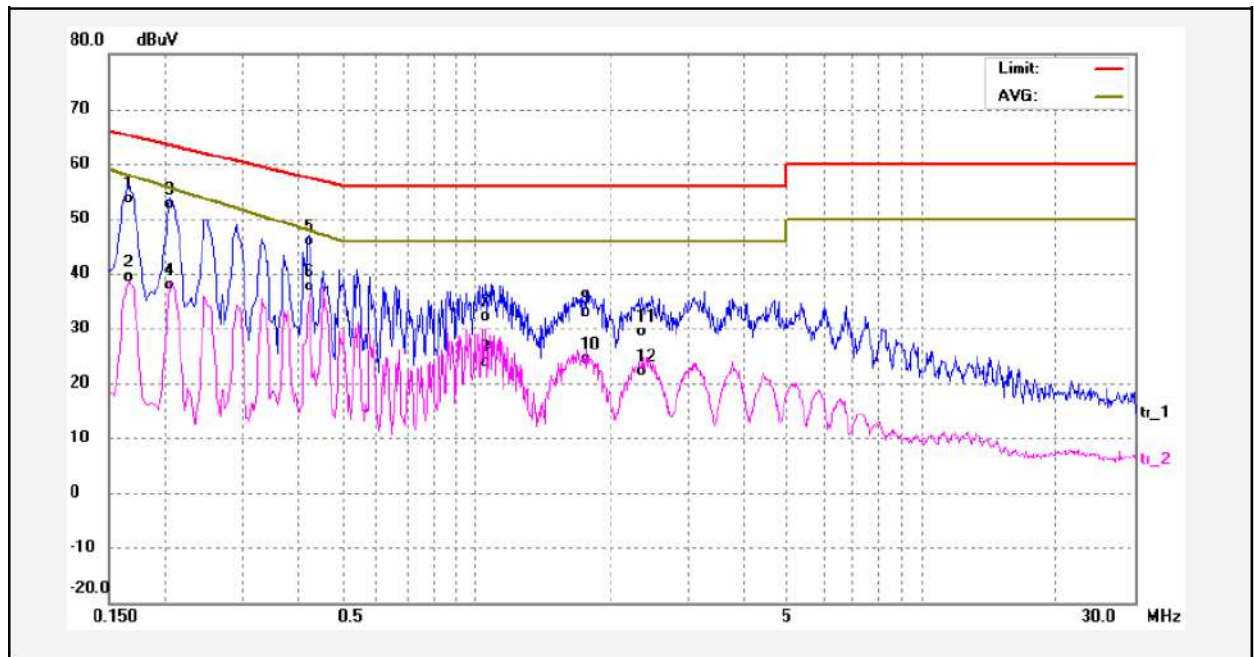
The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

5.1.4 Mains Terminals Disturbance Voltage Test Data

Live Line :



| No. | Freq. (MHz) | Reading (dBuV) | Factor (dB) | Result (dBuV) | Limit dBuV | Margin (dB) | Detector | Remark |
|-----|-------------|----------------|-------------|---------------|------------|-------------|----------|--------|
| 1 | 0.1700 | 38.06 | 9.62 | 47.68 | 64.96 | -17.28 | QP | |
| 2 | 0.1700 | 24.56 | 9.62 | 34.18 | 57.64 | -23.46 | AVG | |
| 3 | 0.2140 | 35.21 | 9.63 | 44.84 | 63.04 | -18.20 | QP | |
| 4 | 0.2140 | 25.11 | 9.63 | 34.74 | 55.16 | -20.42 | AVG | |
| 5 | 0.2540 | 34.78 | 9.64 | 44.42 | 61.62 | -17.20 | QP | |
| 6 | 0.2540 | 24.27 | 9.64 | 33.91 | 53.31 | -19.40 | AVG | |
| 7 | 0.2980 | 32.60 | 9.63 | 42.23 | 60.30 | -18.07 | QP | |
| 8 | 0.2980 | 23.42 | 9.63 | 33.05 | 51.58 | -18.53 | AVG | |
| 9 | 0.4260 | 37.23 | 9.65 | 46.88 | 57.33 | -10.45 | QP | |
| 10 | 0.4260 | 29.85 | 9.65 | 39.50 | 47.73 | -8.23 | AVG | |
| 11 | 0.8500 | 30.93 | 9.65 | 40.58 | 56.00 | -15.42 | QP | |
| 12 | 0.8500 | 21.99 | 9.65 | 31.64 | 46.00 | -14.36 | AVG | |

Neutral Line :

| No. | Freq. (MHz) | Reading (dBuV) | Factor (dB) | Result (dBuV) | Limit dBuV | Margin (dB) | Detector | Remark |
|-----|-------------|----------------|-------------|---------------|------------|-------------|----------|--------|
| 1 | 0.1660 | 42.98 | 9.64 | 52.62 | 65.15 | -12.53 | QP | |
| 2 | 0.1660 | 28.86 | 9.64 | 38.50 | 57.90 | -19.40 | AVG | |
| 3 | 0.2060 | 42.06 | 9.64 | 51.70 | 63.36 | -11.66 | QP | |
| 4 | 0.2060 | 27.14 | 9.64 | 36.78 | 55.57 | -18.79 | AVG | |
| 5 | 0.4220 | 35.14 | 9.66 | 44.80 | 57.41 | -12.61 | QP | |
| 6 | 0.4220 | 27.04 | 9.66 | 36.70 | 47.83 | -11.13 | AVG | |
| 7 | 1.0500 | 21.55 | 9.67 | 31.22 | 56.00 | -24.78 | QP | |
| 8 | 1.0500 | 13.25 | 9.67 | 22.92 | 46.00 | -23.08 | AVG | |
| 9 | 1.7700 | 22.13 | 9.68 | 31.81 | 56.00 | -24.19 | QP | |
| 10 | 1.7700 | 13.81 | 9.68 | 23.49 | 46.00 | -22.51 | AVG | |
| 11 | 2.3500 | 18.63 | 9.69 | 28.32 | 56.00 | -27.68 | QP | |
| 12 | 2.3500 | 11.49 | 9.69 | 21.18 | 46.00 | -24.82 | AVG | |

5.2 Disturbance Power, 30MHz to 300MHz

Test Requirement..... : EN 55014-1
Test Method..... : EN 55014-1
Test Result..... : Pass
Frequency Range..... : 30MHz to 300MHz
Class/Severity..... : Table 7,8 of EN55014-1

5.2.1 E.U.T. Operation

Operating Environment:

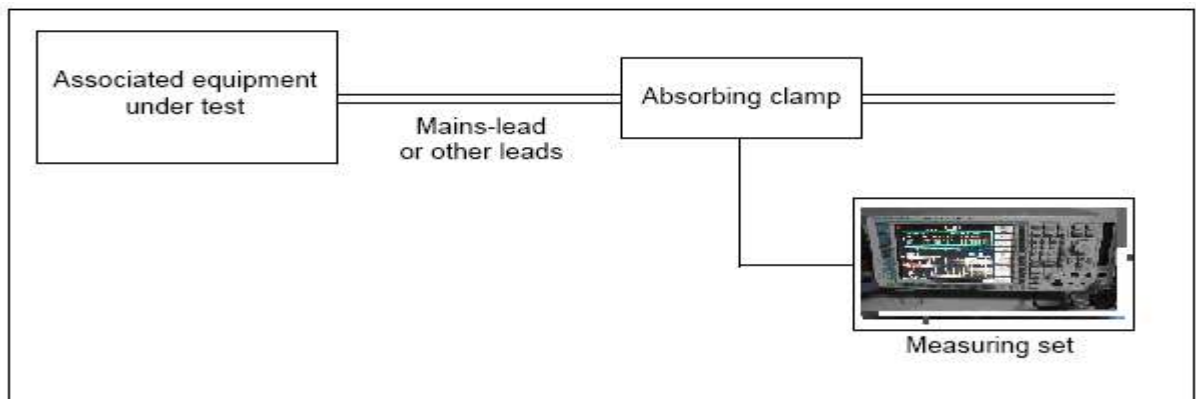
Temperature : 24.8°C
Humidity..... : 49.3%RH
Barometric Pressure..... : 101.2kPa

EUT Operation:

Input Voltage : AC 240V/50Hz
Operating Mode..... : Charging mode

5.2.2 Block Diagram of Test Setup

The Disturbance Power test was performed in accordance with the EN 55014-1.

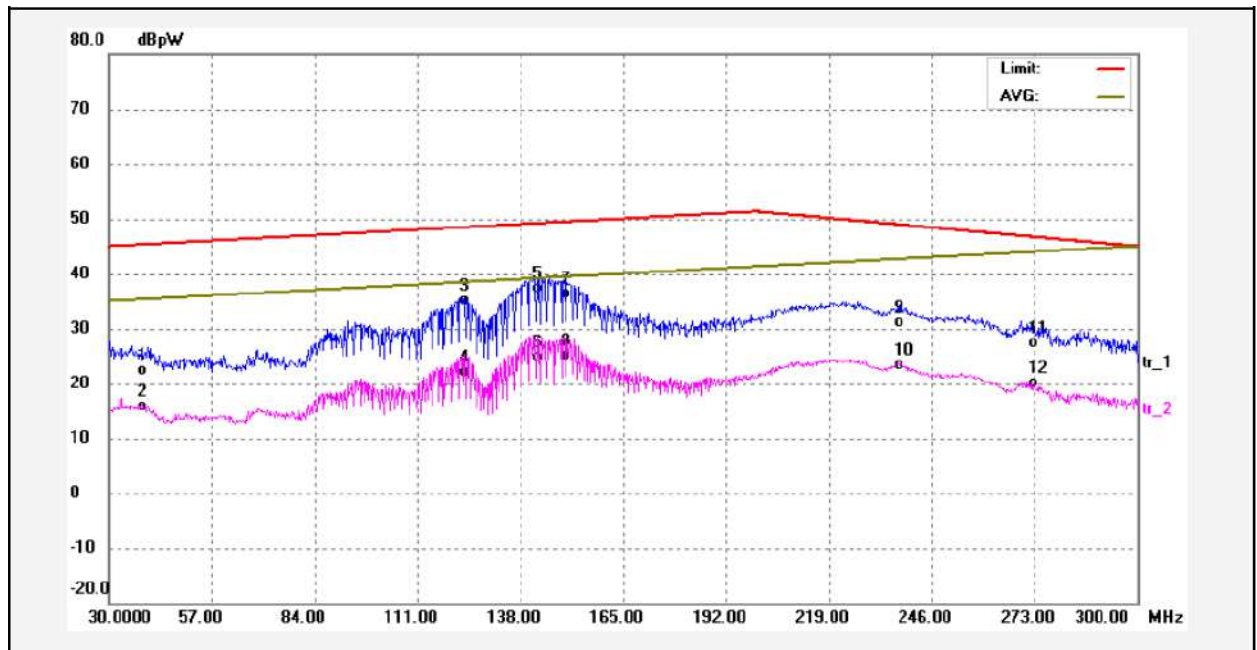


5.2.3 Measurement Data

Extending the cable to 6 meters, performed quasi-peak & average measurements since peak emissions from the EUT were detected within 15dB of the limit line. Average measurements were only performed if the quasi-peak measurements were within 15dB of the average limit line.

According to the Clause 4.3.4.2, if both of the following conditions (1) and (2) are fulfilled: 1) all emission readings from the equipment under test shall be lower than the applicable limits (Table 7) reduced by the margin (Table 8); 2) the maximum clock frequency shall be less than 30 MHz. The Appliances are deemed to comply in the frequency range from 300 MHz to 1 000 MHz

5.2.4 Disturbance Power Test Results on AC Line



| No. | Freq. (MHz) | Reading (dBpW) | Factor (dB) | Result (dBpW) | Limit (dBpW) | Margin (dB) | Detector | Remark |
|-----|-------------|----------------|-------------|---------------|--------------|-------------|----------|--------|
| 1 | 38.8400 | 13.80 | 7.68 | 21.48 | 45.33 | -23.85 | QP | |
| 2 | 38.8400 | 7.13 | 7.68 | 14.81 | 35.33 | -20.52 | AVG | |
| 3 | 123.6000 | 28.69 | 5.46 | 34.15 | 48.47 | -14.32 | QP | |
| 4 | 123.6000 | 15.62 | 5.46 | 21.08 | 38.47 | -17.39 | AVG | |
| 5 | 143.0800 | 31.08 | 5.36 | 36.44 | 49.19 | -12.75 | QP | |
| 6 | 143.0800 | 18.41 | 5.36 | 23.77 | 39.19 | -15.42 | AVG | |
| 7 | 150.2000 | 30.17 | 5.15 | 35.32 | 49.45 | -14.13 | QP | |
| 8 | 150.2000 | 19.06 | 5.15 | 24.21 | 39.45 | -15.24 | AVG | |
| 9 | 236.8400 | 25.55 | 4.49 | 30.04 | 48.98 | -18.94 | QP | |
| 10 | 236.8400 | 17.86 | 4.49 | 22.35 | 42.66 | -20.31 | AVG | |
| 11 | 273.0400 | 21.75 | 4.70 | 26.45 | 46.70 | -20.25 | QP | |
| 12 | 273.0400 | 14.37 | 4.70 | 19.07 | 44.00 | -24.93 | AVG | |

5.3 Voltage Fluctuation and Flicker

Test Requirement : EN 61000-3-3

Test Method : EN 61000-3-3

Test Result : Pass

5.3.1 E.U.T. Operation

Operating Environment:

Temperature : 24.8°C

Humidity..... : 49.3%RH

Barometric Pressure..... : 101.2kPa

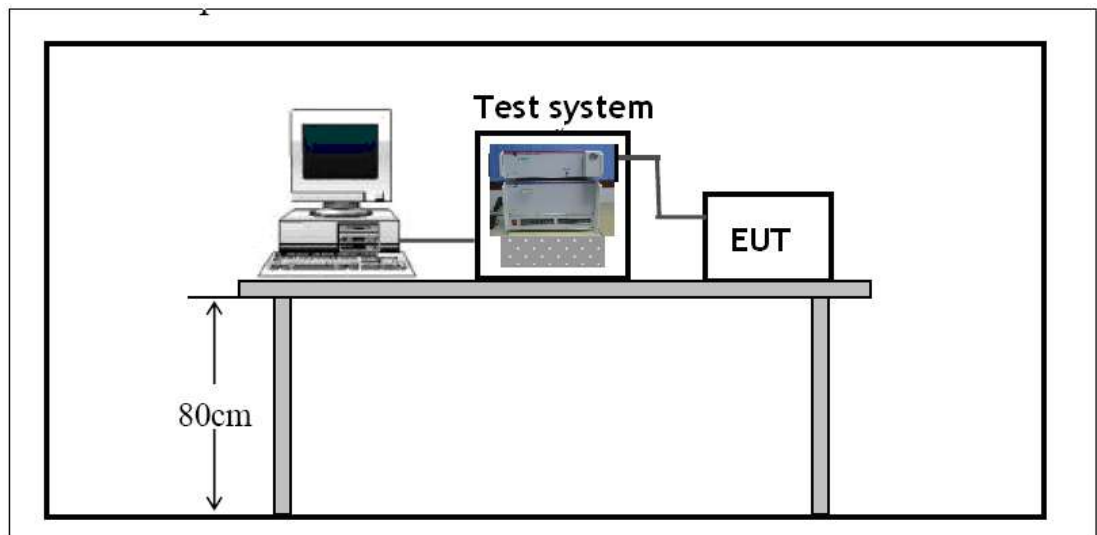
EUT Operation:

Input Voltage : AC 230V/50Hz

Operating Mode..... : On mode

5.3.2 Block Diagram of Setup

The Voltage Fluctuation and Flicker test was performed in accordance with the EN 61000-3-3.



5.3.3 Voltage Fluctuation and Flicker Test Data

Flicker Test Summary per EN/IEC61000-3-3 Ed. 3.0 (2013) (Run time)

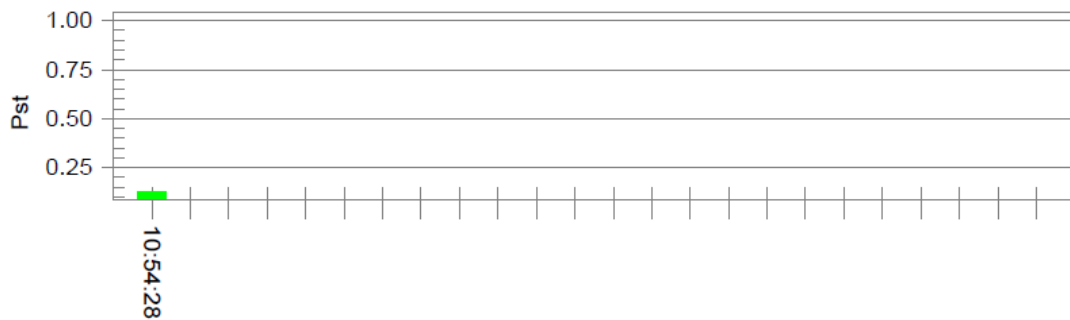
EUT: Battery Charger C802B (WTF16F0653449R1E) **Tested by:** David
Test category: dt,dmax,dc and Pst (European limits) **Test Margin:** 100
Test date: 2016/11/26 **Start time:** 10:43:58 **End time:** 10:54:29
Test duration (min): 10 **Data file name:** F-002206.cts_data
Comment: on mode
Customer:

Test Result: Pass

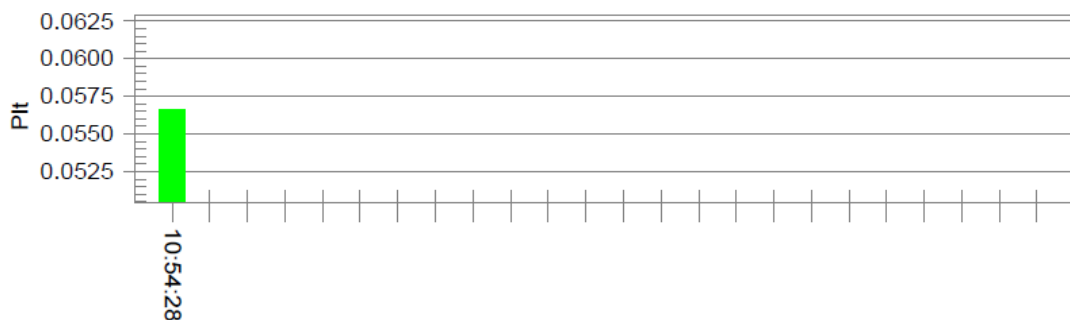
Status: Test Completed

Pst, and limit line

European Limits



Plt and limit line



Parameter values recorded during the test:

| | | | |
|---------------------------------|--------|------------------|-------|
| Vrms at the end of test (Volt): | 230.19 | | |
| Highest dt (%): | 0.00 | Test limit (%): | N/A |
| T-max (mS): | 0 | Test limit (mS): | 500.0 |
| Highest dc (%): | 0.00 | Test limit (%): | 3.30 |
| Highest dmax (%): | -0.04 | Test limit (%): | 4.00 |
| Highest Pst (10 min. period): | 0.130 | Test limit: | 1.000 |

6 Immunity Test Results

6.1 Performance Criteria

Performance criterion A: The apparatus shall continue to operate as intended during the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

Performance criterion B: The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however, no change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

Performance criterion C: Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls, or by any operation specified in the instructions for use. For further details, please refer to EN 55014-2.

6.2 Electrostatic Discharge (ESD)

| | | |
|----------------------------------|---|-------------------------------------------------------------------------------------------------------|
| Test Requirement | : | EN 55014-2 |
| Test Method | : | IEC 61000-4-2 |
| Test Result | : | Pass |
| Discharge Impedance | : | 330 Ω / 150pF |
| Discharge Voltage | : | Air Discharge: $\pm 8\text{kV}$ Contact Discharge: $\pm 4\text{kV}$ HCP & VCP: $\pm 4\text{kV}$ |
| Polarity | : | Positive & Negative |
| Number of Discharge | : | Minimum 10 times at each test point |
| Discharge Mode | : | Single Discharge |
| Discharge Period | : | 1 second minimum |

6.2.3 Direct Discharge Test Results

Observations:

Test points:

1. All Exposed Surface & Seams;
2. All metallic part

| Direct Discharge | | | Test Results | |
|----------------------|-----------------------|------------|-------------------|---------------|
| Applied Voltage (kV) | Performance Criterion | Test Point | Contact Discharge | Air Discharge |
| ±8 | B | 1 | N/A | Pass* |
| ±4 | B | 2 | Pass* | N/A |

Remark:

* During the test no deviation was detected to the selected operation mode(s)

6.2.4 Indirect Discharge Test Results

Observations: **Test points:** 1. All sides.

| Indirect Discharge | | | Test Results | |
|----------------------|-----------------------|------------|---------------------|-------------------|
| Applied Voltage (kV) | Performance Criterion | Test Point | Horizontal Coupling | Vertical Coupling |
| ±4 | B | 1 | Pass* | Pass* |

Remark:

* During the test no deviation was detected to the selected operation mode(s)

6.3 Electrical Fast Transients (EFT)

| | | |
|----------------------------------|---|--------------------------------|
| Test Requirement..... | : | EN 55014-2 |
| Test Method..... | : | IEC 61000-4-4 |
| Test Result..... | : | Pass |
| Test Level | : | 1.0kV on AC Mains |
| Polarity | : | Positive & Negative |
| Repetition Frequency | : | 5kHz |
| Burst Duration | : | 300ms |
| Test Duration..... | : | 2 minutes per level & polarity |

6.3.1 E.U.T. Operation

Operating Environment:

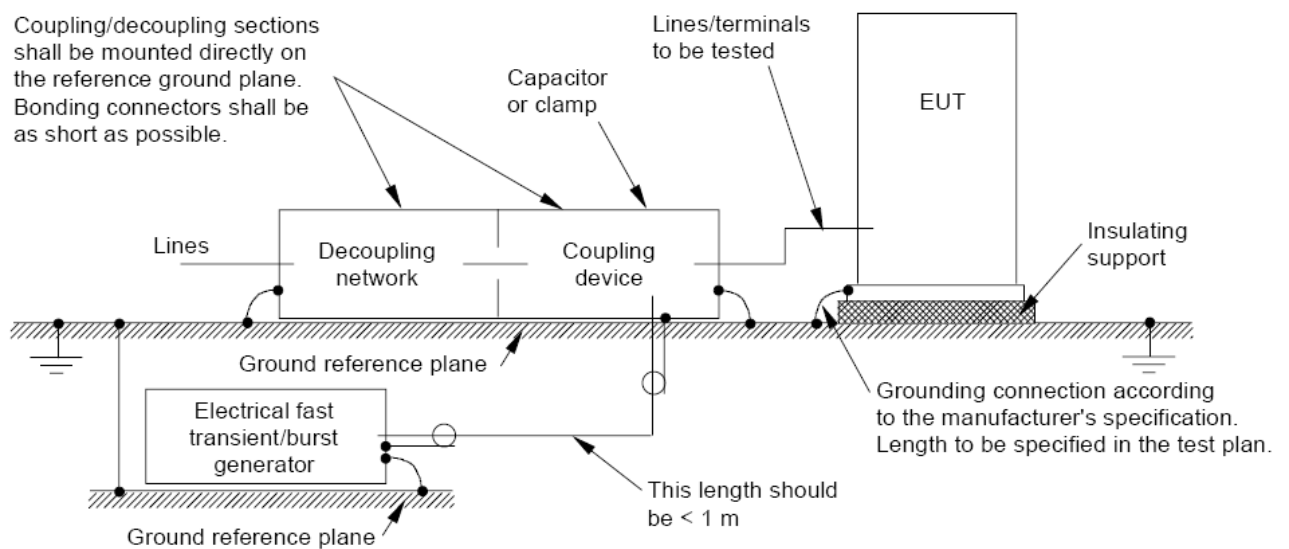
Temperature : 23.5°C
 Humidity : 56.0%RH
 Barometric Pressure : 101.6kPa

EUT Operation:

Input Voltage : AC 230V/50Hz
 Operating Mode : On mode

6.3.2 Block Diagram of Setup

The Electrical Fast Transients Immunity test was performed in accordance with the IEC 61000-4-4.



IEC 900/04

6.3.3 Test Results

| Test Port | Test Level(kV) | Performance Criterion | Result |
|--------------|----------------|-----------------------|--------|
| Line-Neutral | ± 1.0 | B | Pass* |

Remark:

* During the test no deviation was detected to the selected operation mode(s)

6.4 Surge

| | | |
|-------------------------------|---|----------------------------------------------------------------------------------|
| Test Requirement | : | EN 55014-2 |
| Test Method | : | IEC 61000-4-5 |
| Test Result | : | Pass |
| Test level | : | $\pm 1\text{kV}$ Live to Neutral, $\pm 2\text{kV}$ Live to PE and Neutral to PE, |
| Interval | : | 60s between each surge |
| No. of surges | : | 5 positive at 90° , 5 negative at 270° . |

6.4.1 E.U.T. Operation

Operating Environment:

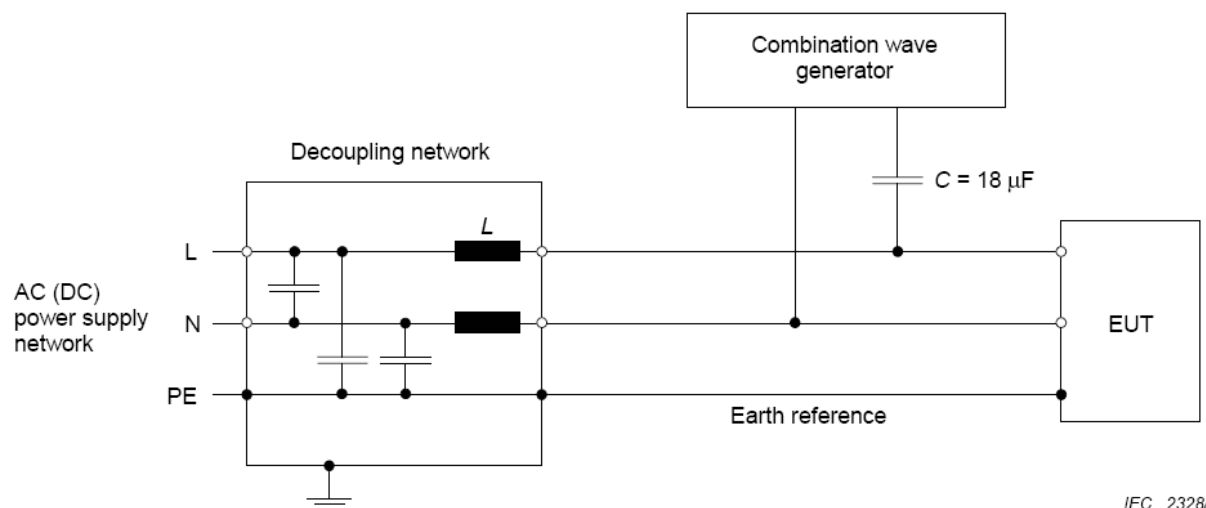
| | | |
|----------------------------------|---|----------------------|
| Temperature | : | 23.5°C |
| Humidity | : | 56.0%RH |
| Barometric Pressure | : | 101.6kPa |

EUT Operation:

| | | |
|-----------------------------|---|--------------|
| Input Voltage | : | AC 230V/50Hz |
| Operating Mode | : | On mode |

6.4.2 Block Diagram of Setup

The Surge Immunity test was performed in accordance with the IEC 61000-4-5.



IEC 2328/05

6.4.3 Test Results

| Test Port | Applied Voltage (kV) | Performance criterion | Result |
|---------------------------|----------------------|-----------------------|--------|
| Between Phase And Phase | ± 1 | B | N/A |
| Between Live And Neutral | ± 1 | B | Pass* |
| Between Live And Earth | ± 2 | B | N/A |
| Between Neutral And Earth | ± 2 | B | N/A |

Remark:

* During the test no deviation was detected to the selected operation mode(s)

6.5 Injected Currents Immunity, 0.15MHz to 230MHz

Test Requirement : EN 55014-2
Test Method : IEC 61000-4-6
Test Result : Pass
Frequency Range : 0.15MHz to 230MHz
Test level : 3V r.m.s. (unmodulated emf into 150 Ω)
Modulation : 80%, 1kHz Amplitude Modulation.

6.5.1 E.U.T. Operation

Operating Environment:

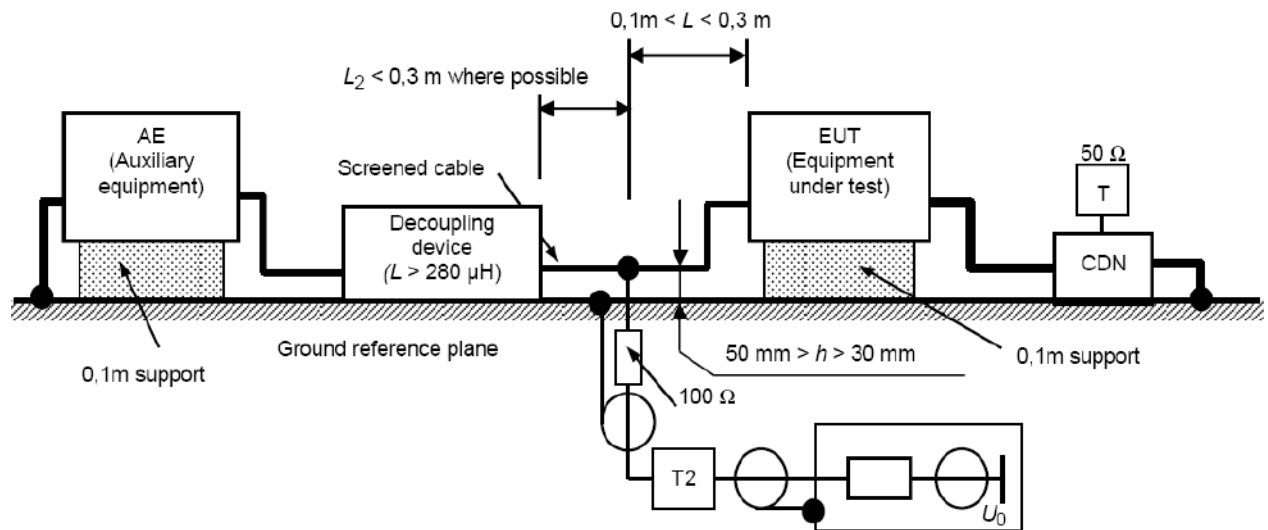
Temperature : 23.5°C
Humidity : 56.0% RH
Barometric Pressure : 101.6kPa

EUT Operation:

Input Voltage : AC 230V/50Hz
Operating Mode : On mode

6.5.2 Block Diagram of Setup

The Injected Currents Immunity test was performed in accordance with the IEC 61000-4-6.



6.5.3 Test Results

| Frequency | Line | Test Level | Modulation | Step Size | Dwell Time | Performance Criterion | Result |
|-------------------|-------------------------|------------|---------------------|-----------|------------|-----------------------|--------|
| 0.15MHz to 230MHz | 2 Wire AC Supply Cables | 3Vr.m.s. | 80%, 1kHz Amp. Mod. | 1% | 1s | A | Pass* |

Remark:

- * During the test no deviation was detected to the selected operation mode(s)

6.6 Voltage Dips and Interruptions

| | |
|-----------------------------------|-------------------------------------------|
| Test Requirement..... | EN 55014-2 |
| Test Method..... | IEC 61000-4-11 |
| Test Result..... | Pass |
| Test Level(Voltage reduction) | 0% & 40% & 70 % of U_T (Supply Voltage) |
| No. of Dips / Interruptions | 1 per Level at 20ms intervals |

6.6.1 E.U.T. Operation

Operating Environment:

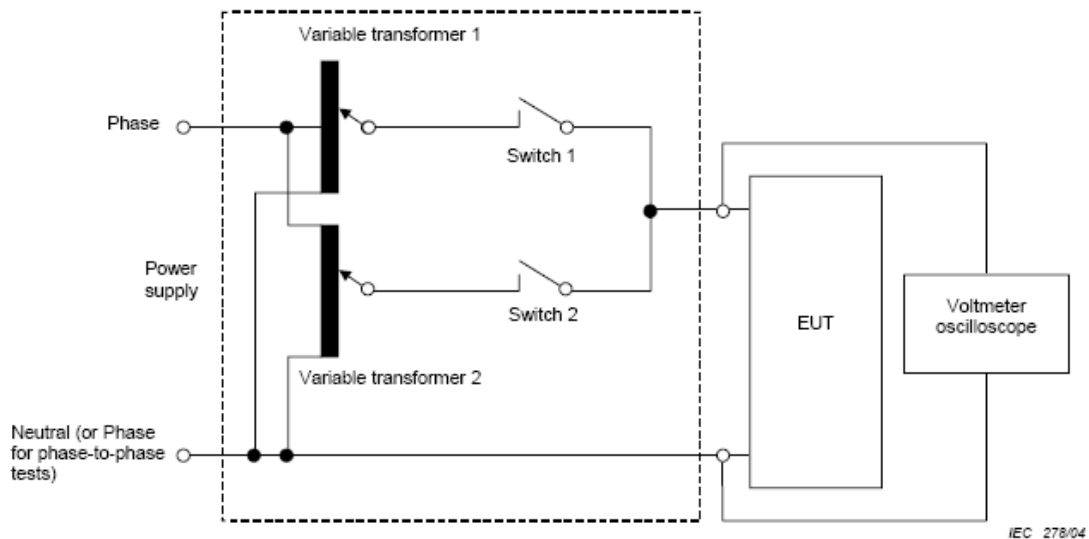
| | |
|---------------------------|----------|
| Temperature | 23.5°C |
| Humidity..... | 56.0%RH |
| Barometric Pressure | 101.6kPa |

EUT Operation:

| | |
|---------------------|--------------|
| Input Voltage | AC 230V/50Hz |
| Operating Mode..... | On mode |

6.6.2 Block Diagram of Setup

The Voltage Dips and Interruptions Immunity test was performed in accordance with the IEC 61000-4-11.



6.6.3 Test Results

| Test Level in %U _T | Performance criterion | 50Hz | | 60Hz | |
|-------------------------------|-----------------------|----------|--------|----------|--------|
| | | Duration | Result | Duration | Result |
| 0 | C | 0.5 | Pass* | 0.5 | Pass* |
| 40 | C | 10 | Pass* | 12 | Pass* |
| 70 | C | 25 | Pass* | 30 | Pass* |

Remark:

- * During the test no deviation was detected to the selected operation mode(s)

7 Photographs – Test Setup

7.1 Photograph – Mains Terminal Disturbance Voltage Test Setup



7.2 Photograph – Disturbance Power Test Setup



7.3 Photograph – Voltage Fluctuation and Flicker Test Setup



7.4 Photograph – ESD Immunity Test Setup



7.5 Photograph – EFT Immunity Test Setup



7.6 Photograph – Surge Immunity Test Setup



7.7 Photograph – Injected Currents Immunity Test Setup



7.8 Photograph – Voltage Dips and Interruptions Immunity Test Setup



8 Photographs – Constructional Details

8.1 EUT – External View

Model C816 C816B C809 C809B



Model C825 C825B C807 C807B



Model C826 C826B C806 C806B



Model C903W C893W



Model C903W C893W



Model C812 C812B



Model C818



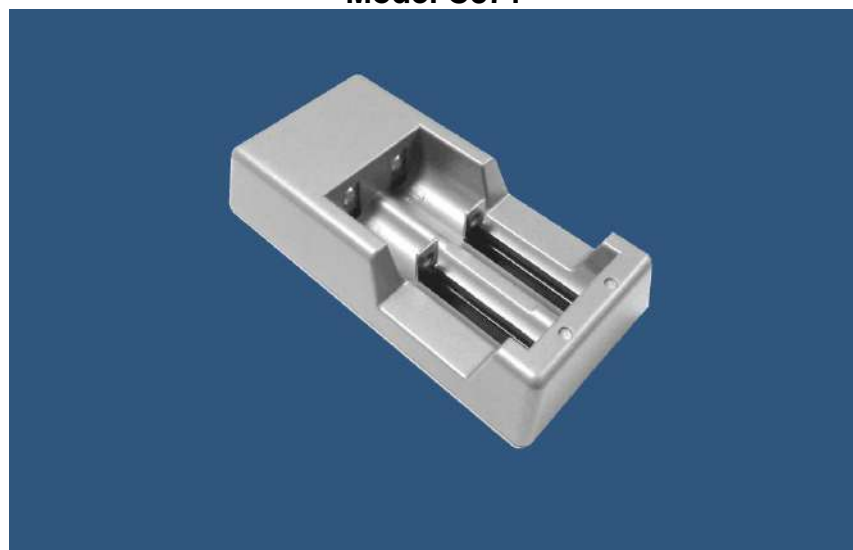
Model C802 C802B



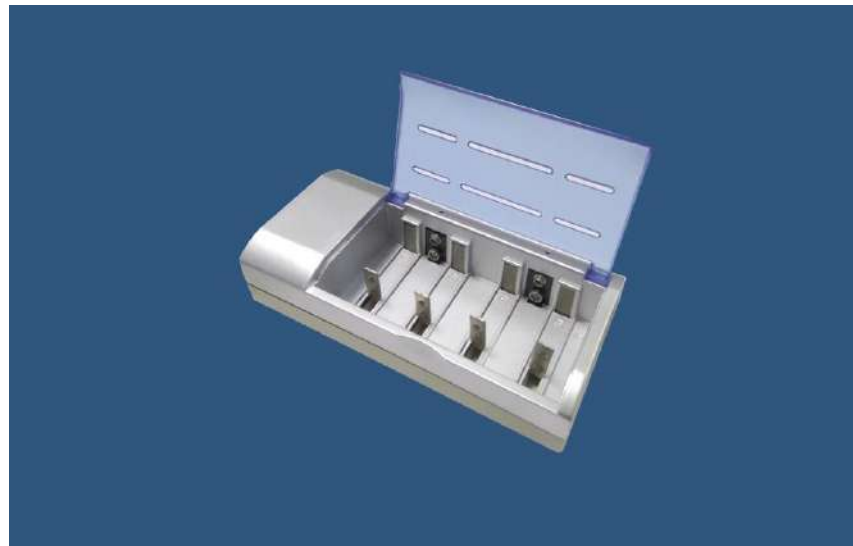
Model C894



Model C871



Model C821BW



Model C896



Model C704A4 C704A3



Model C704A1 C704A2



Model C801 C801B



Model C876



===== End of Report =====

Reference No. : WTF19F06038208J
Applicant : New Seek Electronic Dongguan Co., Ltd
Address : 5th Building, Haiyong Scien-tech Park, Fenggang
Town, Dongguan City, China
Manufacturer : The same as above
Address : The same as above
Product : Battery Charger
Model No. : Refer to model list table in report
Technical data : Refer to model list table in report

**Test Standards:**

EN 60335-1:2012+A11:2014

EN 60335-2-29:2004+A2:2010

EN 62233:2008

The above product has been tested by us with the listed standards and found in compliance with the European Directive LVD 2014/35/EU. It is possible to use CE marking to demonstrate the compliance with this LVD Directive.

Household and similar electrical appliances**Part 1: General requirements****Part 2-29: Particular requirements for battery chargers****Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure**

The referred test report(s) show that the product complies with standard(s) recognized as giving presumption of compliance with the essential requirements in the above mentioned EU Directive. Other relevant Directives have to be observed.

After preparation of the necessary technical documentation as well as the EU Declaration of Conformity, the CE marking as shown below can be affixed on the equipment under the sole responsibility of the manufacturer.



The statement is based on a single evaluation of the sample of above mentioned product. It does not imply an assessment of the whole production.

Waltek Services (Foshan) Co., Ltd.

Hotline: 400-840-2288 E-mail: info@waltek.com.cn
[Http://www.waltek.com.cn](http://www.waltek.com.cn)

TEST REPORT

Reference No. : WTF19F06038208J
Applicant : New Seek Electronic Dongguan Co., Ltd
Address : 5th Building, Haiyong Scien-tech Park, Fenggang Town, Dongguan City, China
Manufacturer : The same as above
Address : The same as above
Product Name : Battery Charger
Model No. : See model list on page 2
Standards : Safety of household and similar electrical appliances
Part 2: Particular requirements for battery chargers
IEC 60335-1:2010
IEC 60335-2-29:2002+A1:2004+A2:2009
Date of Receipt sample : 2019-06-05
Date of Test : 2019-06-06 to 2019-06-13
Date of Issue : 2019-06-17
Test Report Form No. : WSH-60335229F-02A
Test Result : Pass

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

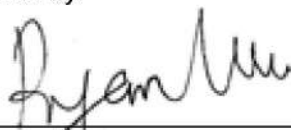
Prepared By:

Waltek Services (Foshan) Co., Ltd.

Address: No.13-19, 2/F., 2nd Building, Sunlink International Machinery City,
Chencun, Shunde District, Foshan, Guangdong, China

Tel:+86-757-23811398 Fax:+86-757-23811381 E-mail:info@waltek.com.cn

Compiled by:




Ryan Wu / Project Engineer


Approved by:




Jerry Mu / Manager

| | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <p>Test item description: Battery Charger</p> <p>Trademark: --</p> <p>Model and/or type reference: C802B, C802, C808W, C808BW, C816, C816B, C812, C812B, C818, C825, C825B, C826, C826B, C903W, C893W, C894, C896, C898, C871, C821BW, C806, C806B, C807, C807B, C809, C809B, C704A4, C704A3, C704A1, C704A2, C702C2, C702C1, C704C2, C704C1, C706C2, C706C1, C708C2, C708C1, C710C2, C710C1, C712C2, C712C1, C716C2, C716C1, C701D, C702E, C7XX, C8XX, C9xx, C801, C801B, C876, C872, C884G, C885G, C712F, C708H, C708Q, C702M, C802M, V202+, V407</p> <p>Rating(s): AC Input: 100-240V~, 50/60Hz, 0.5A MAX Output: 2.4VDC, 400mA Output: 8.4VDC, 35mA Class II, IPX0</p> | |
| <p>Copy of marking plate:</p> <div data-bbox="234 833 770 1232"> <p>Battery Charger Model: C802B Input: 100-240V~ 50/60Hz 0.5A MAX Output: 2.4VDC 400mA Output: 8.4VDC 35mA New Seek Electronic Dongguan Co., Ltd</p>  </div> <p>Remark:</p> <p>When the equipment is vended to EU, then name and address of the importer or authorized representative within the EEA shall be added on the equipment.</p> | |
| <p>National differences:</p> <p>EU group differences were considered according to below standard:</p> <p>EN 60335-1:2012+A11:2014</p> <p>EN 60335-2-29:2004+A2:2010</p> <p>EN 62233:2008</p> | |
| <p>Summary of testing:</p> <ol style="list-style-type: none"> 1. The samples are tested and found to be complied with the requirements of standards listed on cover page. 2. Full tests have been carried out on model C802B. | |

| |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test item particulars..... : |
| Classification of installation and use : Portable appliance and household indoor use |
| Supply Connection..... : Direct plug-in |
| : |
| Possible test case verdicts: - test case does not apply to the test object..... : N - test object does meet the requirement..... : P (Pass) - test object does not meet the requirement : F (Fail) |
| 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 point is used as the decimal separator. |
| General product information: 1. The appliance is class II battery charger for household and indoor use only. 2. All models are with the same circuit and construction except appearance. |

| 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 |
| 5.2 | 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 II | P |
| 6.2 | Protection against harmful ingress of water | IPX0 | N |
| 7 | MARKING AND INSTRUCTIONS | | P |
| 7.1 | Rated voltage or voltage range (V) | 100-240V | P |
| | Symbol for nature of supply, or | ~ | P |
| | Rated frequency (Hz) | 50/60Hz | P |
| | Rated power input (W), or | See page 2 | P |
| | Rated current (A) | | N |
| | Manufacturer's or responsible vendor's name, trademark or identification mark..... | See page 2 | P |
| | Model or type reference | See page 2 | P |
| | Symbol IEC 60417-5172, for class II appliances |  | P |
| | IP number, other than IPX0..... | IPX0 | N |
| | Symbol IEC 60417-5180, for class III appliances, unless | | N |
| | the appliance is operated by batteries only | | N |
| | 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 |
| | Battery chargers marked with (IEC 60335-2-29): | | P |
| | - rated d.c. output voltage (V) | | P |
| | - rated d.c. output current (A) | | P |
| | - rated current (A) of protective devices incorporated in a d.c. distribution board | | N |
| | - 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 |

| IEC 60335-2-29 | | | |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - time-current characteristic of fuse-links of the time-lag type | | N |
| | If the output exceeds 20 VA, battery chargers marked with (IEC 60335-2-29): | | N |
| | - before charging, read the instructions | Not exceed 20 VA | N |
| | - for indoor use or do not expose to rain, unless appliance is at least IPX4 | | N |
| | If the output exceeds 20 VA and the battery charger is for lead-acid batteries, battery chargers marked with (IEC 60335-2-29): | | N |
| | - disconnect the supply before making or breaking the connections to the battery | Not exceed 20 VA | N |
| | - WARNING: Explosive gases. Prevent flames and sparks. Provide adequate ventilation during charging. | | N |
| | Battery chargers incorporating an engine cranking switch allowing the charger to supply a supplementary starting current for the engine marked with (IEC 60335-2-29): | | N |
| | - maximum "on" time | | N |
| | - minimum "off" time or maximum ratio between "on" time and "off" time | | N |
| 7.2 | Warning for stationary appliances for multiple supply | | N |
| | Warning placed in vicinity of terminal cover | | N |
| 7.3 | Range of rated values marked with the lower and upper limits separated by a hyphen | | P |
| | Different rated values marked with the values separated by an oblique stroke | | P |
| 7.4 | Appliances adjustable for different rated voltages, the voltage setting is clearly discernible | | N |
| | Requirement met if frequent changes are not required and the rated voltage to which the appliance is to be adjusted is determined from a wiring diagram | | N |
| | Output voltage clearly discernible if the battery charger can be adjusted to different rated d.c. output voltages (IEC 60335-2-29) | | N |
| 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 | | N |
| | the power input is related to the arithmetic mean value of the rated voltage range | | N |
| | Relation between marking for upper and lower limits of rated power input or rated current and voltage is clear | | P |

| IEC 60335-2-29 | | | |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 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 | | P |
| | 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 | | N |
| | correct mode of connection is obvious | | N |
| 7.8 | Except for type Z attachment, terminals for connection to the supply mains indicated as follows: | | N |
| | - marking of terminals exclusively for the neutral conductor (letter N) | | N |
| | - marking of protective earthing terminals (symbol IEC 60417-5019) | | N |
| | - marking not placed on removable parts | | N |
| 7.9 | Marking or placing of switches which may cause a hazard | | N |
| 7.10 | Indications of switches on stationary appliances and controls on all appliances by use of figures, letters or other visual means | | N |
| | This applies also to switches which are part of a control | | N |
| | If figures are used, the off position indicated by the figure 0 | | N |
| | The figure 0 indicates only OFF position, unless no confusion with the OFF position | | N |
| 7.11 | Indication for direction of adjustment of controls | | N |
| 7.12 | Instructions for safe use provided | | P |
| | Details concerning precautions during user maintenance | | N |
| | The instructions state that: | | P |
| | - the appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction | | P |
| | - children being supervised not to play with the appliance | | P |
| | Instructions for safe use contains (IEC 60335-2-29): | | P |

| IEC 60335-2-29 | | | |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - specification of types, number of cells and rated capacity of batteries that can be charged | | 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 | | P |
| | - statement that battery chargers must only be plugged into an earthed socket-outlet, only for portable Class I battery chargers for outdoor use | | N |
| | - explanation of automatic function stating any limitation, only for automatic battery chargers | | N |
| | Battery chargers for charging automobile batteries include substance concerning (IEC 60335-2-29): | | N |
| | - 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 |
| | - After charging, disconnect the battery charger from the supply mains. Then remove the chassis connection and then the battery connection. | | N |
| | 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 |
| | Instructions for class III appliances state that it must only be supplied at SELV, unless | | N |
| | it is a battery-operated appliance, the battery being charged outside the appliance | | N |
| 7.12.1 | Sufficient details for installation supplied | | P |
| | For an appliance intended to be permanently connected to the water mains and not connected by a hose-set, this is stated | | N |
| | 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 |
| 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 |

| IEC 60335-2-29 | | | |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 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 |
| 7.12.4 | Instructions for built-in appliances: | | N |
| | - dimensions of space | | N |
| | - dimensions and position of supporting and fixing | | N |
| | - minimum distances between parts and surrounding structure | | N |
| | - minimum dimensions of ventilating openings and arrangement | | N |
| | - connection to supply mains and interconnection of separate components | | N |
| | - allow disconnection of the appliance after installation, by accessible plug or a switch in the fixed wiring, unless | | N |
| | a switch complying with 24.3 | | N |
| 7.12.5 | Replacement cord instructions, type X attachment with a specially prepared cord | | N |
| | Replacement cord instructions, type Y attachment | | N |
| | Replacement cord instructions, type Z attachment | | N |
| 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 |
| 7.12.7 | Instructions for fixed appliances stating how the appliance is to be fixed | | N |
| 7.12.8 | Instructions for appliances connected to the water mains: | | N |
| | - max. inlet water pressure (Pa).....: | | N |
| | - min. inlet water pressure, if necessary (Pa).....: | | N |
| | Instructions concerning new and old hose-sets for appliances connected to the water mains by detachable hose-sets | | N |
| 7.13 | Instructions and other texts in an official language | English | P |
| 7.14 | Marking clearly legible and durable, rubbing test as specified | | P |
| 7.15 | Markings on a main part | | 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 |

| IEC 60335-2-29 | | | |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | For stationary appliances, name, trademark or identification mark and model or type reference visible after installation | | N |
| | For fixed appliances, name, trademark or identification mark and model or type reference visible after installation according to the instructions | | N |
| | 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 | | P |
| 7.16 | Marking of a possible replaceable thermal link or fuse link clearly visible with regard to replacing the link | | N |
| 7.101 | D.C. distribution boards marked with (IEC 60335-2-29): | | N |
| | - maximum output current (A) for each output circuit..... | | N |
| | - types of any additional power supply which can be connected | | N |
| 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 | | N |
| | Insertion or removal of lamps, protection against contact with live parts of the lamp cap | | N |
| | 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 |
| 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 | | N |
| 8.1.4 | Accessible part not considered live if: | | P |

| IEC 60335-2-29 | | | |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - safety extra-low a.c. voltage: peak value not exceeding 42,4 V | | N |
| | - safety extra-low d.c. voltage: not exceeding 42,4 V | | P |
| | - or separated from live parts by protective impedance | | N |
| | If protective impedance: d.c. current not exceeding 2 mA, and | | N |
| | a.c. peak value not exceeding 0,7 mA | | N |
| | - for peak values over 42,4 V up to and including 450 V, capacitance not exceeding 0,1 μ F | | N |
| | - for peak values over 450 V up to and including 15 kV, discharge not exceeding 45 μ C | | N |
| | - for peak values over 15kV, the energy in the discharge not exceeding 350 mJ | | N |
| 8.1.5 | Live parts protected at least by basic insulation before installation or assembly: | | N |
| | - built-in appliances | | N |
| | - fixed appliances | | N |
| | - appliances delivered in separate units | | N |
| 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 |
| | Requirements and tests are specified in part 2 when necessary | | N |
| 10 | POWER INPUT AND CURRENT | | P |
| 10.1 | Power input at normal operating temperature, rated voltage and normal operation not deviating from rated power input by more than shown in table 1.: | (see appended table) | P |
| | Test carried out at upper and lower limits of the ranges for appliances with one or more rated voltage ranges, unless | | N |
| | the rated power input is related to the arithmetic mean value | | N |
| 10.2 | Current at normal operating temperature, rated voltage and normal operation not deviating from rated current by more than shown in table 2.....: | | N |

| 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 |
| | the rated current is related to the arithmetic mean value of the range | | N |
| 10.101 | No-load d.c. output voltage does not exceed 42,2 V (IEC 60335-2-29) | (see appended table) | 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 |
| | 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 |
| 11.5 | Battery chargers are only supplied at 1,06 times rated voltage (IEC 60335-2-29) | | P |
| 11.6 | Combined appliances operated under normal operation at most unfavourable voltage between 0,94 and 1,06 times rated voltage (V) | | N |
| 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 |
| | if there is doubt with regard to classification of insulation, | | N |
| | tests of Annex C are carried out | | N |
| | 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 |

| 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 |
| | 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 | | N |
| 13.2 | For class 0, class II and class III appliances, leakage current measured by means of the circuit described in figure 4 of IEC 60990 | | P |
| | For other appliances, a low impedance ammeter may be used | | N |
| | Leakage current measurements | (see appended table) | P |
| 13.3 | The appliance is disconnected from the supply | | P |
| | Electric strength tests according to table 4 | (see appended table) | P |
| | No breakdown during the tests | | P |
| 14 | TRANSIENT OVERVOLTAGES | | N |
| | Appliances withstand the transient over-voltages to which they may be subjected | | N |
| | Clearances having a value less than specified in table 16 subjected to an impulse voltage test, the test voltage specified in table 6.....: | | N |
| | No flashover during the test, unless | | N |
| | of functional insulation if the appliance complies with clause 19 with the clearance short-circuited | | N |
| 15 | MOISTURE RESISTANCE | | P |
| 15.1 | Enclosure provides the degree of moisture protection according to classification of the appliance | | N |
| | Compliance checked as specified in 15.1.1, taking into account 15.1.2, followed by the electric strength test of 16.3 | | N |
| | No trace of water on insulation which can result in a reduction of clearances or creepage distances below values specified in clause 29 | | N |
| 15.1.1 | Appliances, other than IPX0, subjected to tests as specified in IEC 60529 | | N |

| 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 |
| 15.1.2 | Hand-held appliance turned continuously through the most unfavourable positions during the test | | N |
| | Built-in appliances installed according to the instructions | | N |
| | Appliances placed or used on the floor or table placed on a horizontal unperforated support | | N |
| | Appliances normally fixed to a wall and appliances with pins for insertion into socket-outlets are mounted on a wooden board | | N |
| | For IPX3 appliances, the base of wall mounted appliances is placed at the same level as the pivot axis of the oscillating tube | | N |
| | For IPX4 appliances, the horizontal centre line of the appliance is aligned with the pivot axis of the oscillating tube, and | | N |
| | 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 |
| | Wall-mounted appliances, take into account the distance to the floor stated in the instructions | | N |
| | 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 |
| | for IPX4 appliances, the movement of the tube is limited to two times 90° from the vertical for a period of 5 min | | N |
| | Appliances with type X attachment fitted with a flexible cord as described | | N |
| | Detachable parts subjected to the relevant treatment with the main part | | N |
| | However, if a part has to be removed for user maintenance and a tool is needed, this part is not removed | | N |
| 15.2 | Spillage of liquid does not affect the electrical insulation | | N |
| | Appliances with type X attachment fitted with a flexible cord as described | | N |
| | Appliances incorporating an appliance inlet tested with or without an connector, whichever is most unfavourable | | N |

| IEC 60335-2-29 | | | |
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| Clause | Requirement + Test | Result - Remark | Verdict |
| | Detachable parts are removed | | N |
| | Overfilling test with additional amount of water, over a period of 1 min (l) | | N |
| | The appliance withstands the electric strength test of 16.3 | | N |
| | No trace of water on insulation that can result in a reduction of clearances or creepage distances below values specified in clause 29 | | N |
| 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 | | N |
| | Humidity test for 48 h in a humidity cabinet | 48h, 93%R.H, 25°C | P |
| | Reassembly of those parts that may have been removed | | N |
| | The appliance withstands the tests of clause 16 | No breakdown | 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 | | N |
| | 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 $\sqrt{3}$ (V) | | N |
| | Leakage current measurements | (see appended table) | P |
| | Limit values doubled if: | | N |
| | - all controls have an off position in all poles, or | | N |
| | - the appliance has no control other than a thermal cut-out, or | | N |
| | - all thermostats, temperature limiters and energy regulators do not have an off position, or | | N |
| | - the appliance has radio interference filters | | N |
| | With the radio interference filters disconnected, the leakage current do not exceed limits specified | | N |
| 16.3 | Electric strength tests according to table 7 | (see appended table) | P |

| IEC 60335-2-29 | | | |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Test voltage applied between the supply cord and inlet bushing and cord guard and cord anchorage as specified | (see appended table) | P |
| | No breakdown during the tests | | 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) | | P |
| | Output terminals of battery chargers are short-circuited (IEC 60335-2-29) | The appliance did not work | P |
| | Basic insulation is not short-circuited | | N |
| | 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 |
| 18 | ENDURANCE | | N |
| | Requirements and tests are specified in part 2 when necessary | | N |
| 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 | Considered | 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 |
| | Appliances incorporating motors subjected to the tests of 19.7 to 19.10, as applicable | | N |
| | 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 |

| IEC 60335-2-29 | | | |
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| Clause | Requirement + Test | Result - Remark | Verdict |
| 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) | | N |
| 19.3 | Test of 19.2 repeated; test voltage (V), power input of 1,24 times rated power input (W) | | N |
| 19.4 | Test conditions as in clause 11, any control limiting the temperature during tests of clause 11 short-circuited | | N |
| 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 |
| | The test repeated with reversed polarity and the other end of the heating element connected to the sheath | | N |
| | 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 |
| 19.6 | Appliances with PTC heating elements tested at rated voltage, establishing steady conditions | | N |
| | 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 |
| 19.7 | Stalling test by locking the rotor if the locked rotor torque is smaller than the full load torque, or | | N |
| | locking moving parts of other appliances | | N |
| | Locked rotor, capacitors open-circuited one at a time | | N |
| | Test repeated with capacitors short-circuited one at a time, unless | | N |
| | capacitor is of class P2 of IEC 60252-1 | | N |
| | Appliances with timer or programmer supplied with rated voltage for each of the tests, for a period equal to the maximum period allowed | | N |
| | Other appliances supplied with rated voltage for a period as specified | | N |
| | Winding temperatures not exceeding values specified in table 8..... | | N |
| 19.8 | Multi-phase motors operated at rated voltage with one phase disconnected | | N |

| IEC 60335-2-29 | | | |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 19.9 | Running overload test on appliances incorporating motors intended to be remotely or automatically controlled or liable to be operated continuously | | N |
| | 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 |
| | Winding temperatures not exceeding values as specified | | N |
| 19.10 | Series motor operated at 1,3 times rated voltage for 1 min (V) | | N |
| | During the test, parts not being ejected from the appliance | | N |
| 19.11 | Electronic circuits, compliance checked by evaluation of the fault conditions specified in 19.11.2 for all circuits or parts of circuits, unless | | P |
| | they comply with the conditions specified in 19.11.1 | | P |
| | Appliances incorporating an electronic circuit that relies upon a programmable component to function correctly, subjected to the test of 19.11.4.8, unless | | N |
| | restarting does not result in a hazard | | N |
| | 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 |
| | 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 | | N |
| | 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 |
| | - 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 | | N |
| | If a conductor of a printed board becomes open-circuited, the appliance is considered to have withstood the particular test, provided both of the following conditions are met: | | N |
| | - the base material of the printed circuit board withstands the test of Annex E | | N |

| IEC 60335-2-29 | | | |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - 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 |
| 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: | | N |
| | - 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 |
| | - 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 |
| 19.11.2 | Fault conditions applied one at a time, the appliance operating under conditions specified in clause 11, but supplied at rated voltage, duration of the tests as specified: | | P |
| | a) short circuit of functional insulation if clearances or creepage distances are less than the values specified in clause 29 | | P |
| | b) open circuit at the terminals of any component | | P |
| | c) short circuit of capacitors, unless | | P |
| | they comply with IEC 60384-14 | | N |
| | d) short circuit of any two terminals of an electronic component, other than integrated circuits | | P |
| | This fault condition is not applied between the two circuits of an optocoupler | | N |
| | e) failure of triacs in the diode mode | | P |
| | f) failure of microprocessors and integrated circuits | | P |
| | g) failure of an electronic power switching device | | N |
| | 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 |
| 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 | | N |
| 19.11.4 | Appliances having a device with an off position obtained by electronic disconnection, or | | N |
| | a device that can be placed in the stand-by mode, | | N |
| | 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 |

| IEC 60335-2-29 | | | |
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| Clause | Requirement + Test | Result - Remark | Verdict |
| | 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 |
| | appliances operated for 30 s or 5 min during the test of 19.7 are not subjected to the tests for electromagnetic phenomena. | | N |
| | Surge protective devices disconnected, unless | | N |
| | They incorporate spark gaps | | N |
| 19.11.4.1 | The appliance is subjected to electrostatic discharges in accordance with IEC 61000-4-2, test level 4 | | N |
| 19.11.4.2 | The appliance is subjected to radiated fields in accordance with IEC 61000-4-3, test level 3 | | N |
| 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 |
| 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 |
| | Earthed heating elements in class I appliances disconnected | | N |
| 19.11.4.5 | The appliance is subjected to injected currents in accordance with IEC 61000-4-6, test level 3 | | N |
| 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 |
| | 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 |
| 19.11.4.7 | The appliance is subjected to mains signals in accordance with IEC 61000-4-13, test level class 2 | | N |
| 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 |
| | The appliance continues to operate normally, or | | N |
| | requires a manual operation to restart | | N |
| 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) | | N |

| IEC 60335-2-29 | | | |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 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.....: | | 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 |
| | Insulation, other than of class III appliances or class III constructions that do not contain live parts, withstands the electric strength test of 16.3, the test voltage as specified in table 4: | | P |
| | - basic insulation (V).....: | 1000V | P |
| | - supplementary insulation (V) | 1750V | P |
| | - reinforced insulation (V) | 3000V | P |
| | After operation or interruption of a control, clearances and creepage distances across the functional insulation withstand the electric strength test of 16.3, the test voltage being twice the working voltage | | P |
| | The appliance does not undergo a dangerous malfunction, and | | P |
| | no failure of protective electronic circuits, if the appliance is still operable | | N |
| | Appliances tested with an electronic switch in the off position, or in the stand-by mode: | | N |
| | - do not become operational, or | | N |
| | - if they become operational, do not result in a dangerous malfunction during or after the tests of 19.11.4 | | N |
| | If the appliance contains lids or doors that are controlled by one or more interlocks, one of the interlocks may be released provided that: | | N |
| | - the lid or door does not move automatically to an open position when the interlock is released, and | | N |
| | - the appliance does not start after the cycle in which the interlock was released | | N |
| 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 |

| IEC 60335-2-29 | | | |
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| Clause | Requirement + Test | Result - Remark | Verdict |
| | For a relay or contactor with more than one contact, all contacts are short-circuited at the same time | | N |
| | A relay or contactor operating only to ensure the appliance is energized for normal use is not short-circuited | | N |
| | If more than one relay or contactor operates in clause 11, they are short-circuited in turn | | N |
| 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 |
| 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 |
| 19.102 | Reverse connection of battery chargers to a fully charged battery at rated voltage (IEC 60335-2-29) | The appliance did not work | P |
| | The capacity of the battery (IEC 60335-2-29) | According to the instruction manual | P |
| 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 |
| 20 | STABILITY AND MECHANICAL HAZARDS | | P |
| 20.1 | Appliances having adequate stability | | P |
| | Tilting test through an angle of 10°, appliance placed on an inclined plane/horizontal support, not connected to the supply mains; appliance does not overturn | | P |
| | Tilting test repeated on appliances with heating elements, angle of inclination increased to 15° | | N |
| | Possible heating test in overturned position; temperature rise does not exceed values shown in table 9 | | N |
| 20.2 | Moving parts adequately arranged or enclosed as to provide protection against personal injury | | N |
| | Protective enclosures, guards and similar parts are non-detachable, and | | N |
| | have adequate mechanical strength | | N |
| | Enclosures that can be opened by overriding an interlock are considered to be detachable parts | | N |

| IEC 60335-2-29 | | | |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Self-resetting thermal cut-outs and overcurrent protective devices not causing a hazard by unexpected closure | | N |
| | Not possible to touch dangerous moving parts with the test probe described | | N |
| 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 $1,0 \text{ J} \pm 0,05 \text{ J}$ (IEC 60335-2-29) | (see appended table) | P |
| | The appliance shows no damage impairing compliance with this standard, and | | P |
| | compliance with 8.1, 15.1 and clause 29 not impaired | | P |
| | If doubt, supplementary or reinforced insulation subjected to the electric strength test of 16.3 | | N |
| | If necessary, repetition of groups of three blows on a new sample | | N |
| 21.2 | Accessible parts of solid insulation having strength to prevent penetration by sharp implements | | P |
| | Test not applicable if the thickness of supplementary insulation is at least 1 mm and reinforced insulation at least 2 mm | | P |
| | The insulation is tested as specified, and does withstand the electric strength test of 16.3 | | N |
| 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 |
| | Vibration test as specified in IEC 60068-2-6 (IEC 60335-2-29) | | N |
| | 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 |
| | Connections have not worked loose (IEC 60335-2-29) | | N |
| 22 | CONSTRUCTION | | P |

| IEC 60335-2-29 | | | |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 22.1 | Appliance marked with the first numeral of the IP system, relevant requirements of IEC 60529 are fulfilled | | N |
| 22.2 | Stationary appliance: means to ensure all-pole disconnection from the supply being provided: | | N |
| | - a supply cord fitted with a plug, or | | N |
| | - a switch complying with 24.3, or | | N |
| | - a statement in the instruction sheet that a disconnection incorporated in the fixed wiring is to be provided, or | | N |
| | - an appliance inlet | | N |
| | 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 |
| 22.3 | Appliance provided with pins: no undue strain on socket-outlets | | P |
| | Applied torque not exceeding 0,25 Nm | | P |
| | 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 | | P |
| | Each pin subjected to a torque of 0,4 Nm; the pins are not rotating, unless | | P |
| | rotating does not impair compliance with this standard | | P |
| 22.4 | Appliance for heating liquids and appliance causing undue vibration not provided with pins for insertion into socket-outlets | | N |
| 22.5 | No risk of electric shock when touching the pins of the plug, for appliances having a capacitor with rated capacitance exceeding 0,1 μ F, the appliance being disconnected from the supply at the instant of voltage peak | | P |
| | Voltage not exceeding 34 V (V) | | P |
| 22.6 | Electrical insulation not affected by condensing water or leaking liquid | | N |
| | Electrical insulation of Class II appliances not affected if a hose ruptures or seal leaks | | N |
| | In case of doubt, test as described | | N |
| 22.7 | Adequate safeguards against the risk of excessive pressure in appliances containing liquid or gases or having steam-producing devices | | N |

| IEC 60335-2-29 | | | |
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| Clause | Requirement + Test | Result - Remark | Verdict |
| 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 | | P |
| 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 |
| 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 non-self-resetting thermal cut-out is required by the standard, and | | N |
| | - a voltage maintained non-self-resetting thermal cut-out is used to meet it | | N |
| | Non-self-resetting thermal motor protectors have a trip-free action, unless | | N |
| | they are voltage maintained | | N |
| | Reset buttons of non-self-resetting controls so located or protected that accidental resetting is unlikely | | N |
| 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 |
| | No deterioration of the fixing properties of snap-in devices used in parts that are likely to be removed during installation or servicing | | N |
| | Tests as described | | P |
| 22.12 | Handles, knobs etc. fixed in a reliable manner | | P |
| | Fixing in wrong position of handles, knobs etc. indicating position of switches or similar components not possible | | P |
| | Axial force 15 N applied to parts, the shape being so that an axial pull is unlikely to be applied | | P |
| | Axial force 30 N applied to parts, the shape being so that an axial pull is likely to be applied | | P |
| 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 | | N |
| 22.14 | No ragged or sharp edges creating a hazard for the user in normal use, or during user maintenance | | P |

| IEC 60335-2-29 | | | |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | No exposed pointed ends of self-tapping screws or other fasteners, likely to be touched by the user in normal use or during user maintenance | | P |
| 22.15 | Storage hooks and the like for flexible cords smooth and well rounded | | N |
| 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 |
| | Cord reel tested with 6000 operations, as specified | | N |
| | Electric strength test of 16.3, voltage of 1000 V applied | | N |
| 22.17 | Spacers not removable from the outside by hand or by means of a screwdriver or a spanner | | N |
| 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 |
| | constructed to prevent inappropriate replacement | | N |
| 22.20 | Direct contact between live parts and thermal insulation effectively prevented, unless | | P |
| | material used is non-corrosive, non-hygroscopic and non-combustible | | N |
| 22.21 | Wood, cotton, silk, ordinary paper and fibrous or hygroscopic material not used as insulation, unless | | P |
| | impregnated | | N |
| | This requirement does not apply to magnesium oxide and mineral ceramic fibres used for the electrical insulation of heating elements | | N |
| 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 |
| | In case of rupture, the heating conductor is unlikely to come in contact with accessible metal parts | | N |
| 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 |
| 22.26 | Output circuit supplied through a safety isolating transformer (IEC 60335-2-29) | | P |

| IEC 60335-2-29 | | | |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | 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) | | P |
| 22.27 | Parts connected by protective impedance separated by double or reinforced insulation | | N |
| 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 |
| 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 |
| 22.30 | Parts serving as supplementary or reinforced insulation fixed so that they cannot be removed without being seriously damaged, or | | P |
| | so constructed that they cannot be replaced in an incorrect position, and so that if they are omitted, the appliance is rendered inoperable or manifestly incomplete | | P |
| 22.31 | Neither clearances nor creepage distances over supplementary and reinforced insulation reduced below values specified in clause 29 as a result of wear | | P |
| | Neither clearances nor creepage distances between live parts and accessible parts reduced below values for supplementary insulation if wires, screws etc. become loose | | P |
| 22.32 | Supplementary and reinforced insulation constructed or protected against pollution so that clearances or creepage distances are not reduced below the values in clause 29 | | P |
| | Supplementary insulation of natural or synthetic rubber resistant to ageing, or arranged and dimensioned so that creepage distances are not reduced below values specified in 29.2 | | P |
| | Ceramic material not tightly sintered, similar materials or beads alone not used as supplementary or reinforced insulation | | N |
| | Insulating material in which heating conductors are embedded is considered to be basic insulation, not reinforced insulation | | N |
| | Oxygen bomb test at 70 °C for 96 h and 16 h at room temperature | | N |

| IEC 60335-2-29 | | | |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 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 | | N |
| | Electrodes not used for heating liquids | | N |
| | 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 |
| | the reinforced insulation consists of at least 3 layers | | N |
| | For class II constructions, conductive liquids which are in contact with live parts, not in direct contact with reinforced insulation, unless | | N |
| | the reinforced insulation consists of at least 3 layers | | N |
| | An air layer not used as basic or supplementary insulation in a double insulation system if likely to be bridged by leaking liquid | | N |
| 22.34 | Shafts of operating knobs, handles, levers etc. not live, unless | | N |
| | the shaft is not accessible when the part is removed | | N |
| 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 |
| | 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 |
| | This requirement does not apply to handles, levers and knobs on stationary 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 |
| | Insulating material covering metal handles, levers and knobs withstand the electric strength test of 16.3 for supplementary insulation | | N |

| IEC 60335-2-29 | | | |
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| Clause | Requirement + Test | Result - Remark | Verdict |
| 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 |
| | they are separated from live parts by double or reinforced insulation | | N |
| 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 |
| | the capacitors comply with 22.42 | | N |
| 22.38 | Capacitors not connected between the contacts of a thermal cut-out | | P |
| 22.39 | Lamp holders used only for the connection of lamps | | N |
| 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 |
| | 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 |
| 22.41 | No components, other than lamps, containing mercury | | P |
| 22.42 | Protective impedance consisting of at least two separate components | | N |
| | Values specified in 8.1.4 not exceeded if any one of the components are short-circuited or open-circuited | | N |
| | Resistors checked by the test of 14.1 a) in IEC 60065 | | N |
| | Capacitors checked by the tests for class Y capacitors in IEC 60384-14 | | N |
| 22.43 | Appliances adjustable for different voltages, accidental changing of the setting of the voltage unlikely to occur | | N |
| 22.44 | Appliances not having an enclosure that is shaped or decorated like a toy | | P |

| IEC 60335-2-29 | | | |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 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 |
| | 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 |
| | These requirements are not applicable to software used for functional purpose or compliance with clause 11 | | N |
| 22.47 | Appliances connected to the water mains withstand the water pressure expected in normal use | | N |
| | No leakage from any part, including any inlet water hose | | N |
| 22.48 | Appliances connected to the water mains constructed to prevent backsiphonage of non-potable water | | N |
| 22.49 | For remote operation, the duration of operation is to be set before the appliance can be started, unless | | N |
| | the appliance switches off automatically or can operate continuously without hazard | | N |
| 22.50 | Controls incorporated in the appliance take priority over controls actuated by remote operation | | N |
| 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 |
| | There is a visual indication showing that the appliance is adjusted for remote operation | | N |
| | These requirements not necessary on appliances that can operate as follows, without giving rise to a hazard: | | N |
| | - continuously, or | | N |
| | - automatically, or | | N |
| | - remotely | | N |
| 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 |
| 22.102 | Each circuit supplied from a d.c. distribution board incorporates an overload protective device (IEC 60335-2-29) | | N |

| IEC 60335-2-29 | | | |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 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 |
| 23 | INTERNAL WIRING | | P |
| 23.1 | Wireways smooth and free from sharp edges | | P |
| | Wires protected against contact with burrs, cooling fins etc. | | P |
| | Wire holes in metal well-rounded or provided with bushings | | P |
| | Wiring effectively prevented from coming into contact with moving parts | | N |
| 23.2 | Beads etc. on live wires cannot change their position, and are not resting on sharp edges | | N |
| | Beads inside flexible metal conduits contained within an insulating sleeve | | N |
| 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 | | P |
| | Open-coil springs not used | | P |
| | Adequate insulating lining provided inside a coiled spring, the turns of which touch one another | | N |
| | No damage after 10 000 flexings for conductors flexed during normal use, or | | P |
| | 100 flexings for conductors flexed during user maintenance | | N |
| | Electric strength test of 16.3, 1000 V between live parts and accessible metal parts | | P |
| | Not more than 10% of the strands of any conductor broken, and | | P |
| | not more than 30% for wiring supplying circuits that consume no more than 15W | | P |
| 23.4 | Bare internal wiring sufficiently rigid and fixed | | N |
| 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 |
| | no breakdown when a voltage of 2000 V is applied for 15 min between the conductor and metal foil wrapped around the insulation | | P |

| IEC 60335-2-29 | | | |
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| Clause | Requirement + Test | Result - Remark | Verdict |
| 23.6 | Sleeving used as supplementary insulation on internal wiring retained in position by clamping at both ends, or | | N |
| | be such that it can only be removed by breaking or cutting | | N |
| 23.7 | The colour combination green/yellow only used for earthing conductors | | N |
| 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 | | N |
| | the contact pressure is provided by spring terminals | | N |
| 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 |
| 24 | COMPONENTS | | P |
| 24.1 | Components comply with safety requirements in relevant IEC standards | | P |
| | List of components | (see appended table) | P |
| | If components have not been tested and found to comply with relevant IEC standard for the number of cycles specified, they are tested in accordance with 24.1.1 to 24.1.9 | | 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 | | P |
| | Lampholders and starterholders that have not been 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 |
| | No additional tests specified for nationally standardized plugs such as those detailed in IEC/TR 60083 or connectors complying with the standard sheets of IEC 60320-1 and IEC 60309 | | P |

| IEC 60335-2-29 | | | |
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| Clause | Requirement + Test | Result - Remark | Verdict |
| 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 | | N |
| | If the capacitors have to be tested, they are tested according to Annex F | | N |
| 24.1.2 | Safety isolating transformers complying with IEC 61558-2-6 | | N |
| | 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 |
| | If they have to be tested, they are tested according to Annex H | | N |
| | If the switch operates a relay or contactor, the complete switching system is subjected to the test | | N |
| | If the switch only operates a motor starting 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 |
| 24.1.4 | Automatic controls complying with IEC 60730-1 with the relevant part 2. The number of cycles of operation being at least: | | N |
| | - thermostats: 10 000 | | N |
| | - temperature limiters: 1 000 | | N |
| | - self-resetting thermal cut-outs: 300 | | N |
| | - voltage maintained non-self-resetting thermal cut-outs: 1 000 | | N |
| | - other non-self-resetting thermal cut-outs: 30 | | N |
| | - timers: 3 000 | | N |
| | - energy regulators: 10 000 | | N |
| | 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 |
| | Thermal motor protectors are tested in combination with their motor under the conditions specified in Annex D | | N |
| | 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 |
| 24.1.5 | Appliance couplers complying with IEC 60320-1 | | N |

| IEC 60335-2-29 | | | |
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| Clause | Requirement + Test | Result - Remark | Verdict |
| | However, for appliances classified higher than IPX0, the appliance couplers complying with IEC 60320-2-3 | | N |
| | Interconnection couplers complying with IEC 60320-2-2 | | N |
| 24.1.6 | Small lamp holders similar to E10 lampholders complying with IEC 60238, the requirements for E10 lampholders being applicable | | N |
| 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 |
| 24.1.8 | The relevant standard for thermal links is IEC 60691 | | N |
| | Thermal links not complying with IEC 60691 are considered to be an intentionally weak part for the purposes of Clause 19 | | N |
| 24.1.9 | Contactors and relays, other than motor starting relays, tested as part of the appliance | | N |
| | 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 |
| 24.2 | Appliances not fitted with: | | P |
| | - 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 | | P |
| | the solder has a melting point of at least 230 °C | | N |
| 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 |
| 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 | | N |
| 24.5 | Capacitors in auxiliary windings of motors marked with their rated voltage and capacitance, and used accordingly | | N |

| IEC 60335-2-29 | | | |
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| Clause | Requirement + Test | Result - Remark | Verdict |
| | 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 |
| 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 |
| | In addition, the motors comply with the requirements of Annex I | | N |
| 24.7 | Detachable hose-sets for connection of appliances to the water mains comply with IEC 61770 | | N |
| | They are supplied with the appliance | | N |
| | Appliances intended to be permanently connected to the water mains not connected by a detachable hose-set | | N |
| 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 |
| | One or more of the following conditions are to be met: | | N |
| | - the capacitors are of class P2 according to IEC 60252-1 | | N |
| | - the capacitors are housed within a metallic or ceramic enclosure | | N |
| | - the distance of separation of the outer surface to adjacent non-metallic parts exceeds 50 mm | | N |
| | - adjacent non-metallic parts within 50 mm withstand the needle-flame test of Annex E | | N |
| | - adjacent non-metallic parts within 50 mm classified as at least V-1 according to IEC 60695-11-10 | | N |
| 25 | SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS | | P |
| 25.1 | Appliance not intended for permanent connection to fixed wiring, means for connection to the supply: | | P |
| | - supply cord fitted with a plug, | | P |
| | - an appliance inlet having at least the same degree of protection against moisture as required for the appliance, or | | N |
| | - pins for insertion into socket-outlets | | N |
| 25.2 | Appliance not provided with more than one means of connection to the supply mains | | P |

| IEC 60335-2-29 | | | |
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| 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 |
| 25.3 | Appliance intended to be permanently connected to fixed wiring provided with one of the following means for connection to the supply mains: | | N |
| | - a set of terminals allowing the connection of a flexible cord | | N |
| | - a fitted supply cord | | N |
| | - a set of supply leads accommodated in a suitable compartment | | N |
| | - 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 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 |
| | 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 |
| 25.4 | Cable and conduit entries, rated current of appliance not exceeding 16 A, dimension according to table 10 (mm) | | N |
| | Introduction of conduit or cable does not reduce clearances or creepage distances below values specified in clause 29 | | N |
| 25.5 | Method for assembling the supply cord to the appliance: | | P |
| | - type X attachment | | N |
| | - type Y attachment | | P |
| | - type Z attachment, if allowed in relevant part 2 | | N |
| | Type X attachment, other than those with a specially prepared cord, not used for flat twin tinsel cords | | N |
| | 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 |
| 25.6 | Plugs fitted with only one flexible cord | | N |

| IEC 60335-2-29 | | | |
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| Clause | Requirement + Test | Result - Remark | Verdict |
| 25.7 | Supply cords, other than for class III appliances, being one of the following types: | | N |
| | - rubber sheathed (at least 60245 IEC 53) | | N |
| | - polychloroprene sheathed (at least 60245 IEC 57) | | N |
| | - cross-linked polyvinyl chloride sheathed (at least 60245 IEC 88) | | N |
| | - polyvinyl chloride sheathed. Not used if they are likely to touch metal parts having a temperature rise exceeding 75 K during the test of clause 11 | | N |
| | light polyvinyl chloride sheathed cord (60227 IEC 52), for appliances not exceeding 3 kg | | N |
| | <ul style="list-style-type: none"> ordinary polyvinyl chloride sheathed cord (60227 IEC 53), for other appliances | | N |
| | - heat resistant polyvinyl chloride sheathed. Not used for type X attachment other than specially prepared cords | | N |
| | <ul style="list-style-type: none"> heat-resistant light polyvinyl chloride sheathed cord (60227 IEC 56), for appliances not exceeding 3 kg | | N |
| | <ul style="list-style-type: none"> heat-resistant polyvinyl chloride sheathed cord (60227 IEC 57), for other appliances | | N |
| | Supply cords for class III appliances adequately insulated | | N |
| | Test with 500 V for 2 min for supply cords of class III appliances that contain live parts | | N |
| | Battery chargers for charging automobile batteries shall not be fitted with natural rubber sheathed supply cords (IEC 60335-2-29). | | N |
| 25.8 | Nominal cross-sectional area of supply cords not less than table 11; rated current (A); cross-sectional area (mm ²) | | N |
| 25.9 | Supply cords not in contact with sharp points or edges | | N |
| 25.10 | Supply cord of class I appliances have a green/yellow core for earthing | | N |
| 25.11 | Conductors of supply cords not consolidated by soldering where they are subject to contact pressure, unless | | N |
| | the contact pressure is provided by spring terminals | | N |
| 25.12 | Insulation of the supply cord not damaged when moulding the cord to part of the enclosure | | N |
| 25.13 | Inlet openings so constructed as to prevent damage to the supply cord | | N |

| IEC 60335-2-29 | | | |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | If the enclosure at the inlet opening is not of insulating material, a non-detachable lining or bushing complying with 29.3 for supplementary insulation provided | | N |
| | If unsheathed supply cord, a similar additional bushing or lining is required, unless the appliance is | | N |
| | class 0, or | | N |
| | a class III appliance not containing live parts | | N |
| 25.14 | Supply cords moved while in operation adequately protected against excessive flexing | | N |
| | Flexing test, as described: | | N |
| | - applied force (N) | | N |
| | - number of flexings..... | | N |
| | The test does not result in: | | N |
| | - short-circuit between the conductors, such that the current exceeds a value of twice the rated current | | N |
| | - breakage of more than 10% of the strands of any conductor | | N |
| | - separation of the conductor from its terminal | | N |
| | - loosening of any cord guard | | N |
| | - damage to the cord or the cord guard | | N |
| | - broken strands piercing the insulation and becoming accessible | | N |
| 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 |
| | 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 |
| | Pull and torque test of supply cord, values shown in table 12: mass (kg); pull (N); torque (not on automatic cord reel) (Nm) | | N |
| | Cord not damaged and max. 2 mm displacement of the cord | | N |
| 25.16 | Cord anchorages for type X attachments constructed and located so that: | | N |
| | - replacement of the cord is easily possible | | N |
| | - it is clear how the relief from strain and the prevention of twisting are obtained | | N |

| IEC 60335-2-29 | | | |
|----------------|----------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - they are suitable for different types of supply cord | | N |
| | - cord cannot touch the clamping screws of cord anchorage if these screws are accessible, unless | | N |
| | they are separated from accessible metal parts by supplementary insulation | | N |
| | - the cord is not clamped by a metal screw which bears directly on the cord | | N |
| | - at least one part of the cord anchorage securely fixed to the appliance, unless | | N |
| | it is part of a specially prepared cord | | N |
| | - screws which have to be operated when replacing the cord do not fix any other component, unless | | N |
| | the appliance becomes inoperative or incomplete or the parts cannot be removed without a tool | | N |
| | - if labyrinths can be bypassed the test of 25.15 is nevertheless withstood | | N |
| | - for class 0, 0I and I appliances they are of insulating material or are provided with an insulating lining, unless | | N |
| | failure of the insulation of the cord does not make accessible metal parts live | | N |
| | - for class II appliances they are of insulating material, or | | N |
| | if of metal, they are insulated from accessible metal parts by supplementary insulation | | N |
| | After the test of 25.15, under the conditions specified, the conductors have not moved by more than 1 mm in the terminals | | N |
| 25.17 | Adequate cord anchorages for type Y and Z attachment, test with the cord supplied with the appliance | | N |
| 25.18 | Cord anchorages only accessible with the aid of a tool, or | | N |
| | Constructed so that the cord can only be fitted with the aid of a tool | | N |
| 25.19 | Type X attachment, glands not used as cord anchorage in portable appliances | | N |
| | Tying the cord into a knot or tying the cord with string not used | | N |
| 25.20 | The insulated conductors of the supply cord for type Y and Z attachment additionally insulated from accessible metal parts | | N |

| IEC 60335-2-29 | | | |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 25.21 | Space for supply cord for type X attachment or for connection of fixed wiring constructed: | | N |
| | - to permit checking of conductors with respect to correct positioning and connection before fitting any cover | | N |
| | - so there is no risk of damage to the conductors or their insulation when fitting the cover | | N |
| | - 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 |
| | 2 N test to the conductor for portable appliances; no contact with accessible metal parts | | N |
| 25.22 | Appliance inlets: | | N |
| | - live parts not accessible during insertion or removal | | N |
| | Requirement not applicable to appliance inlets complying with IEC 60320-1 | | N |
| | - connector can be inserted without difficulty | | N |
| | - the appliance is not supported by the connector | | N |
| | - not for cold conditions if temp. rise of external metal parts exceeds 75 K during clause 11, unless | | N |
| | the supply cord is unlikely to touch such metal parts | | N |
| 25.23 | Interconnection cords comply with the requirements for the supply cord, except that: | | N |
| | - the cross-sectional area of the conductors is determined on the basis of the maximum current during clause 11 | | N |
| | - the thickness of the insulation may be reduced | | N |
| | If necessary, electric strength test of 16.3 | | N |
| 25.24 | Interconnection cords not detachable without the aid of a tool if compliance with this standard is impaired when they are disconnected | | N |
| 25.25 | Dimensions of pins that are inserted into socket-outlets compatible with the dimensions of the relevant socket-outlet. | | N |
| | Dimensions of pins and engagement face in accordance with the dimensions of the relevant plug in IEC/TR 60083 | | N |
| 26 | TERMINALS FOR EXTERNAL CONDUCTORS | | P |
| 26.1 | Appliances provided with terminals or equally effective devices for connection of external conductors | | P |

| IEC 60335-2-29 | | | |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Terminals only accessible after removal of a non-detachable cover, except | | P |
| | for class III appliances that do not contain live parts | | N |
| | 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 |
| 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 |
| | the connections are soldered | | N |
| | Screws and nuts not used to fix any other component, except | | N |
| | internal conductors, if so arranged that they are unlikely to be displaced when fitting the supply conductors | | N |
| | If soldered connections used, the conductor so positioned or fixed that reliance is not placed on soldering alone, unless | | N |
| | 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 |
| 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 |
| | Terminals fixed so that when the clamping means is tightened or loosened: | | N |
| | - the terminal does not become loose | | N |
| | - internal wiring is not subjected to stress | | N |
| | - neither clearances nor creepage distances are reduced below the values in clause 29 | | N |
| | 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 |
| | No deep or sharp indentations of the conductors | | N |
| 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 |

| IEC 60335-2-29 | | | |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | so constructed or placed that conductors prevented from slipping out when clamping screws or nuts are tightened | | N |
| 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 |
| | Stranded conductor test, 8 mm insulation removed | | N |
| | No contact between live parts and accessible metal parts and, | | N |
| | for class II constructions, between live parts and metal parts separated from accessible metal parts by supplementary insulation only | | N |
| | This requirement does not apply to the terminals of the output circuit (IEC 60335-2-29). | | N |
| 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 |
| | If a specially prepared cord is used, terminals need only be suitable for that cord | | N |
| 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 |
| 26.8 | Terminals for the connection of fixed wiring, including the earthing terminal, located close to each other | | N |
| 26.9 | Terminals of the pillar type constructed and located as specified | | N |
| 26.10 | Terminals with screw clamping and screwless terminals not used for flat twin tinsel cords, unless | | P |
| | conductors ends fitted with means suitable for screw terminals | | N |
| | Pull test of 5 N to the connection | | P |
| 26.11 | For type Y and Z attachment, soldered, welded, crimped or similar connections may be used | | P |
| | For Class II appliances, the conductor so positioned or fixed that reliance is not placed on soldering, welding or crimping alone | | P |
| | 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 |

| IEC 60335-2-29 | | | |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 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 | | N |
| | Earthing terminals and earthing contacts not connected to the neutral terminal | | N |
| | Class 0, II and III appliances have no provision for earthing | Class II | P |
| | Safety extra-low voltage circuits not earthed, unless | | N |
| | protective extra-low voltage circuits | | N |
| 27.2 | Clamping means of earthing terminals adequately secured against accidental loosening | | N |
| | Terminals for the connection of external equipotential bonding conductors allow connection of conductors of 2,5 to 6 mm ² , and | | N |
| | do not provide earthing continuity between different parts of the appliance, and | | N |
| | conductors cannot be loosened without the aid of a tool | | N |
| 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 | | N |
| | For appliances with supply cords, current-carrying conductors become taut before earthing conductor, if the cord slips out of the cord anchorage | | N |
| 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 | | N |
| | Parts providing earthing continuity, other than parts of a metal frame or enclosure, have adequate resistance to corrosion | | N |
| | If of steel, these parts provided with an electroplated coating with a thickness at least 5 µm | | N |
| | Adequate protection against rusting of parts of coated or uncoated steel, only intended to provide or transmit contact pressure | | N |
| | 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 |
| 27.5 | Low resistance of connection between earthing terminal and earthed metal parts | | N |

| IEC 60335-2-29 | | | |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | 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 |
| | Resistance not exceeding 0,1 Ω at the specified low-resistance test (Ω) | | N |
| 27.6 | The printed conductors of printed circuit boards not used to provide earthing continuity in hand-held appliances. | | N |
| | 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 |
| 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 |
| | Screws of insulating material not used for any electrical connections or connections providing earthing continuity | | N |
| | Screws used for electrical connections or connections providing earthing continuity screwed into metal | | P |
| | Screws not of insulating material if their replacement by a metal screw can impair supplementary or reinforced insulation | | N |
| | 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 |
| | For screws and nuts; torque-test as specified in table 14..... | (see appended table) | P |
| 28.2 | Electrical connections and connections providing earthing continuity constructed so that contact pressure is not transmitted through non-ceramic insulating material liable to shrink or distort, unless | | P |
| | there is resiliency in the metallic parts to compensate for shrinkage or distortion of the insulating material | | N |

| IEC 60335-2-29 | | | |
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| Clause | Requirement + Test | Result - Remark | Verdict |
| | This requirement does not apply to electrical connections in circuits of appliances for which: | | N |
| | <ul style="list-style-type: none"> 30.2.2 is applicable and that carry a current not exceeding 0,5 A | | N |
| | <ul style="list-style-type: none"> 30.2.3 is applicable and that carry a current not exceeding 0,2 A | | N |
| 28.3 | Space-threaded (sheet metal) screws only used for electrical connections if they clamp the parts together | | N |
| | 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 |
| | Thread-cutting (self-tapping) screws not used if they are likely to be operated by the user or installer | | N |
| | Thread-cutting, thread rolling and space threaded screws may be used in connections providing earthing continuity provided it is not necessary to disturb the connection: | | N |
| | - in normal use, | | N |
| | - during user maintenance, | | N |
| | - when replacing a supply cord having a type X attachment, or | | N |
| | - during installation | | N |
| | At least two screws being used for each connection providing earthing continuity, unless | | N |
| | the screw forms a thread having a length of at least half the diameter of the screw | | N |
| 28.4 | Screws and nuts that make mechanical connection secured against loosening if they also make electrical connections or connections providing earthing continuity | | N |
| | This requirement does not apply to screws in the earthing circuit if at least two screws are used, or | | N |
| | if an alternative earthing circuit is provided | | N |
| | Rivets for electrical connections or connections providing earthing continuity secured against loosening if the connections are subjected to torsion | | N |
| 29 | CLEARANCES, CREEPAGE DISTANCES AND SOLID INSULATION | | P |
| | Clearances, creepage distances and solid insulation withstand electrical stress | | P |

| IEC 60335-2-29 | | | |
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| Clause | Requirement + Test | Result - Remark | Verdict |
| | For coatings used on printed circuits boards to protect the microenvironment (Type 1) or to provide basic insulation (Type 2), Annex J applies.....: | | N |
| | The microenvironment is pollution degree 1 under type 1 protection | | N |
| | 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 |
| | 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 | | N |
| | 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 |
| | Impulse voltage test is not applicable: | | N |
| | - when the microenvironment is pollution degree 3, or | | N |
| | - for basic insulation of class 0 and class 01 appliances | | N |
| | 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 |
| | 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: | | P |
| | - table 16 based on the rated impulse voltage | (see appended table) | P |
| | - table F.7a in IEC 60664-1, frequency not exceeding 30 kHz | | N |
| | - clause 4 of IEC 60664-4, frequency exceeding 30 kHz | | N |
| | If values of table 16 are largest, the impulse voltage test of clause 14 may be applied instead, unless | | N |
| | the microenvironment is pollution degree 3, or | | N |
| | the distances can be affected by wear, distortion, movement of the parts or during assembly | | N |
| | However, clearances are not specified if the appliance complies with clause 19 with the functional insulation short-circuited | | N |
| | 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 |
| 29.1.5 | Appliances having higher working voltages than rated voltage, clearances for basic insulation are the largest values determined from: | | N |
| | - table 16 based on the rated impulse voltage | | N |
| | - table F.7a in IEC 60664-1, frequency not exceeding 30 kHz | | N |
| | - clause 4 of IEC 60664-4, frequency exceeding 30 kHz | | N |
| | 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 | | N |

| IEC 60335-2-29 | | | |
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| 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 |
| | If clearances for basic insulation are selected from Clause 4 of IEC 60664-4, the clearances of reinforced insulation are twice the value required for basic insulation | | N |
| | 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 |
| | Circuits supplied with a voltage lower than rated voltage, clearances of functional insulation are based on the working voltage used as the rated voltage in table 15 | | N |
| 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 |
| | - insulation subjected to conductive pollution; pollution degree 3 | | N |
| | 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 | | N |

| IEC 60335-2-29 | | | |
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| 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 |
| 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 | | P |
| 29.2.3 | Creepage distances of reinforced insulation at least double those specified for basic insulation in table 17, or | (see appended table) | N |
| | Table 2 of IEC 60664-4, as applicable | | P |
| 29.2.4 | Creepage distances of functional insulation not less than specified in table 18 | (see appended table) | N |
| | 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 | | N |
| | Creepage distances may be reduced if the appliance complies with clause 19 with the functional insulation short-circuited | | N |
| 29.3 | Supplementary and reinforced insulation have adequate thickness, or a sufficient number of layers, to withstand the electrical stresses | | P |
| | Compliance checked: | | P |
| | - by measurement, in accordance with 29.3.1, or | | P |
| | - by an electric strength test in accordance with 29.3.2, or | | P |
| | - by an assessment of the thermal quality of the material combined with an electric strength test, in accordance with 29.3.3, and | | N |
| | for accessible parts of reinforced insulation consisting of a single layer, by measurement in accordance with 29.3.4, or | | N |
| | - 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 |
| 29.3.1 | Supplementary insulation have a thickness of at least 1 mm | | P |
| | Reinforced insulation have a thickness of at least 2 mm | | P |
| 29.3.2 | Each layer of material withstand the electric strength test of 16.3 for supplementary insulation | | P |

| IEC 60335-2-29 | | | |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Supplementary insulation consist of at least 2 layers | | P |
| | Reinforced insulation consist of at least 3 layers | | P |
| 29.3.3 | The insulation is subjected to the dry heat test Bb of IEC 60068-2-2, followed by | | N |
| | the electric strength test of 16.3 | | N |
| | 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 |
| 29.3.4 | Thickness of accessible parts of reinforced insulation consisting of a single layer not less than specified in table 19 | | N |
| 30 | RESISTANCE TO HEAT AND FIRE | | P |
| 30.1 | External parts of non-metallic material, | | P |
| | parts supporting live parts, and | | 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 |
| | 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) | | N |
| 30.2 | Parts of non-metallic material resistant to ignition and spread of fire | | P |
| | This requirement does not apply to: | | N |
| | 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 |
| | decorative trims, knobs and other parts unlikely to be ignited or to propagate flames that originate inside the appliance | | N |
| | Compliance checked by the test of 30.2.1, and in addition: | | P |

| IEC 60335-2-29 | | | |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - for attended appliances, 30.2.2 applies | | N |
| | - for unattended appliances, 30.2.3 applies | | P |
| | For appliances for remote operation, 30.2.3 applies | | N |
| | 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 | | 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 |
| | the material is classified at least HB40 according to IEC 60695-11-10 | | N |
| | Parts for which the glow-wire test cannot be carried out need to meet the requirements in ISO 9772 for material classified HBF | | N |
| 30.2.2 | Appliances operated while attended, parts of non-metallic material supporting current-carrying connections, and | | N |
| | parts of non-metallic material within a distance of 3mm of such connections, | | N |
| | subjected to the glow-wire test of IEC 60695-2-11 | | N |
| | The test severity is: | | N |
| | - 750 °C, for connections carrying a current exceeding 0,5 A during normal operation | | N |
| | - 650 °C, for other connections | | N |
| | Glow-wire applied to an interposed shielding material, if relevant | | N |
| | 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: | | N |
| | - 750 °C, for connections carrying a current exceeding 0,5 A during normal operation | | N |
| | - 650 °C, for other connections | | N |
| | The glow-wire test is also not carried out on small parts. These parts are to: | | N |
| | - comprise material having a glow-wire flammability index of at least 750 °C, or 650 °C as appropriate, or | | N |
| | - comply with the needle-flame test of Annex E, or | | N |
| | - comprise material classified as V-0 or V-1 according to IEC 60695-11-10 | | N |
| | Glow-wire test not applicable to conditions as specified | | N |

| IEC 60335-2-29 | | | |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 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 | | P |
| 30.2.3.1 | Parts of non-metallic material supporting connections carrying a current exceeding 0,2 A during normal operation, and | | 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 | | 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 |
| 30.2.3.2 | Parts of non-metallic material supporting connections, and | | P |
| | parts of non-metallic material within a distance of 3mm, | | P |
| | subjected to glow-wire test of IEC 60695-2-11 | | P |
| | The test severity is: | | P |
| | - 750 °C, for connections carrying a current exceeding 0,2 A during normal operation | | P |
| | - 650 °C, for other connections | | N |
| | Glow-wire applied to an interposed shielding material, if relevant | | P |
| | However, the glow-wire test of 750 °C or 650 °C as appropriate, is not carried out on parts of material fulfilling both or either of the following classifications: | | N |
| | - a glow-wire ignition temperature according to IEC 60695-2-13 of at least: | | N |
| | • 775 °C, for connections carrying a current exceeding 0,2 A during normal operation | | N |
| | • 675 °C, for other connections | | N |
| | - a glow-wire flammability index according to IEC 60695-2-12 of at least: | | N |
| | - 750 °C, for connections carrying a current exceeding 0,2 A during normal operation | | N |
| | - 650 °C, for other connections | | N |
| | The glow-wire test is also not carried out on small parts. These parts are to: | | N |

| IEC 60335-2-29 | | | |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - comprise material having a glow-wire ignition temperature of at least 775 °C or 675 °C as appropriate, or | | N |
| | - comprise material having a glow-wire flammability index of at least 750 °C or 650 °C as appropriate, or | | N |
| | - comply with the needle-flame test of Annex E, or | | N |
| | - comprise material classified as V-0 or V-1 according to IEC 60695-11-10 | | N |
| | The consequential needle-flame test of Annex E applied to non-metallic parts that encroach within the vertical cylinder placed above the centre of the connection zone and on top of the non-metallic parts supporting current-carrying connections, and parts of non-metallic material within a distance of 3 mm of such connections if these parts are those: | | N |
| | - 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 |
| | - parts that comprised material having a glow-wire flammability index of at least 750 °C or 650 °C as appropriate, or | | N |
| | - small parts, that comprised material having a glow-wire flammability index of at least 750 °C or 650 °C as appropriate, or | | N |
| | - small parts for which the needle-flame test of Annex E was applied, or | | N |
| | - small parts for which a material classification of V-0 or V-1 was applied | | N |
| | However, the consequential needle-flame test is not carried out on non-metallic parts, including small parts, within the cylinder that are: | | N |
| | - parts having a glow-wire ignition temperature of at least 775 °C or 675 °C as appropriate, or | | N |
| | - parts comprising material classified as V-0 or V-1 according to IEC 60695-11-10, or | | N |
| | - 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 |
| 30.2.4 | Base material of printed circuit boards subjected to the needle-flame test of Annex E | | P |
| | Test not applicable to conditions as specified.....: | | N |
| 31 | RESISTANCE TO RUSTING | | P |
| | Relevant ferrous parts adequately protected against rusting | | P |
| | Tests specified in part 2 when necessary | | N |

| IEC 60335-2-29 | | | |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 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 | | N |
| 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: | | P |
| | - 2 000 V, for battery chargers having a rated voltage not exceeding 150 V; | | N |
| | - 2 500 V, for other battery chargers. | | P |
| B | ANNEX B (NORMATIVE) APPLIANCES POWERED BY RECHARGEABLE BATTERIES | | N |
| | The following modifications to this standard are applicable for appliances powered by batteries that are recharged in the appliance | | N |
| | This annex does not apply to battery chargers | | N |
| 3.1.9 | Appliance operated under the following conditions: | | N |
| | - the appliance, supplied by its fully charged battery, operated as specified in relevant part 2 | | N |
| | - the battery is charged, the battery being initially discharged to such an extent that the appliance cannot operate | | N |
| | -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 |
| | - 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 |
| 3.6.2 | Part to be removed in order to discard the battery is not considered to be detachable | | N |
| 5.B.101 | Appliances supplied from the supply mains tested as specified for motor-operated appliances | | N |
| 7.1 | Battery compartment for batteries intended to be replaced by the user, marked with battery voltage and polarity of the terminals | | N |

| IEC 60335-2-29 | | | |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | The positive terminal indicated by symbol IEC 60417-5005 and the negative terminal by symbol IEC 60417-5006 | | N |
| 7.6 | Symbols 60417-5005 and IEC 60417-5006 | | N |
| 7.12 | The instructions give information regarding charging | | N |
| | The instructions for appliances incorporating batteries intended to be replaced by the user includes required information | | N |
| | Details about how to remove batteries containing materials hazardous to the environment given | | N |
| 7.15 | Markings placed on the part of the appliance connected to the supply mains | | N |
| 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 |
| | If the appliance can be operated without batteries, double or reinforced insulation required | | N |
| 11.7 | The battery is charged for the period stated in the instructions or 24 h | | N |
| 19.1 | Appliances subjected to tests of 19.B.101, 19.B.102 and 19.B.103 | | N |
| 19.10 | Not applicable | | N |
| 19.B.101 | Appliances supplied at rated voltage for 168 h, the battery being continually charged | | N |
| 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 |
| 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 |
| 21.B.101 | Appliances having pins for insertion into socket-outlets have adequate mechanical strength | | N |
| | Part of the appliance incorporating the pins subjected to the free fall test, procedure 2, of IEC 60068-2-31, the number of falls being: | | N |
| | - 100, if the mass of the part does not exceed 250 g (g) | | N |
| | - 50, if the mass of the part exceeds 250 g | | N |
| | After the test, the requirements of 8.1, 15.1.1, 16.3 and clause 29 are met | | N |

| IEC 60335-2-29 | | | |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 22.3 | Appliances having pins for insertion into socket-outlets tested as fully assembled as possible | | N |
| 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 |
| 30.2 | For parts of the appliance connected to the supply mains during the charging period, 30.2.3 applies | | N |
| | For other parts, 30.2.2 applies | | N |
| C | ANNEX C (NORMATIVE) AGEING TEST ON MOTORS | | N |
| | Tests, as described, carried out when doubt with regard to the temperature classification of the insulation of a motor winding | | N |
| | Test conditions as specified | | N |
| D | ANNEX D (NORMATIVE) THERMAL MOTOR PROTECTORS | | N |
| | Applicable to appliances having motors that incorporate thermal motor protectors necessary for compliance with the standard | | N |
| | Test conditions as specified | | N |
| E | ANNEX E (NORMATIVE) NEEDLE-FLAME TEST | | P |
| | Needle-flame test carried out in accordance with IEC 60695-11-5, with the following modifications: | | N |
| 7 | Severities | | P |
| | The duration of application of the test flame is 30 s \pm 1 s | | P |
| 9 | Test procedure | | N |
| 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 |
| 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 |
| 11 | Evaluation of test results | | P |
| | The duration of burning not exceeding 30 s | | N |

| IEC 60335-2-29 | | | |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | However, for printed circuit boards, the duration of burning not exceeding 15 s | | P |
| F | ANNEX F (NORMATIVE) CAPACITORS | | N |
| | 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 |
| 1.5 | Terms and definitions | | N |
| 1.5.3 | Class X capacitors tested according to subclass X2 | | N |
| 1.5.4 | This subclause is applicable | | N |
| 1.6 | Marking | | N |
| | Items a) and b) are applicable | | N |
| 3.4 | Approval testing | | N |
| 3.4.3.2 | Table 3 is applicable as described | | N |
| 4.1 | Visual examination and check of dimensions | | N |
| | This subclause is applicable | | N |
| 4.2 | Electrical tests | | N |
| 4.2.1 | This subclause is applicable | | N |
| 4.2.5 | This subclause is applicable | | N |
| 4.2.5.2 | Only table 11 is applicable | | N |
| | Values for test A apply | | N |
| | However, for capacitors in heating appliances the values for test B or C apply | | N |
| 4.12 | Damp heat, steady state | | N |
| | This subclause is applicable | | N |
| | Only insulation resistance and voltage proof are checked | | N |
| 4.13 | Impulse voltage | | N |
| | This subclause is applicable | | N |
| 4.14 | Endurance | | N |
| | Subclauses 4.14.1, 4.14.3, 4.14.4 and 4.14.7 are applicable | | N |
| 4.14.7 | Only insulation resistance and voltage proof are checked | | N |
| | No visible damage | | N |
| 4.17 | Passive flammability test | | N |
| | This subclause is applicable | | N |
| 4.18 | Active flammability test | | N |

| IEC 60335-2-29 | | | |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | This subclause is applicable | | N |
| G | ANNEX G (NORMATIVE) SAFETY ISOLATING TRANSFORMERS | | P |
| | The following modifications to this standard are applicable for safety isolating transformers: | | P |
| 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 | | P |
| 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 | | N |
| | For safety isolating transformers subjected to periodic voltages with a frequency exceeding 30 kHz, the clearances, creepage distances and solid insulation values specified in IEC 60664-4 are applicable, if greater than the values specified in items 2a, 2c and 3 in table 13 of IEC 61558-1 | | N |
| H | ANNEX H (NORMATIVE) SWITCHES | | N |
| | Switches comply with the following clauses of IEC 61058-1, as modified below: | | N |
| | The tests of IEC 61058-1 carried out under the conditions occurring in the appliance | | N |
| | Before being tested, switches are operated 20 times without load | | N |
| 8 | Marking and documentation | | N |
| | Switches are not required to be marked | | N |

| IEC 60335-2-29 | | | |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | 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 |
| 13 | Mechanism | | N |
| | The tests may be carried out on a separate sample | | N |
| 15 | Insulation resistance and dielectric strength | | N |
| 15.1 | Not applicable | | N |
| 15.2 | Not applicable | | N |
| 15.3 | Applicable for full disconnection and micro-disconnection | | N |
| 17 | Endurance | | N |
| | Compliance is checked on three separate appliances or switches | | N |
| | For 17.2.4.4, the number of cycles declared according to 7.1.4 is 10 000, unless | | N |
| | otherwise specified in 24.1.3 of the relevant part 2 of IEC 60335 | | N |
| | Switches for operation under no load and which can be operated only by a tool, and | | N |
| | switches operated by hand that are interlocked so that they cannot be operated under load, | | N |
| | are not subjected to the tests | | N |
| | However, switches without this interlock are subjected to the test of 17.2.4.4 for 100 cycles of operation | | N |
| | Subclauses 17.2.2 and 17.2.5.2 not applicable | | N |
| | The ambient temperature during the test is that occurring in the appliance during the test of Clause 11 in IEC 60335-1 | | N |
| | 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 |
| 20 | Clearances, creepage distances, solid insulation and coatings of rigid printed board assemblies | | N |
| | This clause is applicable to clearances and creepage distances for functional insulation, across full disconnection and micro-disconnection, as stated in table 24 | | N |
| I | ANNEX I (NORMATIVE) MOTORS HAVING BASIC INSULATION THAT IS INADEQUATE FOR THE RATED VOLTAGE OF THE APPLIANCE | | N |
| | The following modifications to this standard are applicable for motors having basic insulation that is inadequate for the rated voltage of the appliance: | | N |

| IEC 60335-2-29 | | | |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 8 | Protection against access to live parts | | N |
| 8.1 | Metal parts of the motor are considered to be bare live parts | | N |
| 11 | Heating | | N |
| 11.3 | The temperature rise of the body of the motor is determined instead of the temperature rise of the windings | | N |
| 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 |
| 16 | Leakage current and electric strength | | N |
| 16.3 | Insulation between live parts of the motor and its other metal parts is not subjected to the test | | N |
| 19 | Abnormal operation | | N |
| 19.1 | The tests of 19.7 to 19.9 are not carried out | | N |
| 19.1.101 | Appliance operated at rated voltage with each of the following fault conditions: | | N |
| | - short circuit of the terminals of the motor, including any capacitor incorporated in the motor circuit | | N |
| | - short circuit of each diode of the rectifier | | N |
| | - open circuit of the supply to the motor | | N |
| | - open circuit of any parallel resistor, the motor being in operation | | N |
| | Only one fault simulated at a time, the tests carried out consecutively | | N |
| 22 | Construction | | N |
| 22.1.101 | 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 |
| | Compliance checked by the tests specified for double and reinforced insulation | | N |
| J | ANNEX J (NORMATIVE) COATED PRINTED CIRCUIT BOARDS | | N |
| | Testing of protective coatings of printed circuit boards carried out in accordance with IEC 60664-3 with the following modifications: | | N |
| 5.7 | Conditioning of the test specimens | | N |
| | When production samples are used, three samples of the printed circuit board are tested | | N |
| 5.7.1 | Cold | | N |

| IEC 60335-2-29 | | | |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | The test is carried out at -25 °C | | N |
| 5.7.3 | Rapid change of temperature | | N |
| | Severity 1 is specified | | N |
| 5.9 | Additional tests | | N |
| | This subclause is not applicable | | N |
| K | ANNEX K (NORMATIVE) OVERVOLTAGE CATEGORIES | | P |
| | The information on overvoltage categories is extracted from IEC 60664-1 | | P |
| | Ovvoltage category is a numeral defining a transient overvoltage condition | | N |
| | Equipment of overvoltage category IV is for use at the origin of the installation | | N |
| | 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 |
| | 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 |
| | 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 |
| 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 |

| IEC 60335-2-29 | | | |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | 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 |
| | - 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 |
| | - pollution degree 4: the pollution generates persistent conductivity caused by conductive dust or by rain or snow | | N |
| N | ANNEX N (NORMATIVE) PROOF TRACKING TEST | | P |
| | The proof tracking test is carried out in accordance with IEC 60112 with the following modifications: | | P |
| 7 | Test apparatus | | P |
| 7.3 | Test solutions | | P |
| | Test solution A is used | | P |
| 10 | Determination of proof tracking index (PTI) | | P |
| 10.1 | Procedure | | P |
| | The proof voltage is 100V, 175V, 400V or 600V....: | 175V | P |
| | The test is carried out on five specimens | | P |
| | In case of doubt, additional test with proof voltage reduced by 25 V, the number of drops increased to 100 | | N |
| 10.2 | Report | | P |
| | The report states if the PTI value was based on a test using 100 drops with a test voltage of (PTI-25) V | | N |
| 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 |

| IEC 60335-2-29 | | | |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| P | ANNEX P (INFORMATIVE) GUIDANCE FOR THE APPLICATION OF THIS STANDARD TO APPLIANCES USED IN WARM DAMP EQUABLE CLIMATES | | N |
| | 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 |
| | 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 |
| 5.7 | The ambient temperature for the tests of clauses 11 and 13 is 40 +3/0 °C | | N |
| 7.1 | The appliance marked with the letters WDaE | | N |
| 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 |
| | 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 |
| 11.8 | The values of Table 3 are reduced by 15 K | | N |
| 13.2 | The leakage current for class I appliances not exceeding 0,5 mA | | N |
| 15.3 | The value of t is 37 °C | | N |
| 16.2 | The leakage current for class I appliances not exceeding 0,5 mA (mA): | | N |
| 19.13 | The leakage current test of 16.2 is applied in addition to the electric strength test of 16.3 | | N |
| Q | ANNEX Q (INFORMATIVE) SEQUENCE OF TESTS FOR THE EVALUATION OF ELECTRONIC CIRCUITS | | N |
| | Description of tests for appliances incorporating electronic circuits | | N |
| R | ANNEX R (NORMATIVE) SOFTWARE EVALUATION | | N |
| | 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 |
| R.1 | Programmable electronic circuits using software | | N |
| | 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 |

| IEC 60335-2-29 | | | |
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| Clause | Requirement + Test | Result - Remark | Verdict |
| R.2 | Requirements for the architecture | | N |
| | 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 |
| 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 |
| | - single channel with periodic self-test and monitoring | | N |
| | - dual channel (homogenous) with comparison | | N |
| | - dual channel (diverse) with comparison | | N |
| | 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 |
| | - single channel with functional test | | N |
| | - single channel with periodic self-test | | N |
| | - dual channel without comparison | | N |
| R.2.2 | Measures to control faults/errors | | N |
| 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 |
| 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 |
| 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 |
| 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 |

| IEC 60335-2-29 | | | |
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| Clause | Requirement + Test | Result - Remark | Verdict |
| 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 |
| R.2.2.6 | The software is referenced to relevant parts of the operating sequence and the associated hardware functions | | N |
| R.2.2.7 | Labels used for memory locations are unique | | N |
| R.2.2.8 | The software is protected from user alteration of safety-related segments and data | | N |
| R.2.2.9 | Software and safety-related hardware under its control is initialized and terminates before compliance with clause 19 is impaired | | N |
| R.3 | Measures to avoid errors | | N |
| R.3.1 | General | | N |
| | 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 |
| | 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 |
| R.3.2 | Specification | | N |
| R.3.2.1 | Software safety requirements: | Software Id: | N |
| | The specification of the software safety requirements includes the descriptions listed | | N |
| R.3.2.2 | Software architecture | | N |
| R.3.2.2.1 | <p>The specification of the software architecture includes the aspects listed</p> <ul style="list-style-type: none"> - 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 |

| IEC 60335-2-29 | | | |
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| Clause | Requirement + Test | Result - Remark | Verdict |
| R.3.2.2.2 | The architecture specification is validated against the specification of the software safety requirements by static analysis | | N |
| R.3.2.3 | Module design and coding | | N |
| R.3.2.3.1 | Based on the architecture design, software is suitably refined into modules | | N |
| | Software module design and coding is implemented in a way that is traceable to the software architecture and requirements | | N |
| R.3.2.3.2 | Software code is structured | | N |
| R.3.2.3.3 | Coded software is validated against the module specification by static analysis | | N |
| | The module specification is validated against the architecture specification by static analysis | | N |
| R.3.3.3 | Software validation | | N |
| | The software is validated with reference to the requirements of the software safety requirements specification | | N |
| | Compliance is checked by simulation of: | | N |
| | - input signals present during normal operation | | N |
| | - anticipated occurrences | | N |
| | - undesired conditions requiring system action | | N |

| 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 | | | | | | N |
| 1.1 Registers | Stuck at | Functional test, or periodic self-test using either: - static memory test, or - word protection with single bit redundancy | H.2.16.5 H.2.16.6 H.2.19.6 H.2.19.8.2 | | | N |
| 1.2 VOID | | | | | | N |
| 1.3 Programme counter | Stuck at | Functional test, or Periodic self-test, or Independent time-slot monitoring, or Logical monitoring of the programme sequence | H.2.16.5 H.2.16.6 H.2.18.10.4 H.2.18.10.2 | | | N |

| 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 |
|----------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------|----------------------------------------|-------------------------------------|---------|
| 2 Interrupt handling and execution | No interrupt or too frequent interrupt | Functional test, or time-slot monitoring | H.2.16.5 H.2.18.10.4 | | | N |
| 3 Clock | Wrong frequency (for quartz synchroniz ed clock: harmonics/ sub-harmonics only) | Frequency monitoring, or time slot monitoring | H.2.18.10.1 H.2.18.10.4 | | | N |
| 4. Memory 4.1 Invariable memory | All single bit faults | Periodic modified checksum, or multiple checksum, or word protection with single bit redundancy | H.2.19.3.1 H.2.19.3.2 H.2.19.8.2 | | | N |
| 4.2 Variable memory | DC fault | Periodic static memory test, or word protection with single bit redundancy | H.2.19.6 H.2.19.8.2 | | | N |
| 4.3 Addressing (relevant to variable and invariable memory) | Stuck at | Word protection with single bit redundancy including the address | H.2.19.8.2 | | | N |
| 5 Internal data path | Stuck at | Word protection with single bit redundancy | H.2.19.8.2 | | | N |
| 5.1 VOID | | | | | | N |
| 5.2 Addressing | Wrong address | Word protection with single bit redundancy including the address | H.2.19.8.2 | | | N |
| 6 External communication | Hamming distance 3 | Word protection with multi-bit redundancy, or CRC – single work, or Transfer redundancy, or Protocol test | H.2.19.8.1 H.2.19.4.1 H.2.18.2.2 H.2.18.14 | | | N |
| 6.1 VOID | | | | | | N |

| Clause | Requirement + Test | Result - Remark | Verdict |
|--------|--------------------|-----------------|---------|
|--------|--------------------|-----------------|---------|

TABLE R.1^e – GENERAL FAULT/ERROR CONDITIONS

| Component ^a | Fault/error | Acceptable measures ^{b, c} | Definitions | Document reference for applied measure | Document reference for applied test | Verdict |
|--------------------------------------------------------|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------|---------|
| 6.2 VOID | | | | | | N |
| 6.3 Timing | Wrong point in time Wrong sequence | Time-slot monitoring, or scheduled transmission Time-slot and logical monitoring, or comparison of redundant communication channels by either: - reciprocal comparison - independent hardware comparator Logical monitoring, or time-slot monitoring, or Scheduled transmission | H.2.18.10.4 H.2.18.18 H.2.18.10.3 H.2.18.15 H.2.18.3 H.2.18.10.2 H.2.18.10.4 H.2.18.18 | | | N |
| 7 Input/output periphery | Fault conditions specified in 19.11.2 | Plausibility check | H.2.18.13 | | | N |
| 7.1 VOID | | | | | | N |
| 7.2 Analog I/O | | | | | | N |
| 7.2.1 A/D and D/A-converter | Fault conditions specified in 19.11.2 | Plausibility check | H.2.18.13 | | | N |
| 7.2.2 Analog multiplexer | Wrong addressing | Plausibility check | H.2.18.13 | | | N |
| 8 VOID | | | | | | N |
| 9 Custom chips ^d e.g. ASIC, GAL, gate array | Any output outside the static and dynamic functional specification | Periodic self-test | H.2.16.6 | | | N |

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.

| 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 |
| | 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 |
| 5 | GENERAL CONDITIONS FOR THE TESTS | | N |
| 5.201 | When batteries are used, the generally available rechargeable batteries giving the most unfavourable conditions are used | | N |
| 6.1 | Battery chargers suitable for outdoor use shall be class III | | N |
| | Other battery chargers shall be class II or class III | | N |
| 6 | CLASSIFICATION | | N |
| 6.2 | Battery chargers suitable for outdoor use shall be at least IPX7 | | N |
| 6.201 | Enclosures shall be classified at least IP3X with regard to protection against ingress of solid foreign objects. | | N |
| 7 | MARKING AND INSTRUCTIONS | | N |
| 7.1 | Symbol 5957 of IEC 60417 or text "For indoor use only" for battery chargers for indoor use | | N |
| | IP number | | N |
| | Smiling face symbol together with 8+ | | N |
| 7.6 | Correct symbols used | | N |
| 7.12 | Instructions for safe use contains: | | N |
| | - Warning to only allow children at least 8 years old to use battery charger | | N |
| | - Sufficient instructions for safe use of battery charger by a child | | N |
| | - Explanation that battery charger is not a toy | | N |
| | - Instruction for child not to try and recharge non-rechargeable batteries | | N |
| | - Warning to examine battery charger regularly for damage | | N |
| | - Warning in case battery charger is damaged | | N |
| | Instruction for Class III battery charger to be supplied from transformer for toys | | N |
| 7.14 | Height of symbol marked on the appliance at least 10 mm | | N |

| IEC 60335-2-29 | | | |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Height of lettering at least 3 mm | | N |
| 8 | PROTECTION AGAINST ACCESS TO LIVE PARTS | | N |
| 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 |
| 10 | POWER INPUT AND CURRENT | | N |
| 10.101 | The output voltage not exceed 42,4 V peak | | N |
| 11 | HEATING | | N |
| 11.8 | Temperature rises of parts that can be touched by test probe 18 of IEC 61032 | | N |
| | - 25 K, if of metal; | | N |
| | - 35 K, if of other material. | | N |
| 17 | OVERLOAD PROTECTION OF TRANSFORMERS AND ASSOCIATED CIRCUITS | | N |
| | Temperature rises of parts that can be touched by test probe 18 of IEC 61032 | | N |
| | - 45 K, if of metal; | | N |
| | - 55 K, if of other material. | | N |
| 19 | ABNORMAL OPERATION | | N |
| 19.13 | Temperature rises of parts that can be touched by test probe 18 of IEC 61032 | | N |
| | - 45 K, if of metal; | | N |
| | - 55 K, if of other material. | | N |
| 21 | MECHANICAL STRENGTH | | N |
| 21.201 | Impact test Eha of IEC 60068-2-75, with impact energy of 2 J | | N |
| | 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 |
| | Free fall test Ed, Procedure 1 of IEC 60068-2-32, from the height of 500 mm | | N |
| | Battery charger not damaged to such extend that compliance is impaired, live parts shall not become accessible | | N |
| 22 | CONSTRUCTION | | N |
| 22.201 | Battery charger with only one rated voltage or rated voltage range | | N |
| | Battery charger not incorporate means for manually adjusting output voltage | | N |

| 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 |
| 24 | COMPONENTS | | N |
| 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 |
| 25 | SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS | | N |
| 25.1 | Battery charger not provided with an appliance inlet | | N |
| 25.5 | Battery charger provided with type Y or type Z attachment | | N |

| | | | | | | |
|------------------------|------------------------------|-------------|----------------|----|-------------|--------|
| 10.1 | TABLE: Power input deviation | | | | | N |
| Input deviation of/at: | | P rated (W) | P measured (W) | dP | Required dP | Remark |
| | | | | | | |
| | | | | | | |

| | | | | | | |
|-------------------------|--------------------------------|-------------|----------------|--------|-------------|--------|
| 10.2 | TABLE: Current input deviation | | | | | P |
| Input deviation of/at: | | I rated (A) | I measured (A) | dI | Required dI | Remark |
| AC100V, 50Hz | | 0.5 | 0.05 | -90.0% | +20% | -- |
| AC100V, 60Hz | | 0.5 | 0.05 | -90.0% | +20% | -- |
| AC240V, 50Hz | | 0.5 | 0.03 | -94.0% | +20% | -- |
| AC240V, 60Hz | | 0.5 | 0.03 | -94.0% | +20% | -- |
| Tested with all output. | | | | | | |

| | | | | | |
|------------------------------|----------------------------------|--------------------------|-----------------------------|-----------------------------|--------|
| 10.101 | TABLE: Voltage output at no load | | | | P |
| Input deviation of/at: | | U _o rated (V) | U _o measured (V) | Required U _o (V) | Remark |
| For output: 2.4 VDC, 0.4 A | | | | | |
| AC100V, 50Hz | | 2.4V | 5.475 | 42.4 | P |
| AC100V, 60Hz | | 2.4V | 5.476 | 42.4 | P |
| AC240V, 50Hz | | 2.4V | 5.508 | 42.4 | P |
| AC240V, 60Hz | | 2.4V | 5.508 | 42.4 | P |
| For output: 8.4 VDC, 0.035 A | | | | | |
| AC100V, 50Hz | | 8.4V | 10.875 | 42.4 | P |
| AC100V, 60Hz | | 8.4V | 10.875 | 42.4 | P |
| AC240V, 50Hz | | 8.4V | 10.910 | 42.4 | P |
| AC240V, 60Hz | | 8.4V | 10.911 | 42.4 | P |

| | | | | | | |
|------------------------------|---------------------------------|--------------------------|-----------------------------|------------------|---------------------------|--------|
| 10.102 | TABLE: Output current deviation | | | | | P |
| Current deviation of/at: | | I _o rated (A) | I _o measured (A) | d I _o | Required d I _o | Remark |
| For output: 2.4 VDC, 0.4 A | | | | | | |
| AC100V, 50Hz | | 0.4A | 0.43 | +7.5% | ±10% | P |
| AC100V, 60Hz | | 0.4A | 0.43 | +7.5% | ±10% | P |
| AC240V, 50Hz | | 0.4A | 0.42 | +5.0% | ±10% | P |
| AC240V, 60Hz | | 0.4A | 0.42 | +5.0% | ±10% | P |
| For output: 8.4 VDC, 0.035 A | | | | | | |

| | | | | | |
|--------------|--------|-------|-------|------|---|
| AC100V, 50Hz | 0.035A | 0.035 | 0.0% | ±10% | P |
| AC100V, 60Hz | 0.035A | 0.035 | 0.0% | ±10% | P |
| AC240V, 50Hz | 0.035A | 0.034 | -2.9% | ±10% | P |
| AC240V, 60Hz | 0.035A | 0.034 | -2.9% | ±10% | P |

| | | | | |
|----------------------------------|------------------------------------|-------------------|---------------------|--------------|
| 11.8-1 | TABLE: Heating test, thermocouples | | | P |
| | | Test 1 | Test 2 | |
| | Test voltage (V): | 1.06 x 100V =106V | 1.06 x 240V =254.4V | |
| | Ambient t1(°C): | 24.4 | 18.2 | — |
| | Ambient t2(°C): | 23.7 | 19.5 | |
| Thermocouple locations | | dT (K) | | Max. dT (K) |
| | | Test 1 | Test 2 | |
| Internal wire | | 13.7 | 16.5 | T80-25=55 |
| PCB surface | | 36.4 | 42.5 | 120 |
| Primary winding of transformer | | 36.0 | 40.4 | Class F, 115 |
| Secondary winding of transformer | | 37.5 | 41.4 | Class F, 115 |
| Plastic enclosure(inside) | | 19.4 | 22.9 | Cl.30 |
| Plastic supporting pin | | 19.0 | 21.9 | Cl.30 |
| Plastic enclosure(outside) | | 14.4 | 18.5 | 75 |
| Test corner | | 1.9 | 4.0 | 65 |
| Remark: | | | | |
| For output: 2.4VDC, 0.45A) | | | | |

| | | | | | |
|----------------------------------|------------------------------------|-------------------|---------------------|--------------|---|
| 11.8-2 | TABLE: Heating test, thermocouples | | | | P |
| | | Test 1 | Test 2 | | |
| | Test voltage (V): | 1.06 x 100V =106V | 1.06 x 240V =254.4V | | |
| | Ambient t1(°C): | 24.1 | 24.3 | | — |
| | Ambient t2(°C): | 23.7 | 23.9 | | |
| Thermocouple locations | | dT (K) | | Max. dT (K) | |
| | | Test 1 | Test 2 | | |
| Internal wire | | 5.7 | 6.6 | T80-25=55 | |
| PCB surface | | 21.8 | 26.7 | 120 | |
| Primary winding of transformer | | 23.5 | 26.1 | Class F, 115 | |
| Secondary winding of transformer | | 25.5 | 27.6 | Class F, 115 | |
| Plastic enclosure(inside) | | 11.2 | 13.0 | Cl.30 | |

| | | | |
|----------------------------------------|-----|-----|-------|
| Plastic supporting pin | 7.2 | 8.4 | Cl.30 |
| Plastic enclosure(outside) | 7.6 | 8.9 | 75 |
| Test corner | 1.3 | 2.3 | 65 |
| Remark: For output: 8.4VDC, 0.035A) | | | |

| | | | |
|----------------------------------|-----------------------------------------------------------------------|--------------|---------------------|
| 13.2 | TABLE: Leakage current | | P |
| | Heating appliances: 1.15 x rated input | -- | — |
| | Motor-operated and combined appliances: 1.06 x rated voltage | Same as 11.8 | — |
| Leakage current between | | I (mA) | Max. allowed I (mA) |
| Live/Neutral – plastic enclosure | | 0.011 | 0.35 peak |
| Live/Neutral – output terminal | | 0.051 | 0.35 peak |

| | | | |
|----------------------------------------------------|--------------------------|-------------|-----------------------|
| 13.3 | TABLE: Electric strength | | P |
| Test voltage applied between: | | Voltage (V) | Breakdown (Yes/No) |
| Live/Neutral – plastic enclosure | | 3000 | No |
| Live/Neutral – output terminal | | 3000 | No |
| Primary of transformer to secondary of transformer | | 3000 | No |

| | | | | | | |
|--------------------|-------------------------------|---------|---------------------|------------------------------|-----------------------------|-----------------------|
| 14 | TABLE: Transient overvoltages | | | | | N |
| Clearance between: | | Cl (mm) | Required Cl (mm) | Rated impulse voltage (V) | Impulse test voltage (V) | Flashover (Yes/No) |
| | | | | | | |

| | | | |
|----------------------------------|------------------------------------------------------------------------------|---------------------|---------------------|
| 16.2 | TABLE: Leakage current | | P |
| | Single phase appliances: 1.06 x rated voltage | 1.06 x 240V =254.4V | -- |
| | Three phase appliances 1.06 x rated voltage divided by $\sqrt{3}$: | -- | -- |
| Leakage current between | | I (mA) | Max. allowed I (mA) |
| Live/Neutral – plastic enclosure | | 0.014 | 0.25 |
| Live/Neutral – output terminal | | 0.076 | 0.25 |

| | | | |
|----------------------------------------------------|--------------------------|-------------|--------------------|
| 16.3 | TABLE: Electric strength | | P |
| Test voltage applied between: | | Voltage (V) | Breakdown (Yes/No) |
| Live/Neutral – plastic enclosure | | 3000 | No |
| Live/Neutral – output terminal | | 3000 | No |
| Primary of transformer to secondary of transformer | | 3000 | No |

| | | | |
|----------------------------------|--------------------------------------------------------------|-----------------------------------|-------------------------------|
| 17 | TABLE: Overload protection, temperature rise for transformer | | P |
| | Test duration: | Until steady conditions | |
| | Test voltage (V): | 1.06 x 240V =254.4V | |
| | Ambient t1 (°C): | 24.1 | |
| | Ambient t2 (°C): | 24.5 | |
| Temperature rise of part/at: | | Max. measured temperature, dT (K) | Max.temperature limit, dT (K) |
| Primary winding of transformer | | 18.7 | Class F, 190-25=165 |
| Secondary winding of transformer | | 16.0 | Class F, 190-25=165 |

| | | | | | | |
|-------------------|--------------------------------------------|--------------|-------------------|-------------------------------------|-------------------------------------|---|
| 24.1 | TABLE: Components | | | | | P |
| Object / part No. | Manufacturer/ trademark | Type / model | Technical data | Standard | Mark(s) of conformity | |
| Plastic of plug | CHI MEI CORPORATION | PA-765A(+) | ABS, V-0, 85°C | IEC/EN 60335-1 IEC/EN 60335-2-29 | UL E56070 Tested with appliance | |
| Pin of plug | New Seek Electronic Dongguan Co., Ltd | D4 | D4x31x1.78 | IEC/EN 60335-1 IEC/EN 60335-2-29 | Tested with appliance | |
| Internal wire | SHENZHEN CITY DE XING LONG ELECTRIC CO LTD | 1007 | 300V, 80°C, 24AWG | -- | UL E328945 | |
| PCB material | KINGBOARD LAMINATES HOLDINGS LTD | KB-3151S | V-0, 130°C | IEC/EN 60335-1 IEC/EN 60335-2-15 | UL E123995 Tested with appliance | |
| Fuse resistor | SHENZHEN GREAT ELECTRONICS CO LTD | RXF | 1-10Ω, 1W or 2W | IEC/EN 60065 | VDE 40026608 | |

IEC 60335-2-29

| | | | | | |
|---------------------------|----------------------------------------------|-------|---------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|---------------------------------------|
| Transformer | HUIZHOU CHUANGHUA INDUSTRIAL CO LTD | EE13 | Input: 100-240V~, 50/60Hz, 0.5A max Output: DC2.4V, 450mA Output: DC8.4V, 35mA Class 155(F) | IEC/EN 60335-1 IEC/EN 60335- 2-29 | Tested with appliance |
| Triple insulation wire | Suzhou Yusheng Electronic Co., Ltd. | TIW-B | 130°C | IEC/EN 60950-1 | VDE 40033527 |
| Plastic enclosure | CHANG CHUN PLASTICS CO LTD | T375J | ABS, V-0,150°C | IEC/EN 60335-1 IEC/EN 60335- 2-15 | UL E59481 Tested with appliance |

| | | | | |
|------------------------------|----------------------------------|----------------------------------|-----------------------|---|
| 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 fixed enclosure | 2.2 | II | 0.4 | |

| | | | | | | |
|------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------|------------|---------------|------------|------------------|
| 29.1 | TABLE: Clearances | | | | | P |
| | Overvoltage category... : | II | | | | -- |
| | | Type of insulation: | | | | |
| Rated impulse voltage (V): | Min. cl (mm) | Basic | Functional | Supplementary | Reinforced | Verdict / Remark |
| 330 | 0,5* | — | — | — | — | N |
| 500 | 0,5* | — | — | — | — | N |
| 800 | 0,5* | — | — | — | — | N |
| 1 500 | 0,5*/** | — | — | — | — | N |
| 2 500 | 1,5** | >1.5 | >1.5 | >1.5 | — | P |
| 4 000 | 3,0** | — | — | — | >3.0 | P |
| 6 000 | 5,5** | — | — | — | — | N |
| 8 000 | 8,0** | — | — | — | — | N |
| 10 000 | 11,0** | — | — | — | — | N |
| *) The value is increased to 0,8mm for pollution degree 3 | | | | | | |
| *) If the construction is affected by wear, distortion, movement of the parts or during assembly, the value is increased by 0,5 mm | | | | | | |
| | | | | | | |

| 29.2 | TABLE: Creepage distances, basic, supplementary and reinforced insulation | | | | | | | | | | P |
|------------------------|---------------------------------------------------------------------------|----------------|------|------------|----------------|------|-----------|--------------------|-----------------|-----------------|---------|
| Working voltage (V) | Creepage distance (mm) Pollution degree | | | | | | | — | | | |
| | 1 | <u>2</u> | | | 3 | | | Type of insulation | | | |
| | | Material group | | | Material group | | | | | | |
| | | I | II | IIIa/IIIb | I | II | IIIa/IIIb | B ^{*)} | S ^{*)} | R ^{*)} | Verdict |
| ≤50 | 0,2 | 0,6 | 0,9 | 1,2 | 1,5 | 1,7 | 1,9 | | — | — | N |
| ≤50 | 0,2 | 0,6 | 0,9 | 1,2 | 1,5 | 1,7 | 1,9 | — | | — | N |
| ≤50 | 0,4 | 1,2 | 1,8 | 2,4 | 3,0 | 3,4 | 3,8 | — | — | | N |
| >50 and ≤125 | 0,3 | 0,8 | 1,1 | 1,5 | 1,9 | 2,1 | 2,4 | | — | — | N |
| >50 and ≤125 | 0,3 | 0,8 | 1,1 | 1,5 | 1,9 | 2,1 | 2,4 | — | | — | N |
| >50 and ≤125 | 0,6 | 1,6 | 2,2 | 3,0 | 3,8 | 4,2 | 4,8 | — | — | | N |
| >125 and ≤250 | 0,6 | 1,3 | 1,8 | <u>2,5</u> | 3,2 | 3,6 | 4,0 | >2.5 | — | — | P |
| >125 and ≤250 | 0,6 | 1,3 | 1,8 | <u>2,5</u> | 3,2 | 3,6 | 4,0 | — | >2.5 | — | P |
| >125 and ≤250 | 1,2 | 2,6 | 3,6 | <u>5,0</u> | 6,4 | 7,2 | 8,0 | — | — | >5.0 | P |
| >250 and ≤400 | 1,0 | 2,0 | 2,8 | 4,0 | 5,0 | 5,6 | 6,3 | | — | — | N |
| >250 and ≤400 | 1,0 | 2,0 | 2,8 | 4,0 | 5,0 | 5,6 | 6,3 | — | | — | N |
| >250 and ≤400 | 2,0 | 4,0 | 5,6 | 8,0 | 10,0 | 11,2 | 12,6 | — | — | | N |
| >400 and ≤500 | 1,3 | 2,5 | 3,6 | 5,0 | 6,3 | 7,1 | 8,0 | | — | — | N |
| >400 and ≤500 | 1,3 | 2,5 | 3,6 | 5,0 | 6,3 | 7,1 | 8,0 | — | | — | N |
| >400 and ≤500 | 2,6 | 5,0 | 7,2 | 10,0 | 12,6 | 14,2 | 16,0 | — | — | | N |
| >500 and ≤800 | 1,8 | 3,2 | 4,5 | 6,3 | 8,0 | 9,0 | 10,0 | | — | — | N |
| >500 and ≤800 | 1,8 | 3,2 | 4,5 | 6,3 | 8,0 | 9,0 | 10,0 | — | | — | N |
| >500 and ≤800 | 3,6 | 6,4 | 9,0 | 12,6 | 16,0 | 18,0 | 20,0 | — | — | | N |
| >800 and ≤1000 | 2,4 | 4,0 | 5,6 | 8,0 | 10,0 | 11,0 | 12,5 | | — | — | N |
| >800 and ≤1000 | 2,4 | 4,0 | 5,6 | 8,0 | 10,0 | 11,0 | 12,5 | — | | — | N |
| >800 and ≤1000 | 4,8 | 8,0 | 11,2 | 16,0 | 20,0 | 22,0 | 25,0 | — | — | | N |
| >1000 and ≤1250 | 3,2 | 5,0 | 7,1 | 10,0 | 12,5 | 14,0 | 16,0 | | — | — | N |
| >1000 and ≤1250 | 3,2 | 5,0 | 7,1 | 10,0 | 12,5 | 14,0 | 16,0 | — | | — | N |
| >1000 and ≤1250 | 6,4 | 10,0 | 14,2 | 20,0 | 25,0 | 28,0 | 32,0 | — | — | | N |
| >1250 and ≤1600 | 4,2 | 6,3 | 9,0 | 12,5 | 16,0 | 18,0 | 20,0 | | — | — | N |
| >1250 and ≤1600 | 4,2 | 6,3 | 9,0 | 12,5 | 16,0 | 18,0 | 20,0 | — | | — | N |
| >1250 and ≤1600 | 8,4 | 12,6 | 18,0 | 25,0 | 32,0 | 36,0 | 40,0 | — | — | | N |
| >1600 and ≤2000 | 5,6 | 8,0 | 11,0 | 16,0 | 20,0 | 22,0 | 25,0 | | — | — | N |

| | | | | | | | | | | | |
|-----------------------------------------------|------|-------|-------|-------|-------|-------|-------|---|---|---|---|
| >1600 and ≤2000 | 5,6 | 8,0 | 11,0 | 16,0 | 20,0 | 22,0 | 25,0 | — | — | — | N |
| >1600 and ≤2000 | 11,2 | 16,0 | 22,0 | 32,0 | 40,0 | 44,0 | 50,0 | — | — | — | N |
| >2000 and ≤2500 | 7,5 | 10,0 | 14,0 | 20,0 | 25,0 | 28,0 | 32,0 | — | — | — | N |
| >2000 and ≤2500 | 7,5 | 10,0 | 14,0 | 20,0 | 25,0 | 28,0 | 32,0 | — | — | — | N |
| >2000 and ≤2500 | 15,0 | 20,0 | 28,0 | 40,0 | 50,0 | 56,0 | 64,0 | — | — | — | N |
| >2500 and ≤3200 | 10,0 | 12,5 | 18,0 | 25,0 | 32,0 | 36,0 | 40,0 | — | — | — | N |
| >2500 and ≤3200 | 10,0 | 12,5 | 18,0 | 25,0 | 32,0 | 36,0 | 40,0 | — | — | — | N |
| >2500 and ≤3200 | 20,0 | 25,0 | 36,0 | 50,0 | 64,0 | 72,0 | 80,0 | — | — | — | N |
| >3200 and ≤4000 | 12,5 | 16,0 | 22,0 | 32,0 | 40,0 | 45,0 | 50,0 | — | — | — | N |
| >3200 and ≤4000 | 12,5 | 16,0 | 22,0 | 32,0 | 40,0 | 45,0 | 50,0 | — | — | — | N |
| >3200 and ≤4000 | 25,0 | 32,0 | 44,0 | 64,0 | 80,0 | 90,0 | 100,0 | — | — | — | N |
| >4000 and ≤5000 | 16,0 | 20,0 | 28,0 | 40,0 | 50,0 | 56,0 | 63,0 | — | — | — | N |
| >4000 and ≤5000 | 16,0 | 20,0 | 28,0 | 40,0 | 50,0 | 56,0 | 63,0 | — | — | — | N |
| >4000 and ≤5000 | 32,0 | 40,0 | 56,0 | 80,0 | 100,0 | 112,0 | 126,0 | — | — | — | N |
| >5000 and ≤6300 | 20,0 | 25,0 | 36,0 | 50,0 | 63,0 | 71,0 | 80,0 | — | — | — | N |
| >5000 and ≤6300 | 20,0 | 25,0 | 36,0 | 50,0 | 63,0 | 71,0 | 80,0 | — | — | — | N |
| >5000 and ≤6300 | 40,0 | 50,0 | 72,0 | 100,0 | 126,0 | 142,0 | 160,0 | — | — | — | N |
| >6300 and ≤8000 | 25,0 | 32,0 | 45,0 | 63,0 | 80,0 | 90,0 | 100,0 | — | — | — | N |
| >6300 and ≤8000 | 25,0 | 32,0 | 45,0 | 63,0 | 80,0 | 90,0 | 100,0 | — | — | — | N |
| >6300 and ≤8000 | 50,0 | 64,0 | 90,0 | 126,0 | 160,0 | 180,0 | 200,0 | — | — | — | N |
| >8000 and ≤10000 | 32,0 | 40,0 | 56,0 | 80,0 | 100,0 | 110,0 | 125,0 | — | — | — | N |
| >8000 and ≤10000 | 32,0 | 40,0 | 56,0 | 80,0 | 100,0 | 110,0 | 125,0 | — | — | — | N |
| >8000 and ≤10000 | 64,0 | 80,0 | 112,0 | 160,0 | 200,0 | 220,0 | 250,0 | — | — | — | N |
| >10000 and ≤12500 | 40,0 | 50,0 | 71,0 | 100,0 | 125,0 | 140,0 | 160,0 | — | — | — | N |
| >10000 and ≤12500 | 40,0 | 50,0 | 71,0 | 100,0 | 125,0 | 140,0 | 160,0 | — | — | — | N |
| >10000 and ≤12500 | 80,0 | 100,0 | 142,0 | 200,0 | 250,0 | 280,0 | 320,0 | — | — | — | N |
| *), B=Basic, S=Supplementary and R=Reinforced | | | | | | | | | | | |

| 29.2 | TABLE: Creepage distances, functional insulation | | | | P |
|---------------------|--------------------------------------------------|----------------|----------------|---|---|
| Working voltage (V) | Creepage distance (mm) Pollution degree | | | — | |
| | 1 | 2 | 3 | | |
| | | Material group | Material group | | |

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

| | | | | | |
|------------------------|-----------------------|--|--------------------------|----------------------------------|---|
| 30.1 | TABLE: Ball pressure | | | | P |
| Part | Test temperature (°C) | | Impression diameter (mm) | Allowed impression diameter (mm) | |
| Transformer bobbin | 125 | | 0.9 | 2.0 | |
| Plastic enclosure | 70 | | 1.0 | 2.0 | |
| Plastic supporting pin | 125 | | 1.2 | 2.0 | |

| | | | | | | | | |
|------------------------|------------------------------------------------------------|-------|-------|-------|-------|-----|-----------------------------------|---------|
| 30.2 | TABLE: Glow wire test (GWT)°C and Needle- flame test (NFT) | | | | | | | P |
| Part | 550 | 650 | | 750 | | 850 | Needle- flame test (NFT) | verdict |
| | | ti(s) | te(s) | ti(s) | te(s) | | | |
| Plastic enclosure | x | -- | -- | -- | -- | -- | -- | P |
| Transformer bobbin | -- | -- | -- | 0 | 0 | x | -- | P |
| Plastic supporting pin | -- | -- | -- | 0 | 0 | x | -- | P |

| |
|----------------|
| IEC 60335-2-29 |
|----------------|

| | | | | | | | | |
|-----|----|----|----|---|---|---|---|---|
| PCB | -- | -- | -- | 0 | 0 | x | x | P |
|-----|----|----|----|---|---|---|---|---|

Remark: Ti = the time between glow wire touched the material and the material ignite
Te= the time between glow wire touched the material and the flame extinguished;

===== End of Report=====

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

| Group/CENELEC Common Differences to IEC 60335-1:2010 (5th Edition) | | | |
|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---|
| 6.1 | Delete “class 0” and “class 01” | | N |
| 7.10 | Add: | | P |
| | Devices used to start/stop operational functions of the appliance, if any, shall be distinguished from other manual devices by means of shape, or size, or surface texture, or position, etc. | | P |
| | A tactile feedback or | | P |
| | An audible and visual feedback | | P |
| | NOTE Z1 The sound of the motor or sound of an actuator switching ON/OFF is regarded as audible feedback. The stopping of the typical function (e.g.stopping of the vibration on the body of the appliance or of a part of it) is regarded as tactile means. | | P |
| | NOTE Z2 Devices used to start/stop operational functions mean devices that are operated by the user to start/stop the intended function of the appliance. | | P |
| | A selector switch with an off-position clearly identifiable is allowed. | | N |
| | An ON/OFF switch, if any, is considered a suitable device to stop operational functions. A plug is not considered a suitable device to stop operational functions, as it can be difficult to be reached by vulnerable persons. | | P |
| 7.12 | The instructions shall include the substance of the following: | | P |
| | This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision. | | P |
| 7.12.Z1 | The specific instructions related to the safe operation of this appliance (as given in 7.12 of this standard) shall be collated together in the front section of the user instructions. The height of the characters, measured on the capital letters, shall be at least 3mm | | P |
| | These instructions shall also be available in an alternative format, e.g. on a website | | P |
| 7.14 | Added: | | P |

| IEC 60335-2-29 – Attachment | | | |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | For the evaluation of legibility and clarity of safety warnings guidance can be found in IEC 62079 | | P |
| 8.1.1 | Replace the 3 rd paragraph by the following: | | P |
| | Test probe B and probe 18 of EN 61032 are applied with a force not exceeding 1N, the appliance being in every possible position..... | | P |
| 8.2 | Replace “test probe B of EN 61032” by “test probe of EN 61032” | | P |
| | Replace “test probe B of EN 61032” by “test probe B and probe 18 of EN 61032 are” | | P |
| 11.8 | Delete the sentence “The temperature rise of the..... “ of the first paragraph. | | P |
| 15.1.2 | Appliances with an automatic cord reel are tested with the cord in the most unfavourable position in such a way that the reeling of the wet cord may affect electrical insulation during operation. The cord shall not be dried before reeling | | N |
| 20 | Replace Note 1 by the following requirement: For appliances having dangerous movable parts, due to their main function, e.g. the needle of a sewing machine, tools of kitchen machines of the blade of an electrical knife, full protection is not possible for performing their intended use. | | N |
| 20.2 | Replaced the 1 st paragraph of compliance by: -a test probe that is similar to test probe B of EN 61032 but having a circular stop face with a diameter of 50 mm, instead of the non-circular face, applied with a force of 5N with the accessories and detachable cover removed and - test probe 18 of EN 61032, applied with a force of 2.5N on the appliance in a fully assembled situation. | No dangerous moving parts | P |
| 24.1 | Plugs and socket-outlets and other connecting devices of interconnection cords shall not be interchangeable with plugs and socket-outlets listed in IEC/TR 60083 or IEC 6906-1 or with connectors and appliance inlets complying with the standard sheets of IEC 60320-1, if direct supply to these parts from the supply mains could give rise to a hazard | | N |
| 24.1.3 | Add NOTE Z1 For this test a thermostat or timer that is operating the relay or contactor is considered to be a switch | | N |
| 24.1.7 | If the remote operation of the appliance is via a telecommunication network, the relevant standard for the telecommunication interface circuitry in the appliance is EN 41003. | | N |

| IEC 60335-2-29 – Attachment | | | |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 24.Z1 | For motor running capacitors (IEC 60252-1 type P2) with a metallic enclosure having an overpressure fuse the flame testing of internal plastic parts supporting current carrying connections as required in 30.2.2 and 30.2.3.1 is not necessary. | | N |
| 25.6 | Add Supply cords of single-phase portable appliances having a rated current not exceeding 16A shall be fitted with a plug complying with the following standard sheets of IEC/TR60083 | | P |
| 26 | Add after the second sentence in the first paragraph: | | P |
| | Conductors connected by soldering are not considered to be positioned or fixed so that reliance is not placed upon the soldering alone to maintain them in position unless they are held in place near the terminals independently of the solder. | | N |
| 29 | Modification: Replace NOTE 5 by: Attention is drawn on the fact that for appliances intended for use at altitudes exceeding 2000 m, the altitude correction factors, relevant to the intended altitude, for clearances specified in Table A.2 of EN 60664-1:2007 may need to be taken into account. | | N |
| 29.3.Z1 | Appliance shall be constructed so that if there is a possibility of damaging the insulation during installation, the insulation shall withstand the scratch and penetration test of 21.2. | | N |
| Annex ZB | Deleted 7.1 and 29.3 | | N |
| Annex ZF | Table ZF.1 add EN 60335-2-97, drives for rolling shutters, awnings, blinds and similar equipment | | N |
| Annex ZG | Add the following: | | N |
| 7.12.ZG | The instructions for appliances incorporating UVC emitters shall include the substance of the following: | | N |
| | WARNING-This appliance contains a UV emitter. Do not stare at the light source. | | N |
| 32 | Add the following: | | P |
| | For appliances incorporating UV emitters the manufacturer's shall deliver a declaration providing evidence that the plastic material exposed to the radiation is UV resistant | | N |
| | NOTE Examples of appliances that may incorporate UVC emitters are range hoods, air cleaners and finger nail hardeners | | N |

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

| EN 60335-1: 2012/A11: 2014 | | | |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|--|---|
| 7 | MARKING AND INSTRUCTIONS (EN 60335-1/A11) | | P |
| 7.1 | (Replacement: In NOTE Z1, replace "IEC 82079-1" by "EN 82079-1". | | N |
| ZF | ANNEX ZF (INFORMATIVE) CRITERIA APPLIED FOR THE ALLOCATION OF PRODUCTS COVERED BY STANDARDS IN THE EN 60335 SERIES UNDER LVD OR MD(EN 60335-1/A11) | | N |
| | (Replacement: In Table ZF.1 – List of standards under CLC/TC 61, replace line of EN 60335-2-38 | | N |

| | | | |
|-------|----------------------------------------------------------------------|------------|---|
| ANNEX | EMF | | P |
| | The test product also complies with the requirements of EN62233:2008 | | P |
| | Limit.....100% | Max: 0.34% | P |

IEC 60335-2-29 – Attachment

| Clause | Requirement + Test | Result - Remark | Verdict |
|--------|--------------------|-----------------|---------|
|--------|--------------------|-----------------|---------|

European plug portion test: EN 50075:1990

| | | | |
|----------|-------------------------------------------------------------------------------|-----------------------------------|---|
| 6 | Marking | | N |
| | Appliances shall be marked as follows: | Incorporated with battery charger | N |
| | Rated current in amperes (A) | | N |
| | Rated Voltage in volts (V) | | N |
| | Symbol for nature of supply (~) | | N |
| | Name, trade mark or identification mark of manufacturer or responsible vendor | | N |
| | Type reference | | N |

| | | | | |
|---|-----------------------------------------------------------|------------------------------------------------------|--------------------|---|
| 7 | Dimensions | | | P |
| | Plug shall comply with Standard Sheet 1 | | | P |
| | Between two pins (pin base) | 18.0 - 19.2 mm | 18.1 mm | P |
| | Between two pins (pin top) | 17.0 - 18.0 mm | 18.1 mm | P |
| | Diameter of pin (metallic part) | 4 ^{±0.06} mm | 3.98 mm | P |
| | Diameter of pin (pin base) | max. 4.0 mm | 3.7 mm | P |
| | Diameter of pin (middle part) | max. 3.8 mm | 3.4 mm | P |
| | Pin length | 19 ^{±0.5} mm | 18.8 mm | P |
| | Length of pin except metal part | 10 ^{+1.0} mm | 10.4 mm | P |
| | Shape of pin top | | Round shape | P |
| | Length of plug base | 35.3 ^{±0.7} mm | 35.1 mm | P |
| | Width of plug base | 13.7 ^{±0.7} mm | 13.7 mm | P |
| | Diagonal dimension of plug base within a distance of 18mm | <26.1 ^{±0.5} mm <26.1 ^{±0.5} mm | 25.7 mm 25.7 mm | P |

| | | | |
|----------|--------------------------------------------------------------|-----------------------------------|---|
| 8 | Protection against electric shock | | P |
| 8.1 | Live parts of the plug not accessible (standard test finger) | Incorporated with battery charger | P |
| 8.2 | No connection between one plug-pin and socket outlet | | P |
| 8.3 | External parts of insulating material | | P |

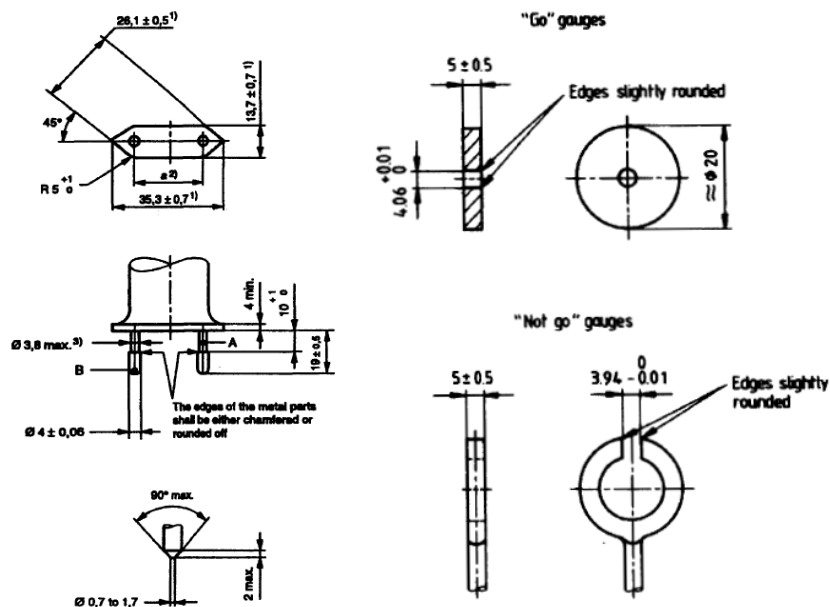
| IEC 60335-2-29 – Attachment | | | |
|-----------------------------|------------------------------------------------------------------------------------------|-----------------------------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 9. | Construction | | P |
| 9.1 | Plugs not replacable | Incorporated with battery charger | P |
| 9.2 | Switches, fuse, lampholder not incorporated | | P |
| 9.3 | Solid pins | See clause 13 | P |
| | Adequate mechanical strength | | P |
| 9.4 | Pins locked against rotation | See clause 13.1 & 13.4 | P |
| | Adequate fixed into the body | | P |
| 9.5 | Kind of connection | | P |
| 9.6 | Easily to be withdrawn from socket-outlet | Incorporated with battery charger | P |
| 10 | Resistance to humidity | | P |
| | -Humidity treatment for 48 hours | Test with battery charger | P |
| 11 | Insulation resistance and electric strength | | P |
| 11.1 | Insulation resistance (500V, min 5MΩ) | Test with battery charger | P |
| 11.2 | Electric strength (2000V) | (see appended table) | P |
| 13 | Mechanical strength | | P |
| 13.1 | Pressed with 150N for 5 min | | P |
| 13.2 | Tumbling barrel according to EN 60335-2-29: Number of cycles: | | P |
| | No damages after the test | | P |
| | Requirements of clause 7 and 8.2 still fulfilled | | P |
| 13.3 | Rubbing test of plug-pins: 10000 cycles, 4N | | P |
| | No damage of the pins | | P |
| 13.4 | Pull test at 70°C with 40N | | P |
| | Pins not more than 1 mm displaced | Displacement: 0.2mm | P |
| 14 | Resistance to heat and to aging | | P |
| 14.1 | Sufficient resistant to heat | Incorporated with battery charger | P |
| 14.1.1 | After 1 h in heating cabinet at 100°C no damage shown | Tested with battery charger | P |
| 14.1.2 | After 1 h in heating cabinet at 80°C and a force of 20N through the jaws no damage shown | | P |

| IEC 60335-2-29 – Attachment | | | |
|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|----------------------|------------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 14.2 | Aging test | | P |
| | -at 70°C for 168h | | P |
| | -at room temperature for 96h | | P |
| | No traces of cloth at a force of 5N | | P |
| | No damage leads to non-compliance | | P |
| 15 | Current-carrying parts and connections resistance to heat and to aging | | P |
| 15.1 | Connections withstand the mechanical stresses occurring in normal use | | P |
| 15.2 | Contact pressure not through isolating material | | P |
| 15.3 | Current carrying parts of copper | | P |
| | No electroplated coating when part is subjected to mechanical wear | | P |
| | Other metals having a mechanical strength, an electrical conductivity and a resistance to corrosion | | N |
| 16 | Creepage distances, clearances and distances through insulation | | P |
| | Live parts of different polarity: 3mm | 5.0mm | P |
| | Through insulation between live parts and accessible surfaces: 1.5mm | 5.0mm | P |
| 17 | Resistance of insulation material to abnormal heat and fire | | P |
| | Insulating material not unduly affected by abnormal heat and by fire | (see appended table) | P |
| 11.1 | TABLE: Insulation resistance measurements | | P |
| Measured between: | | Result | |
| Pins connected together and the body ($\geq 5M\Omega$) | | $>6.5M\Omega$ | P |
| Each pins in turn and the other, the latter being connected to the body ($\geq 5M\Omega$) | | $>6.5M\Omega$ | P |
| 11.2 | TABLE: electric strength measurements | | P |
| Test voltage applied between: | | Test voltage (V) | Break down |
| Pins connected together and the body | | 2000 | No |
| Each pins in turn and the other, the latter being connected to the body | | 2000 | No |

IEC 60335-2-29 – Attachment

| Clause | Requirement + Test | Result - Remark | Verdict |
|--------|--------------------|-----------------|---------|
|--------|--------------------|-----------------|---------|

| | | |
|-------------------------------------------------------------|------------------------------------------------------------------------------|---|
| 17.3 | TABLE: Resistance of insulating material to abnormal heat and to fire | P |
| Parts that retain current-carrying parts in position: 750°C | | P |
| Other parts: 650°C | | P |



===== End of Attachment =====

Photo Documentation

Model: C802B, C802



Photo 1



Photo 2

Photo Documentation



Photo 3



Photo 4

Photo Documentation



Photo 5



Photo 6

Photo Documentation



Photo 7

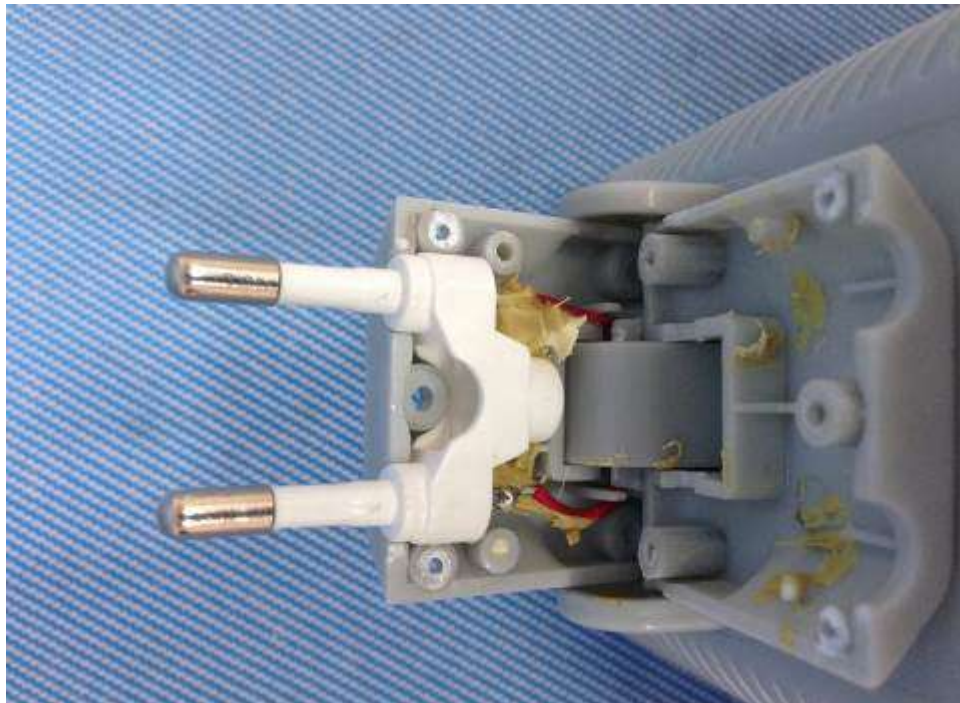


Photo 8

Photo Documentation

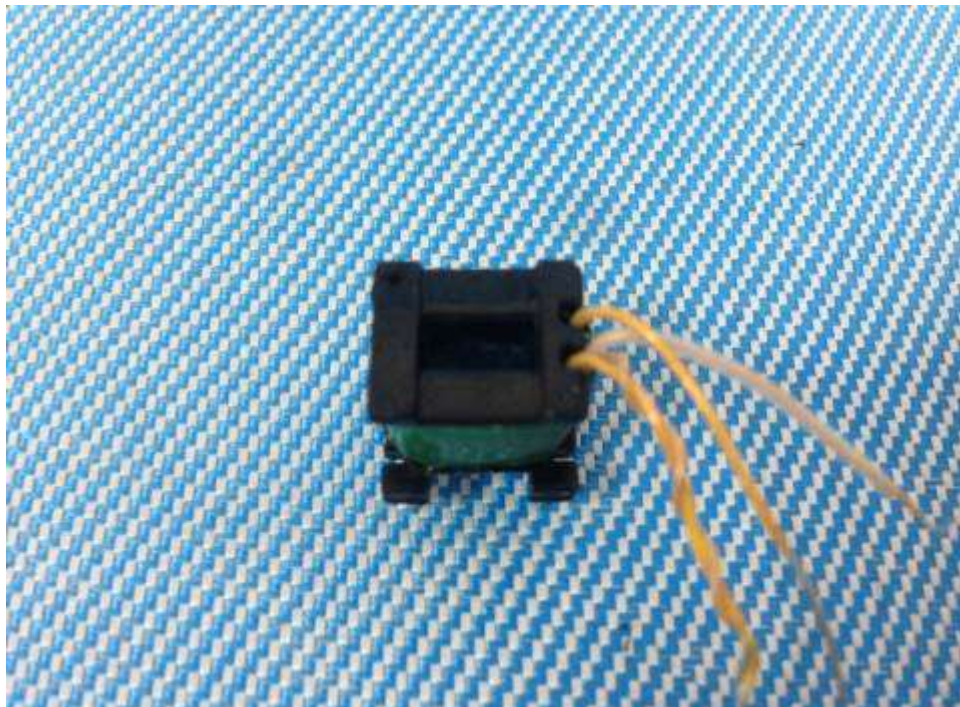


Photo 9

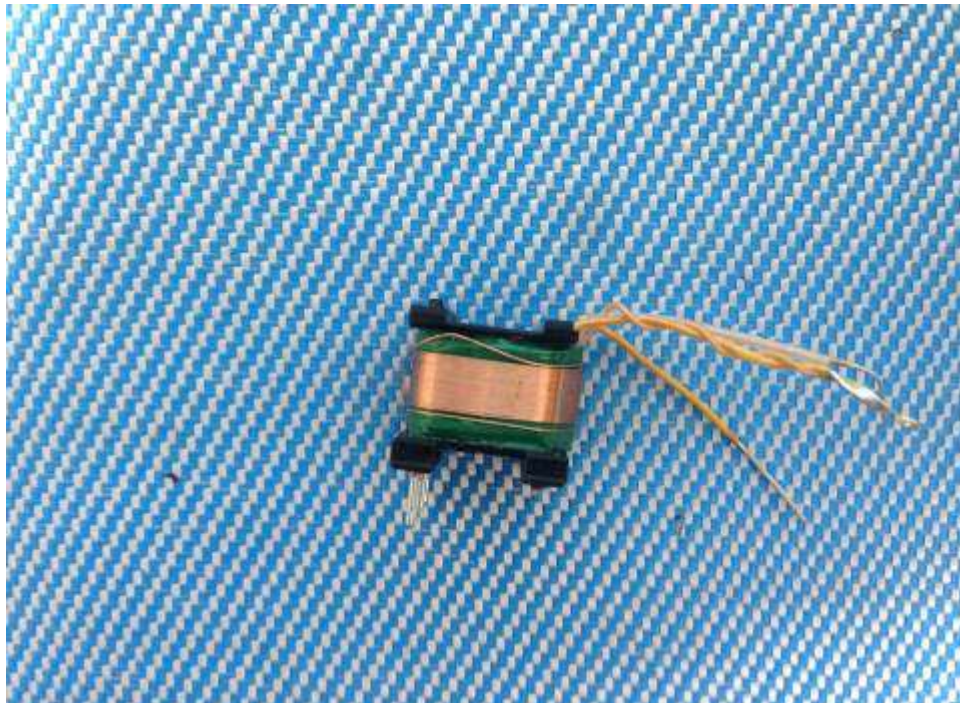


Photo 10

Photo Documentation

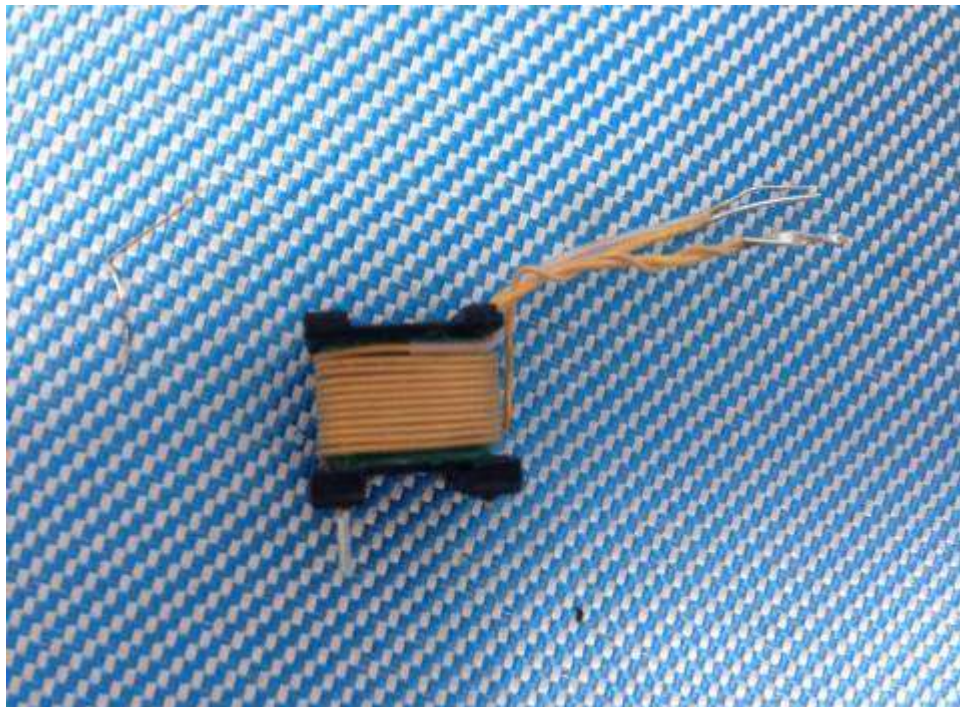


Photo 11



Photo 12

Photo Documentation

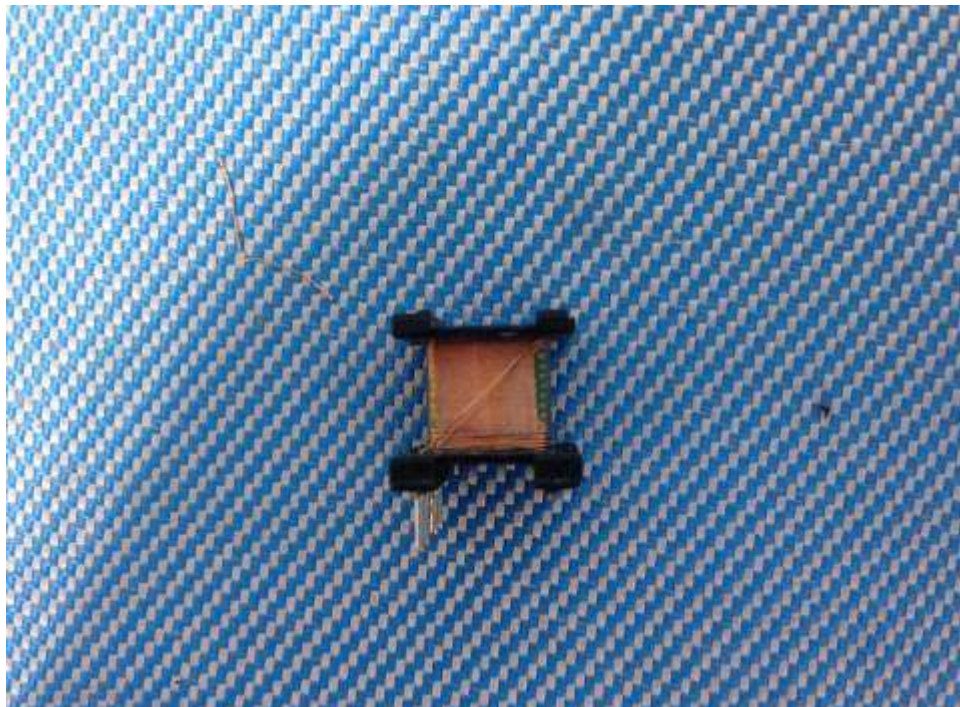


Photo 13

Model: C816, C816B, C809, C809B



Photo 14

Photo Documentation

Model: C825, C825B, C807, C807B



Photo 15

Model: C826, C826B, C806, C806B



Photo 16

Model: C903W, C893W

Photo Documentation

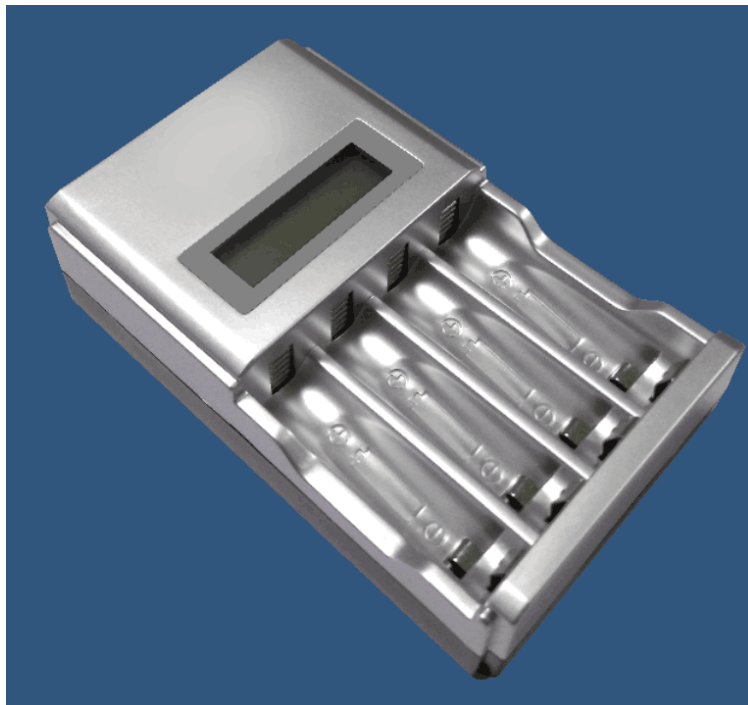


Photo 17

Model: C812, C812B

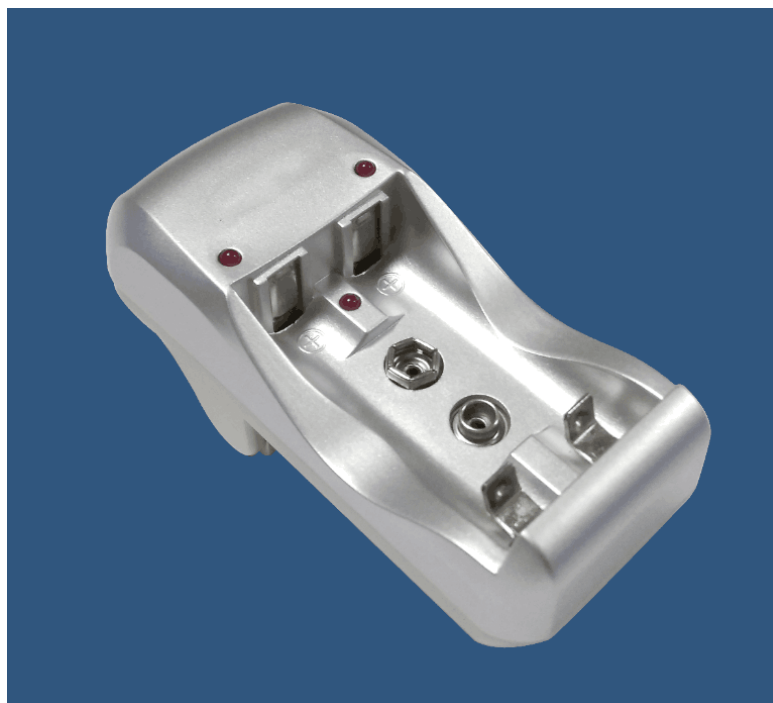


Photo 18

Model: C818

Photo Documentation



Photo 19

Model: C894

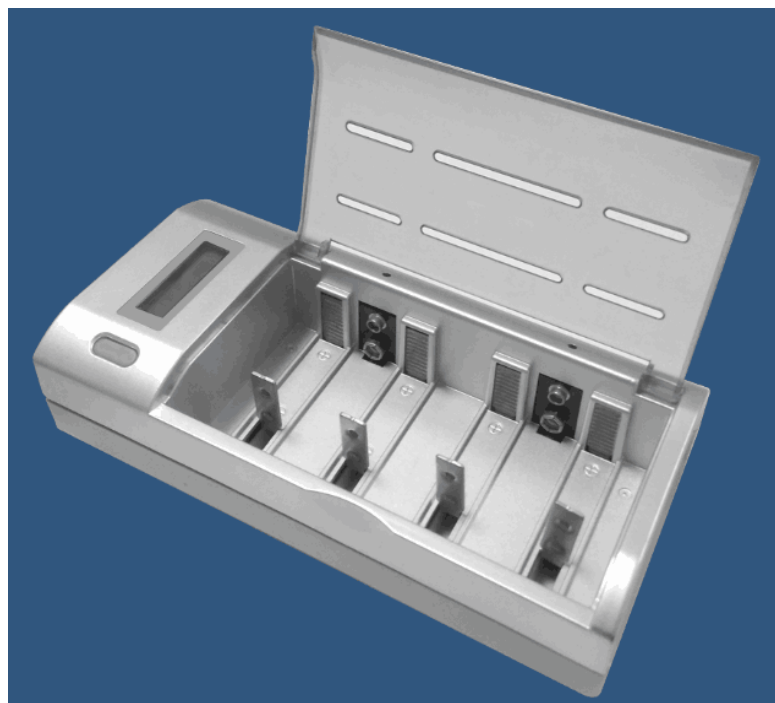


Photo 20

Model: C871

Photo Documentation

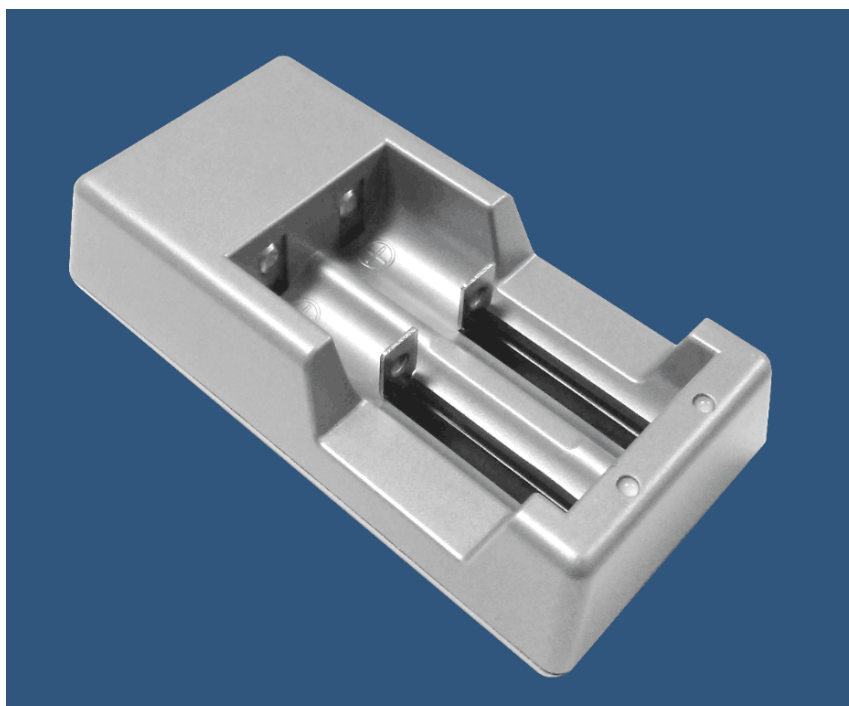


Photo 21

Model: C821BW

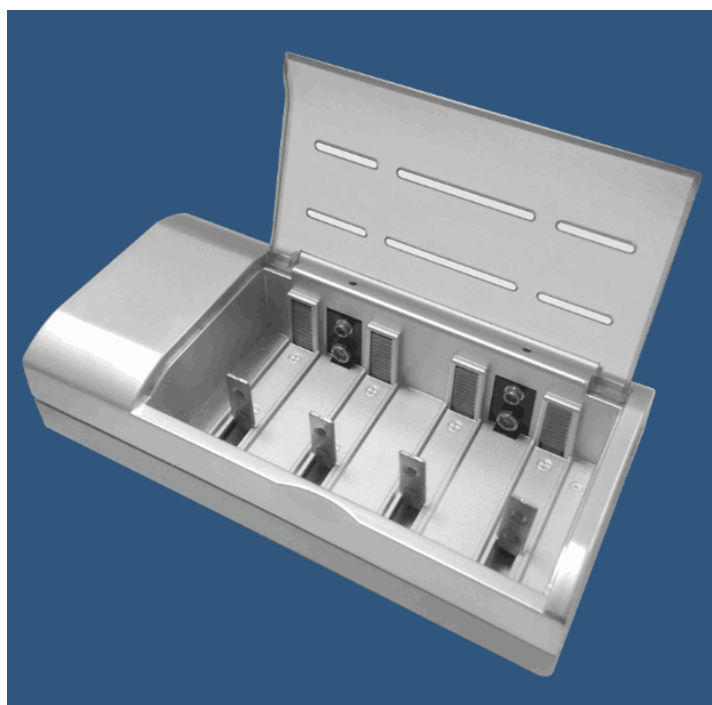


Photo 22

Model: C896

Photo Documentation

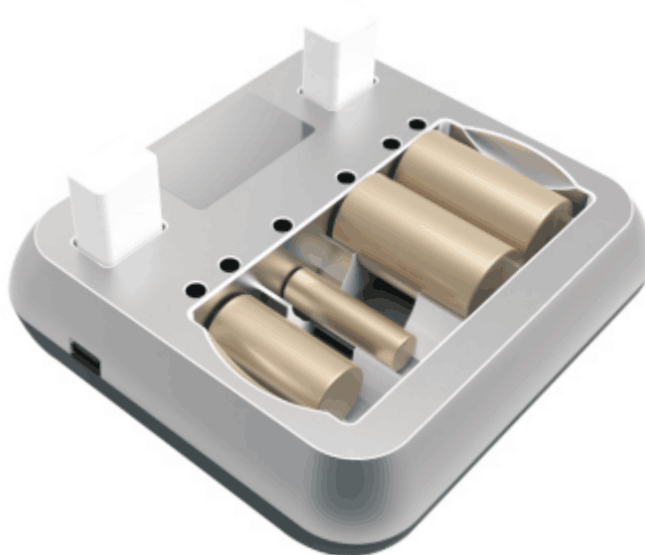


Photo 23

Model: C704A4, C704A3



Photo 24

Model: C704A1, C704A2

Photo Documentation



Photo 25

Model: C702C2, C702C1

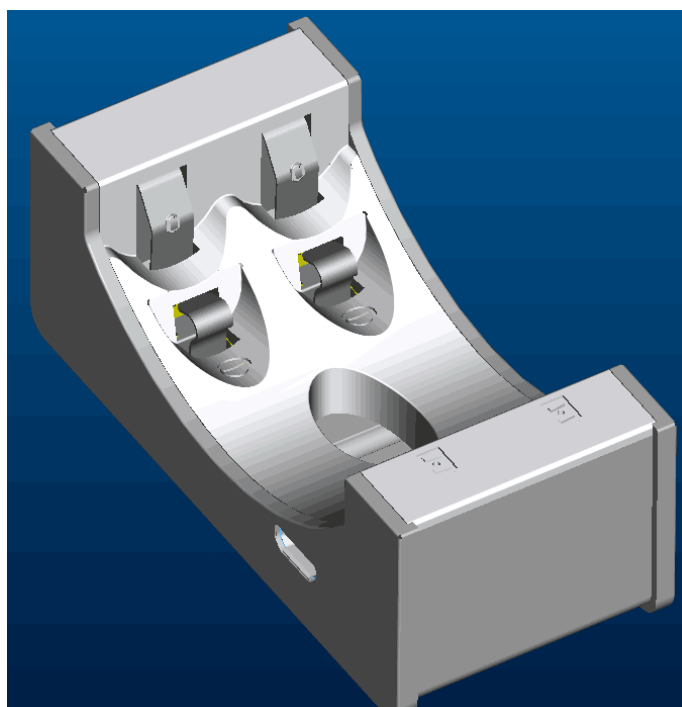


Photo 26

Model: C704C2, C704C1

Photo Documentation

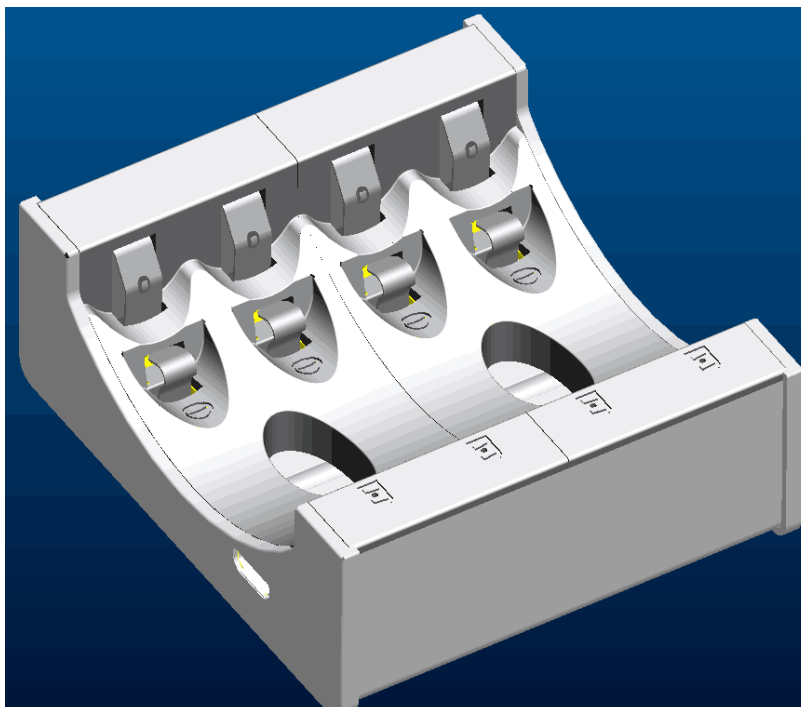


Photo 27

Model: C801



Photo 28

Photo Documentation



Photo 29

Model: C876

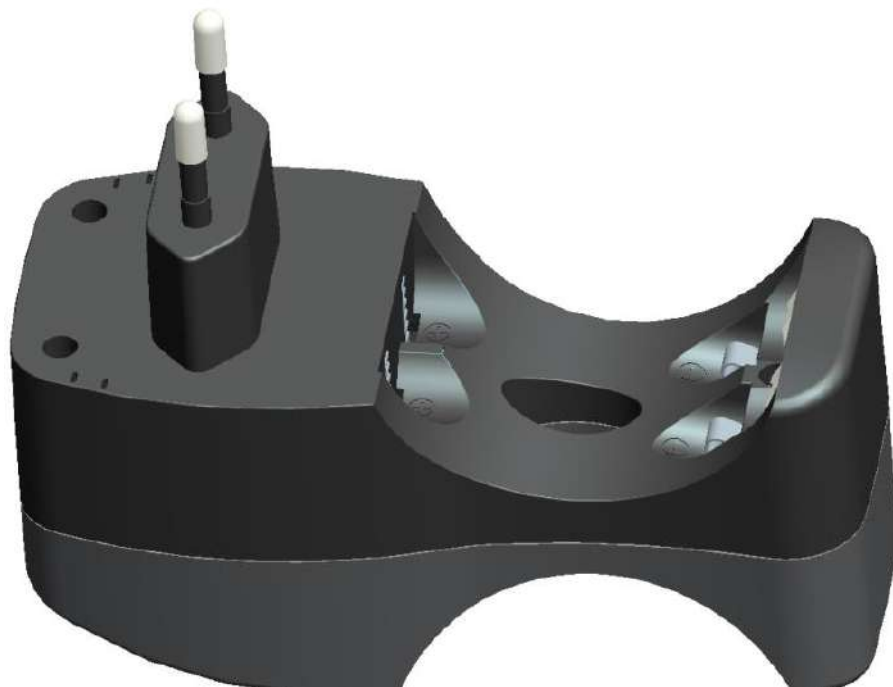


Photo 30

Photo Documentation



Photo 31

===== End of photos =====



TEST REPORT

Report No. : WTF21F03024697C

Applicant : New Seek Electronic Dongguan Co., Ltd

Address : 5th Building, Haiyong Scien-tech Park, Fenggang Town, Dongguan City, China

Manufacturer : New Seek Electronic Dongguan Co., Ltd

Address : 5th Building, Haiyong Scien-tech Park, Fenggang Town, Dongguan City, China

Sample Name : Battery charger

Model No. : C804G3, 4911599, 70906001, C804U2

Sample Receiving Date : 2021-04-06

Testing Period..... : 2021-04-06 to 2021-04-15

Date of Issue : 2021-04-30

Test Result : Please refer to next page (s)

Remarks:

The results shown in this test report refer only to the sample(s) tested; this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

If the report is not stamped with the accreditation recognized seal, it will only be used for scientific research, education, and internal quality control activities, and is not used for the purpose of issuing supporting data to the society.

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Reference Model No...... : C804HG, C804HU, C802HD, C802WA, C804HA, C804HB, C804HC, C804HE, C804HE-9V, C804HG4, C804HL, C804HLW, C804HV, C804WB, C806HM, C802HT, C808F, C808HK, C701P, C702C, C702F1A, C702M, C702T, C702V, C704A2, C704A3L, C704A4, C704C, C704D, C704U, C705M, C706C, C706K, C708C, C708F, C708FB, C708H, C708N4, C708Q, C716N4, C728L, C736L, C7XX, C8XX, C9XX

Test Requested..... : In accordance with the RoHS Directive 2011/65/EU and its amendment (EU) No. 2015/863.

Test Method..... : 1) With Reference to IEC 62321-2:2013, disassembly, disjunction and mechanical sample preparation
2) With Reference to IEC 62321-3-1:2013, screening - Lead, mercury, cadmium, total chromium and total bromine by X-ray fluorescence spectrometry
3) With reference to IEC 62321-4:2013+AMD1:2017 CSV, determination of Mercury by ICP-OES
4) With reference to IEC 62321-5:2013, determination of Lead and Cadmium by ICP-OES
5) With reference to IEC 62321-7-2: 2017 and IEC 62321-7-1: 2015, determination of Hexavalent Chromium by UV-Vis
6) With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS
7) With reference to IEC 62321-8:2017, determination of Phthalates content by GC-MS.

Test Conclusion..... : **Pass** (Based on the performed tests on the submitted samples, the results comply with the RoHS Directive 2011/65/EU and its amendment (EU) No. 2015/863)

**Test Results:****1. Lead, Mercury, Cadmium, Hexavalent Chromium, PBBs and PBDEs**

| Part No. | Part Description | Result of XRF | | | | | Result of Wet Chemical Testing (mg/kg) |
|----------|-------------------------------------------------------------------|---------------|----|----|----|----|----------------------------------------|
| | | Cd | Pb | Hg | Cr | Br | |
| 1 | Silvery metal shell with black printing of electrolytic capacitor | BL | BL | BL | BL | BL | NA |
| 2 | Black rubber stopper of electrolytic capacitor | BL | BL | BL | BL | BL | NA |
| 3 | Silvery-grey metal foil of electrolytic capacitor | BL | BL | BL | BL | BL | NA |
| 4 | Grey metal foil of electrolytic capacitor | BL | BL | BL | BL | BL | NA |
| 5 | Brown paper of electrolytic capacitor | BL | BL | BL | BL | BL | NA |
| 6 | Transparent plastic adhesive tape of electrolytic capacitor | BL | BL | BL | BL | BL | NA |
| 7 | Black plastic base of electrolytic capacitor | BL | BL | BL | BL | BL | NA |
| 8 | Silvery metal pin of electrolytic capacitor | BL | BL | BL | BL | BL | NA |
| 9 | Chip diode | BL | BL | BL | BL | IN | PBBs : ND PBDEs : ND |
| 10 | Yellow plastic adhesive tape of transformer | BL | BL | BL | BL | BL | NA |
| 11 | Dark grey magnetic core of transformer | BL | BL | BL | BL | BL | NA |
| 12 | Black plastic bobbin of transformer | BL | BL | BL | BL | BL | NA |
| 13 | Coppery metal of transformer | BL | BL | BL | BL | BL | NA |
| 14 | Yellow triple insulation winding of transformer | BL | BL | BL | BL | IN | PBBs : ND PBDEs : ND |
| 15 | Chip IC | BL | BL | BL | BL | BL | NA |
| 16 | Black plastic film of electrolytic capacitor | BL | BL | BL | BL | BL | NA |
| 17 | Dark grey magnetic of inductor | BL | BL | BL | IN | BL | Cr ⁶⁺ : ND |
| 18 | Coppery metal winding of inductor | BL | BL | BL | BL | BL | NA |
| 19 | Chip LED | BL | BL | BL | BL | IN | PBBs : ND PBDEs : ND |



| Part No. | Part Description | Result of XRF | | | | | Result of Wet Chemical Testing (mg/kg) |
|----------|-------------------------------|---------------|----|----|----|----|----------------------------------------|
| | | Cd | Pb | Hg | Cr | Br | |
| 20 | Chip diode | BL | BL | BL | BL | BL | NA |
| 21 | Chip rectifier | BL | BL | BL | BL | IN | PBBs : ND PBDEs : ND |
| 22 | Chip resistor | BL | BL | BL | BL | BL | NA |
| 23 | Chip capacitor | BL | BL | BL | BL | BL | NA |
| 24 | Chip resistor | BL | BL | BL | BL | BL | NA |
| 25 | Yellow PCB with green plating | BL | BL | BL | BL | IN | PBBs : ND PBDEs : ND |
| 26 | Silvery metal sheet | BL | BL | BL | BL | BL | NA |
| 27 | Chip audion | BL | BL | BL | BL | BL | NA |
| 28 | Chip IC | BL | BL | BL | BL | BL | NA |
| 29 | Solder | BL | BL | BL | BL | BL | NA |
| 30 | Silvery metal sheet | BL | BL | BL | BL | BL | NA |
| 31 | White plastic shell | BL | BL | BL | BL | BL | NA |
| 32 | Transparent plastic sheet | BL | BL | BL | BL | BL | NA |
| 33 | White plastic sheet of plug | BL | BL | BL | BL | BL | NA |
| 34 | White plastic holder of plug | BL | BL | BL | BL | BL | NA |
| 35 | Silvery metal pin of plug | BL | BL | BL | BL | BL | NA |
| 36 | Silvery metal screw | BL | BL | BL | IN | BL | Cr ⁶⁺ : Negative |
| 37 | Solder | BL | BL | BL | BL | BL | NA |
| 38 | Red plastic wire covering | BL | BL | BL | BL | BL | NA |
| 39 | Silvery metal wire | BL | BL | BL | BL | BL | NA |



| Part No. | Part Description | Result of XRF | | | | | Result of Wet Chemical Testing (mg/kg) |
|----------|----------------------------------------|---------------|----|----|----|----|----------------------------------------|
| | | Cd | Pb | Hg | Cr | Br | |
| 40 | Black plastic sheet of plug | BL | BL | BL | BL | BL | NA |
| 41 | Black plastic holder of plug | BL | BL | BL | BL | BL | NA |
| 42 | Silvery metal screw with black plating | BL | BL | BL | BL | BL | NA |
| 43 | Black plastic sheet | BL | BL | BL | BL | IN | PBBs : ND PBDEs : 64 |
| 44 | Silvery metal sheet | BL | BL | BL | BL | BL | NA |
| 45 | Silvery metal sheet | BL | BL | BL | BL | BL | NA |

Remark:

- (1) Results are obtained by EDXRF for primary screening, and further chemical testing by ICP (for Cd, Pb, Hg), UV-VIS (for Cr^{6+}) and GC-MS (for PBBs, PBDEs) is recommended to be performed, if the concentration exceeds the below warning value according to IEC 62321-3-1: 2013 (unit: mg/kg)

| Element | Polymer | Metal | Composite Materials |
|---------|----------------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------|
| Cd | $\text{BL} \leq (70-3\sigma) < \text{IN} < (130+3\sigma) \leq \text{OL}$ | $\text{BL} \leq (70-3\sigma) < \text{IN} < (130+3\sigma) \leq \text{OL}$ | $\text{LOD} < \text{IN} < (150+3\sigma) \leq \text{OL}$ |
| Pb | $\text{BL} \leq (700-3\sigma) < \text{IN} < (1300+3\sigma) \leq \text{OL}$ | $\text{BL} \leq (700-3\sigma) < \text{IN} < (1300+3\sigma) \leq \text{OL}$ | $\text{BL} \leq (500-3\sigma) < \text{IN} < (1500+3\sigma) \leq \text{OL}$ |
| Hg | $\text{BL} \leq (700-3\sigma) < \text{IN} < (1300+3\sigma) \leq \text{OL}$ | $\text{BL} \leq (700-3\sigma) < \text{IN} < (1300+3\sigma) \leq \text{OL}$ | $\text{BL} \leq (500-3\sigma) < \text{IN} < (1500+3\sigma) \leq \text{OL}$ |
| Cr | $\text{BL} \leq (700-3\sigma) < \text{IN}$ | $\text{BL} \leq (700-3\sigma) < \text{IN}$ | $\text{BL} \leq (500-3\sigma) < \text{IN}$ |
| Br | $\text{BL} \leq (300-3\sigma) < \text{IN}$ | -- | $\text{BL} \leq (250-3\sigma) < \text{IN}$ |

BL= Below Limit

OL= Over Limit

LOD = Limit of Detection

-- = Not Regulated

- (2) "IN" expresses the inconclusive region, and further chemical testing to confirm whether it complies with the requirement of RoHS Directive.
- (3) The XRF screening test for RoHS elements – the reading may be different to the actual content in the sample be of non-uniformity composition.
- (4) mg / kg =milligram per kilogram=ppm, $\mu\text{g}/\text{cm}^2$ = Micrograms per square centimetre.
- (5) ND = Not Detected or lower than limit of quantitation.
- (6) NA = Not Applicable, as the XRF screening test result was below the limit or as the XRF screening directly determine that test result was over the limit, it was not need to conduct the wet chemical testing.
- (7) LOQ = Limit of quantitation.

| Test Items | Pb | Cd | Hg | Cr^{6+} | | PBB | PBDE |
|------------|-------|-------|-------|------------------|---------------------------|-------|-------|
| Units | mg/kg | mg/kg | mg/kg | mg/kg | $\mu\text{g}/\text{cm}^2$ | mg/kg | mg/kg |
| LOQ | 2 | 2 | 2 | 8 | 0.1 | 5 | 5 |

The LOQ for single compound of PBBs and PBDEs is 5mg/kg, LOQ of Cr^{6+} for polymer and composite sample is 8mg/kg and LOQ of Cr^{6+} for metal sample is $0.1\mu\text{g}/\text{cm}^2$.



(8) RoHS Requirement

| Restricted Substances | Limits |
|----------------------------------------|-------------------|
| Cadmium (Cd) | 0.01% (100 mg/kg) |
| Lead (Pb) | 0.1% (1000 mg/kg) |
| Mercury (Hg) | 0.1% (1000 mg/kg) |
| Chromium (VI) (Cr ⁶⁺) | 0.1% (1000 mg/kg) |
| Polybrominated Biphenyls (PBBs) | 0.1% (1000 mg/kg) |
| Polybrominated Diphenyl Ethers (PBDEs) | 0.1% (1000 mg/kg) |

- (9) According to IEC 62321-7-1:2015, determined of Cr⁶⁺ on metal sample by boiling water extraction test method, and result is shown as Positive/Negative.

Boiling water extraction:

Negative = Absence of Cr⁶⁺ coating, the detected concentration in boiling water extraction solution is less than 0.10ug/cm².

Positive = Presence of Cr⁶⁺ coating, the detected concentration in boiling water extraction solution is greater than 0.13ug/cm².

Information on storage conditions and production date of the tested sample is unavailable and thus Cr⁶⁺ results represent status of the sample at the time of testing.

(10) Abbreviation:

"Pb" denotes Lead, "Cd" denotes Cadmium, "Hg" denotes Mercury, "Cr" denotes Chromium, "Cr (VI)" denotes Hexavalent Chromium, "Br" denotes Bromine, "PBBs" denotes Total Polybrominated Biphenyls, "PBDEs" denotes Total Polybrominated Diphenyl Ethers.



2. Phthalates:

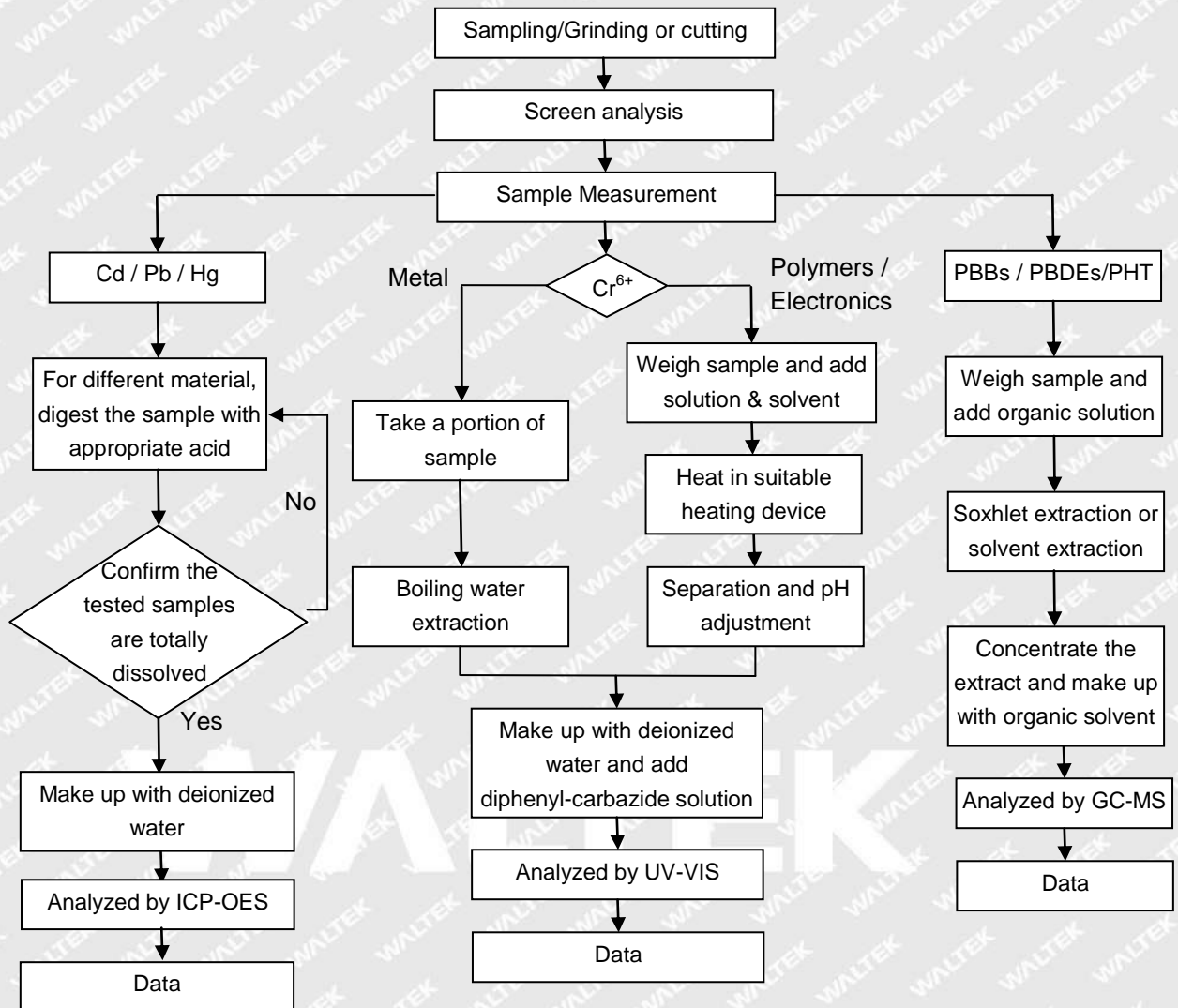
| Serial No. | Part No. | Result (mg/kg) | | | |
|------------|-----------------------------|----------------|-----|------|------|
| | | DBP | BBP | DEHP | DIBP |
| T01 | 2 | <50 | <50 | <50 | <50 |
| T02 | 5 | <50 | <50 | <50 | <50 |
| T03 | 6 | <50 | <50 | <50 | <50 |
| T04 | 7 | <50 | <50 | <50 | <50 |
| T05 | 9+11+15+17+19 [△] | <50 | <50 | <50 | <50 |
| T06 | 10 | <50 | <50 | <50 | <50 |
| T07 | 12 | <50 | <50 | <50 | <50 |
| T08 | 14+25+27+28 [△] | <50 | <50 | <50 | <50 |
| T09 | 16 | <50 | <50 | <50 | <50 |
| T10 | 20+21+22+23+24 [△] | <50 | <50 | <50 | <50 |
| T11 | 31+32 [△] | <50 | <50 | <50 | <50 |
| T12 | 33+40+41+43 [△] | <50 | <50 | <50 | <50 |
| T13 | 34 | <50 | <50 | <50 | <50 |
| T14 | 38 | <50 | <50 | <50 | <50 |

Note:

- (1) "<" = less than
- (2) mg/kg = milligram per kilogram= ppm
- (3) Abbreviation:
 "DBP" denotes Dibutyl phthalate, "BBP" denotes Benzyl butyl phthalate (BBP), "DEHP" denotes Bis(2-ethylhexyl)-phthalate, "DIBP" denotes Diisobutyl phthalate, "PHT" denotes Phthalates.
- (4) RoHS requirement

| Restricted Substances | Limits |
|-----------------------------------|-------------------|
| Dibutyl phthalate (DBP) | 0.1% (1000 mg/kg) |
| Benzyl butyl phthalate (BBP) | 0.1% (1000 mg/kg) |
| Di(2-ethylhexyl) phthalate (DEHP) | 0.1% (1000 mg/kg) |
| Di-iso-butyl phthalate (DIBP) | 0.1% (1000 mg/kg) |

- (5) "△" = As client's requirement, the testing was conducted based on mixed components. Results are calculated by the minimum weight of mixed components.

**Measurement Flowchart:**

**Sample Photo(s):**



Reference Sample Photo(s):



C804G3, C804HG, 4911599, 70906001



C804HU



C802HD



C802WA



C804HA



C804HB



C804HC



C804HE



C804HE-9V



C804HG4



C804HL, C804HLW



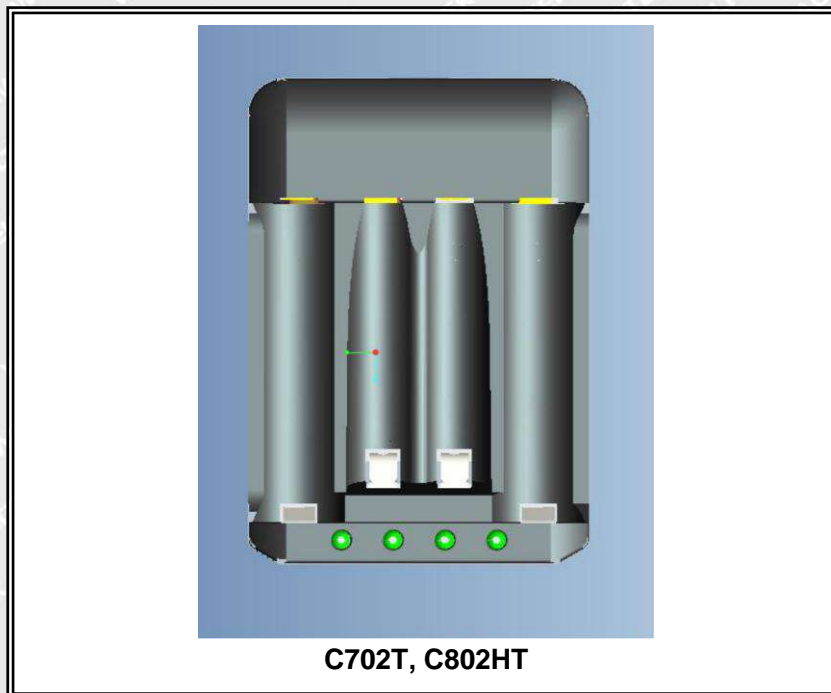
C804HV



C804WB



C706K, C806HM





C708FB, C808HK



C701P





C702M



C702V



C704A2



C704A3L

**C704A4****C704C**



C704D



C704U



C705M



C706C



C708C



C708H



C708N4



C708Q



C716N4



C728L

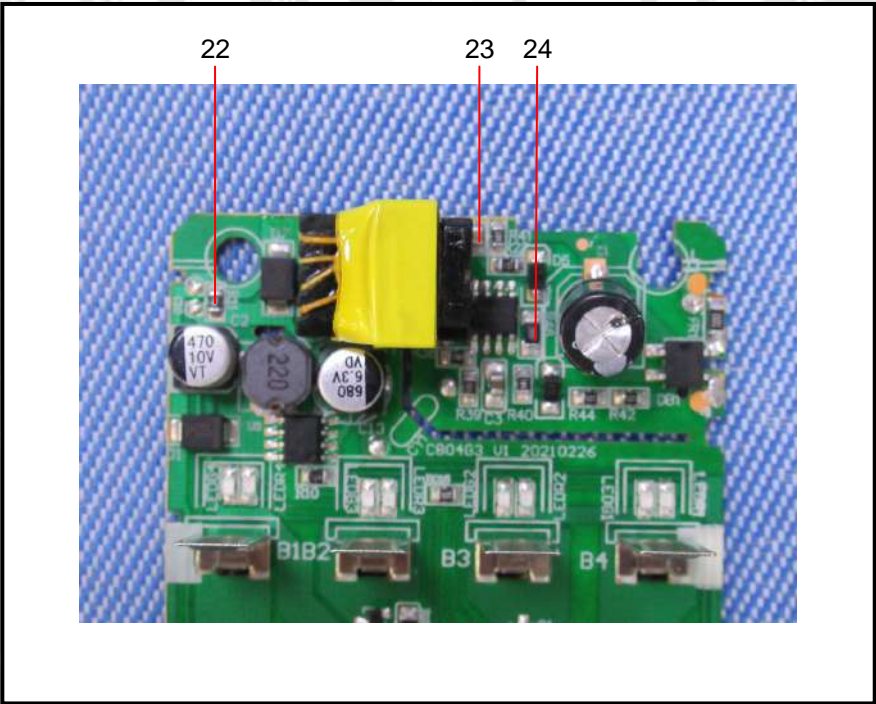
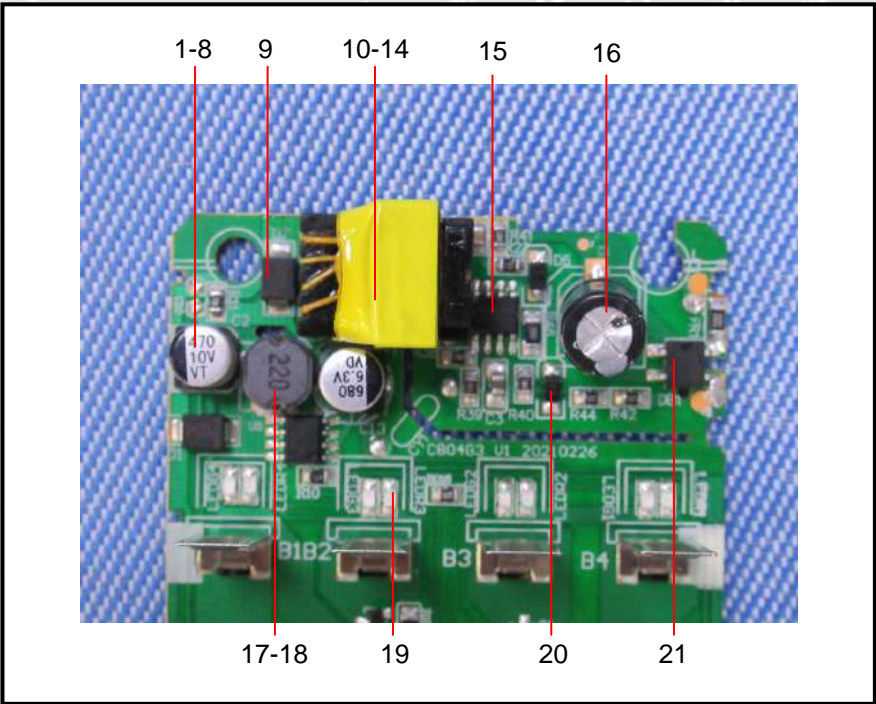


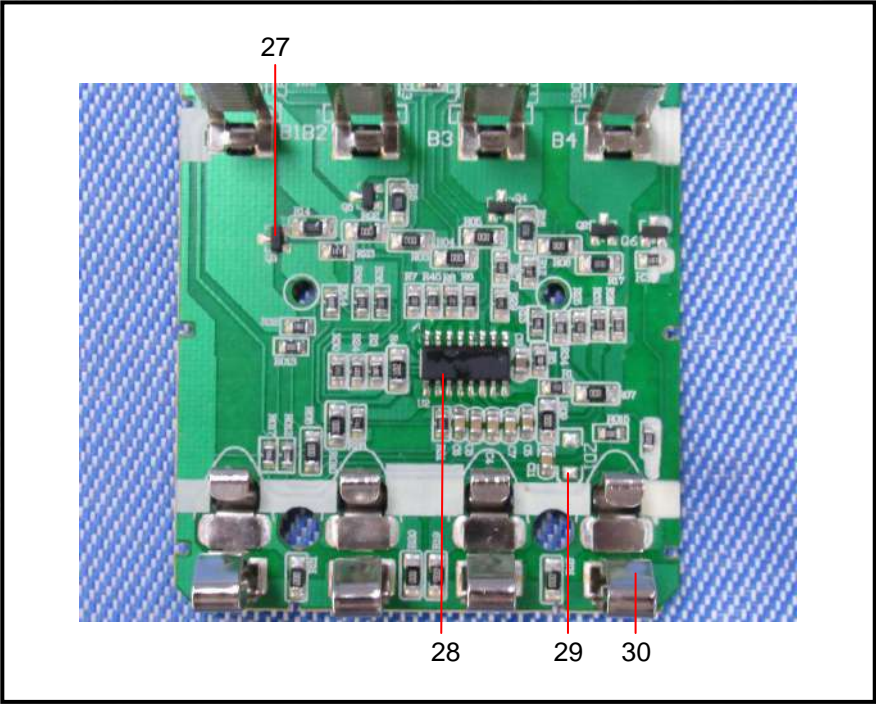
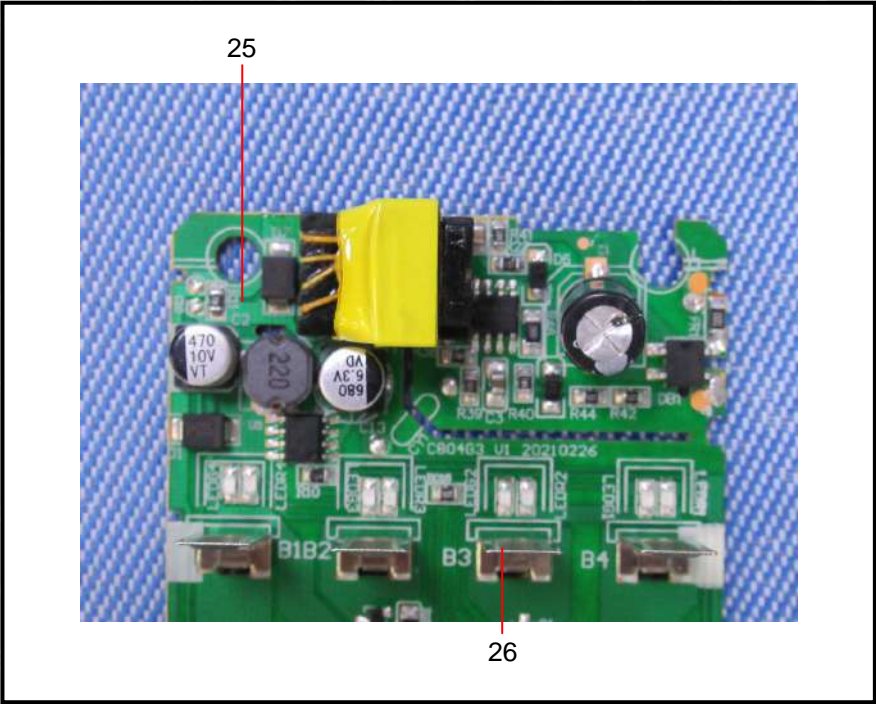
C736L

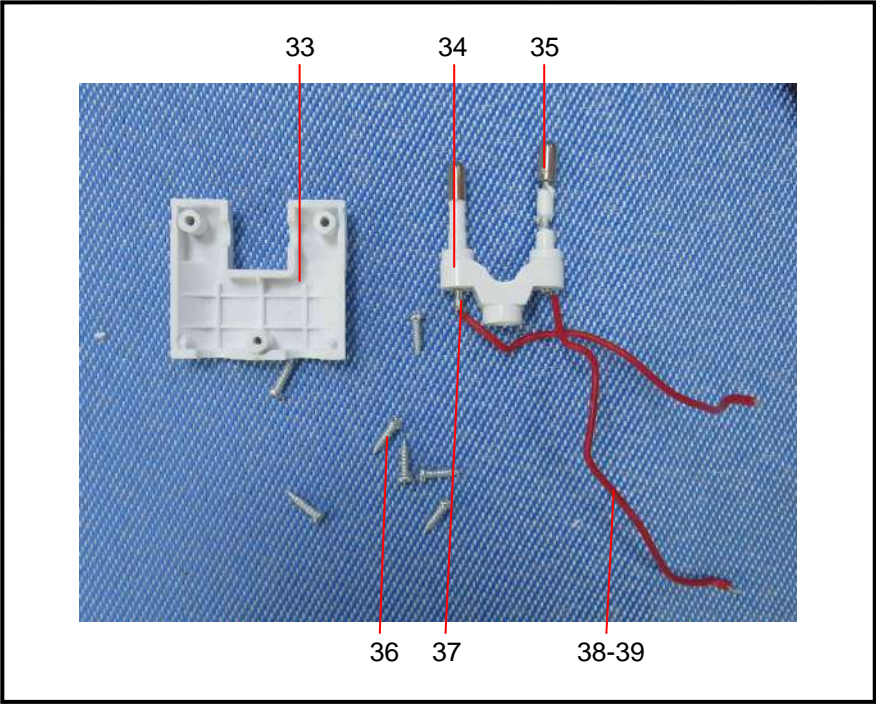
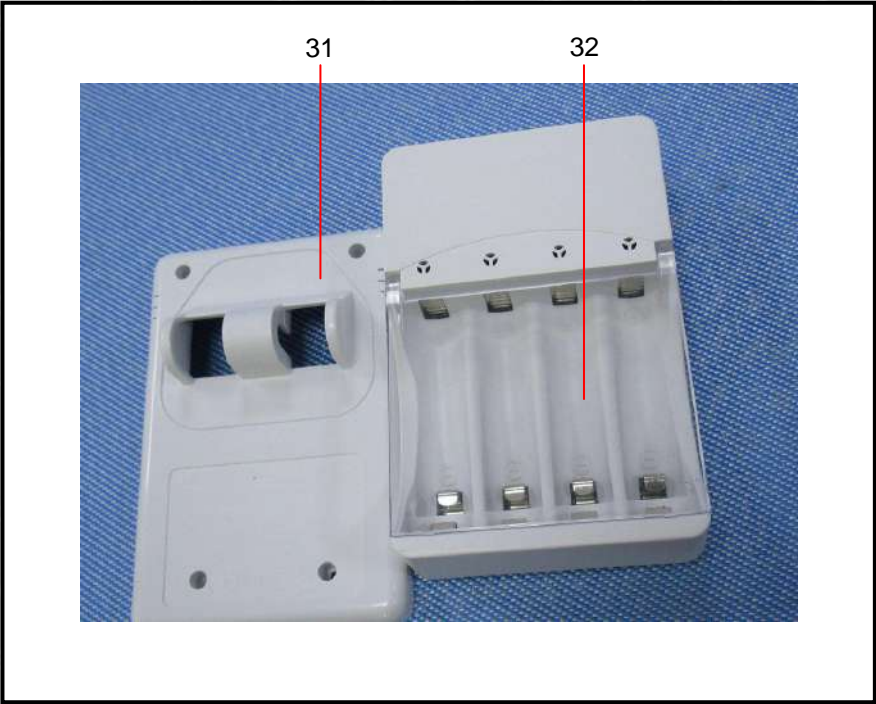
WALTEK

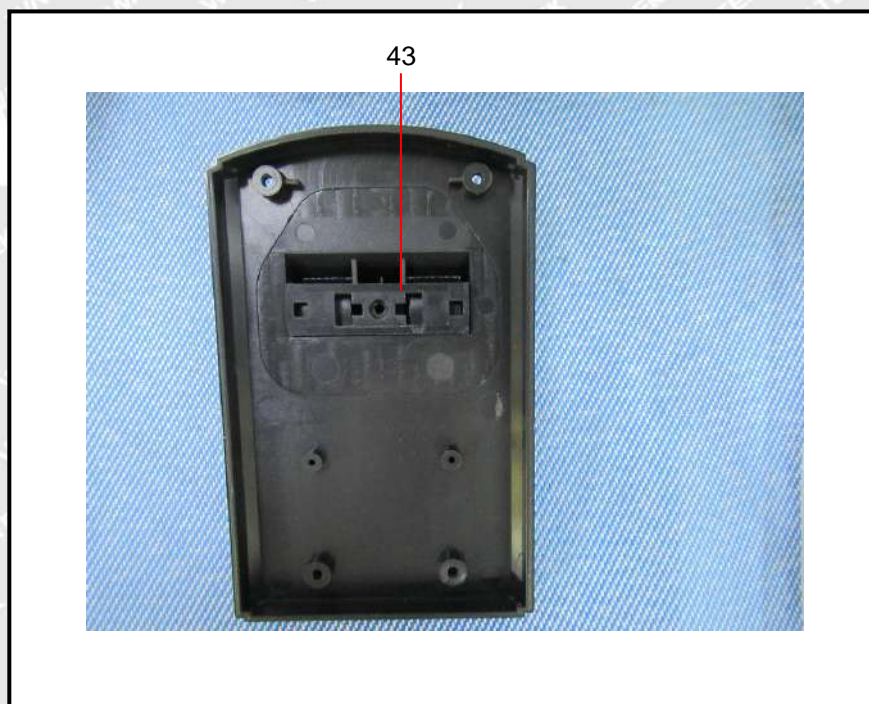
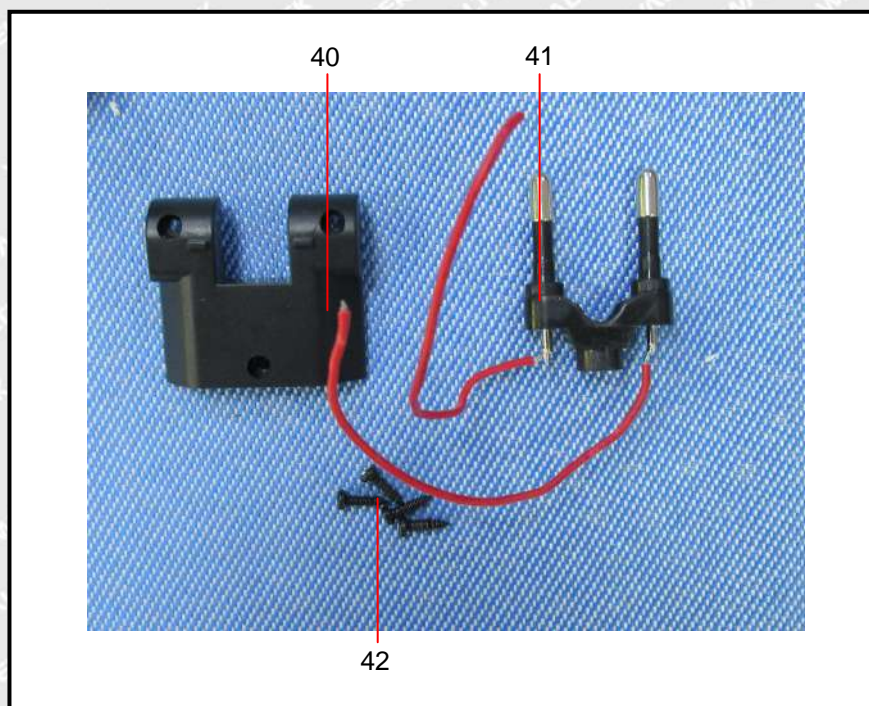


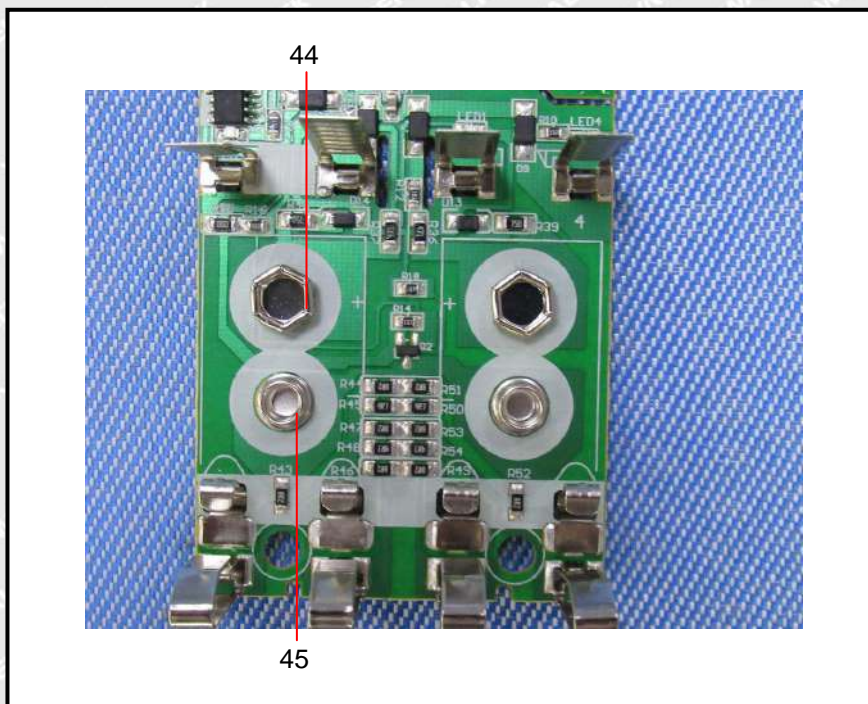
Photograph(s) of parts tested:











===== End of Report =====

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