



# LVD Test Report

**Application No.** : HXT240403290516

**Applicant** : Huizhou Zhuopu core car industry Co., Ltd.

**Equipment Under Test (EUT)**

**EUT Name** : electric scooter

**Model No.** : X13

**Serial No.** : See page 2

**Trade Mark** : TOURSOR

**Receipt Date** : 2024-04-20

**Test Date** : 2024-04-20 to 2024-04-30

**Issue Date** : 2024-04-30

**Standards** : EN 60335-1:2012/A15:2021;

**Conclusions** : **PASS**

This report shows that the product technically complies with the Council LVD Directive 2014/35/EU requirements.

**Test/Witness Engineer** :

*Tim Chen*



**Approved & Authorized** :

*Andy Zhang*

This test report is valid for above tested sample only and shall not be reproduced in part without written approval of the laboratory.



**TEST REPORT**  
**EN 60335-1:2012/A15:2021**  
**Household and similar electrical appliances –**  
**Safety – Part 1: General requirements**

Report Reference No..... : HXT240403290516

**Testing Laboratory**..... : Shenzhen HuaXu Testing Technology Co., Ltd.

Address..... : 106, building B12, Yintian Industrial Zone, Yantian community,  
Xixiang street, Bao'an District, Shenzhen

**Applicant's name**..... : Huizhou Zhuopu core car industry Co., Ltd.

Address..... : 8th floor, Building 1, Yuepu Technology Wisdom Valley Phase I,  
Xinwei Town, Huiyang District, Huizhou City

**Manufacturer's name**..... : Dongguan Zhuopu core energy technology Co., Ltd.

Address..... : No.601, Building B, Bangshou Science Park, No.69 Xiangshan  
Road, Qingxi Town, Dongguan City

**Test specification:**

Standard..... : EN 60335-1:2012/A15:2021

Test procedure..... : LVD procedure

Non-standard test method..... : N/A

**Test Report Form No:**

TRF Originator..... : Hua xu

Master TRF..... : Dated 2022-08

**Test item description**..... : electric scooter

Model/Type reference..... : X13

Serial No. .... : X5, X7, X14, E5B, E8P, E6, T5B

Model different..... : The model no. and appearance different only

Brand Name..... : TOURSOR

Ratings..... : AC 70V, 40A, 50/60Hz

**Test item particulars**

Classification of installation and use.....: (Household Electric Appliances)

Supply Connection.....: Non-detachable power cord and plug

**Possible test case verdicts:**

- test case does not apply to the test object.....: N(/A)
- test object does meet the requirement.....: P(Pass)
- test object does not meet the requirement.....: F(Fail)

**General remarks:**

The test results presented in this report relate only to the object tested.  
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"(see Enclosure #)" refers to additional information appended to the report.

"(see appended table)" refers to a table appended to the report.

Throughout this report a comma (point) is used as the decimal separator.

**Copy of marking plate:****electric scooter**

Model: X13

Rating: AC 70V, 40A, 50/60Hz



Dongguan Zhuopu core energy technology Co., Ltd.

Made in China



| EN 60335-1:2012/A15:2021 |                                                                                   |                   |          |
|--------------------------|-----------------------------------------------------------------------------------|-------------------|----------|
| CL.                      | Requirement of the test                                                           | Result--Remark    | Verdict  |
| <b>5</b>                 | <b>GENERAL CONDITIONS FOR THE TESTS</b>                                           |                   | <b>P</b> |
|                          | Test performed according to Cl.5, e.g.nature of supply, sequence of testing, etc. |                   | P        |
| <b>6</b>                 | <b>CLASSIFICATION</b>                                                             |                   | <b>P</b> |
| 6.1                      | Protection against electric shock: Class I, II, III...:                           | Class II          | P        |
| 6.2                      | Protection against harmful ingress of water                                       | IP20              | N        |
| <b>7</b>                 | <b>MARKING</b>                                                                    |                   | <b>P</b> |
| 7.1                      | Rated voltage or voltage range (V) .....:                                         | See the marking   | P        |
|                          | Single-phase appliances: 230 V covered                                            | Three-phase       | N        |
|                          | Multi-phase appliances: 400 V covered                                             | See the marking   | P        |
|                          | Nature of supply                                                                  | ~                 | P        |
|                          | Rated frequency or frequency range (Hz) ..... :                                   | See the marking   | P        |
|                          | Rated input or rated current                                                      |                   | P        |
|                          | Manufacturer's or responsible vendor's name, trademark or identification mark     | See page 2        | P        |
|                          | Model or type reference                                                           | See page 5        | P        |
|                          | Symbol for Class II                                                               | Class II          | P        |
|                          | IP number                                                                         | IP20              | N        |
| 7.2                      | Warning for stationary appliances                                                 |                   | N        |
|                          | Warning placed in vicinity of terminal cover                                      |                   | N        |
| 7.3                      | Range of rated values correctly marked                                            |                   | P        |
| 7.4                      | Voltage setting clearly discernible                                               |                   | N        |
| 7.5                      | Marking of rated input for each rated voltage                                     |                   | N        |
|                          | Marking for upper and lower limits of rated input                                 |                   | N        |
| 7.6                      | Correct symbols used                                                              |                   | P        |
| 7.7                      | Correct connection diagram, fixed to the appliance                                |                   | N        |
| 7.8                      | Not for type Z attachment:                                                        |                   | N        |
|                          | - marking of terminals for the neutral conductor (N)                              |                   | P        |
|                          | - marking of earthing terminals                                                   |                   | P        |
|                          | - marking not placed on removable parts                                           | No removable part | P        |
|                          | - marking of terminal for single- pole protective device                          |                   | N        |



| EN 60335-1:2012/A15:2021 |                                                                                                                                                                                                                                                                  |                           |         |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------|
| CL.                      | Requirement of the test                                                                                                                                                                                                                                          | Result--Remark            | Verdict |
| 7.9                      | Marking or placing of switches which may cause a hazard                                                                                                                                                                                                          |                           | N       |
| 7.10                     | Indications of switches and regulating devices by use of figures, letters or other                                                                                                                                                                               |                           | 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                                                                                                                                                                                                               | No adjustment of controls | N       |
| 7.12                     | Instructions for safe use provided                                                                                                                                                                                                                               |                           | P       |
|                          | The instructions state that:                                                                                                                                                                                                                                     |                           | --      |
|                          | - the appliance is not to be used by children or persons with reduced physical, sensory or mental capabilities, or lack of experience and knowledge                                                                                                              |                           | P       |
|                          | - children being supervised not to play with the appliance                                                                                                                                                                                                       |                           | P       |
| 7.12.1                   | Sufficient details for installation or maintenance supplied                                                                                                                                                                                                      |                           | P       |
| 7.12.2                   | For stationary appliances not equipped with power cord and plug or other means for separating from the mains with min. 3mm contact opening a statement has to be in the manual requiring such a separation device in line with the fixed wiring. (EN 60335-1/A2) |                           | N       |
| 7.12.3                   | Insulation in contact with parts exceeding 50 K; instruction                                                                                                                                                                                                     | <50K                      | N       |
| 7.12.4                   | Information with regard to built-in:                                                                                                                                                                                                                             |                           | N       |
|                          | - dimensions of space                                                                                                                                                                                                                                            |                           | N       |
|                          | - dimensions and position of support                                                                                                                                                                                                                             |                           | N       |
|                          | - ventilation openings                                                                                                                                                                                                                                           | No opening                | N       |
|                          | - connection/interconnection plug accessible                                                                                                                                                                                                                     |                           | N       |
| 7.12.5                   | Replacement cord, type X attachment                                                                                                                                                                                                                              |                           | N       |
|                          | Replacement cord, type Y attachment                                                                                                                                                                                                                              |                           | N       |
|                          | Replacement cord, type Z attachment                                                                                                                                                                                                                              |                           | P       |
| 7.12.6                   | Caution in the instructions for heating appliances with a non-self-resetting thermal cut-out                                                                                                                                                                     | No such part              | 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 (Pa).....:                                                                                                                                                                                                                           |                           | N       |



| EN 60335-1:2012/A15:2021 |                                                                                                                   |                                    |          |
|--------------------------|-------------------------------------------------------------------------------------------------------------------|------------------------------------|----------|
| CL.                      | Requirement of the test                                                                                           | Result--Remark                     | Verdict  |
|                          | 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 official language                                                                 | English                            | P        |
| 7.14                     | Marking easily legible and durable                                                                                | legible and durable                | P        |
| 7.15                     | Marking on a main part                                                                                            |                                    | P        |
|                          | Marking clearly discernible from outside                                                                          |                                    | P        |
|                          | Stationary appliance: name or trademark and model or type reference visible after installation                    |                                    | N        |
|                          | Indication for switches and controls in vicinity of components; not on removable parts if misleading              |                                    | P        |
| 7.16                     | Marking of a possible replaceable thermal link or fuse link clearly visible with regard to replacing the link     | No thermal link used               | N        |
|                          |                                                                                                                   |                                    |          |
| <b>8</b>                 | <b>PROTECTION AGAINST ACCESSIBILITY TO LIVE PARTS</b>                                                             |                                    | <b>P</b> |
| 8.1                      | Adequate protection against accidental contact with live parts                                                    |                                    | P        |
| 8.1.1                    | All positions; detachable parts removed                                                                           | No hazards                         | P        |
|                          | Removal of lamps: protection against contact with live parts                                                      | No lamp used                       | N        |
|                          | Use of test finger: no contact with live parts                                                                    |                                    | P        |
| 8.1.2                    | Use of test pin: no contact with live parts                                                                       |                                    | P        |
| 8.1.3                    | Use of test probe: no contact with live parts of visible glowing heating elements                                 | No visible glowing heating element | N        |
| 8.1.4                    | Accessible part not considered live                                                                               |                                    | P        |
|                          | - extra-low a.c. voltage: peak values not exceeding 42,4 V                                                        |                                    | N        |
|                          | - extra-low d.c. voltage: not exceeding 42,4 V                                                                    |                                    | N        |
|                          | - or separated from live parts by protective impedance, d.c. current not exceeding 2 mA                           |                                    | N        |
|                          | - or separated from live parts by protective impedance, a.c. peak value not exceeding 0,7 mA                      |                                    | N        |
|                          | - for peak value 42,4 V up to and including 450 V capacitance not exceeding 0,1F                                  |                                    | N        |
|                          | - for peak value 450 V up to and including 15 kV capacitance not exceeding 0,1F                                   |                                    | N        |
| 8.1.5                    | Live parts protected at least by basic insulation before installation or assembly                                 |                                    | N        |
|                          | - built-in appliances                                                                                             |                                    | P        |



| EN 60335-1:2012/A15:2021 |                                                                                                                                                                                                    |                        |          |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|----------|
| CL.                      | Requirement of the test                                                                                                                                                                            | Result--Remark         | Verdict  |
|                          | - fixed appliances                                                                                                                                                                                 |                        | N        |
|                          | - separate units                                                                                                                                                                                   |                        | N        |
| 8.2                      | Class II appliances and constructions adequately protected against accidental contact with basic insulation and metal parts separated from live parts with only basic insulation                   | Class II               | P        |
|                          | Only possible to touch parts separated from live parts by double or reinforced insulation                                                                                                          |                        | N        |
|                          |                                                                                                                                                                                                    |                        |          |
| <b>10</b>                | <b>POWER INPUT AND CURRENT</b>                                                                                                                                                                     |                        | <b>P</b> |
| 10.1                     | Power input at rated voltage and normal operating temperature not deviating from rated input by more than shown in table; measured power input (W); rated input (W); deviation .....               |                        | P        |
| 10.2                     | Current at normal operating temperature not deviating from rated current by more than shown in table; measured current at rated voltage under normal operation (A); rated current (A); deviation : |                        | N        |
|                          |                                                                                                                                                                                                    |                        |          |
| <b>11</b>                | <b>HEATING</b>                                                                                                                                                                                     |                        | <b>P</b> |
| 11.1                     | No excessive temperatures in normal use                                                                                                                                                            |                        | P        |
| 11.2                     | Placing and mounting of appliance as described                                                                                                                                                     |                        | P        |
| 11.3                     | Temperature rises determined by thermocouples or resistance method                                                                                                                                 |                        | P        |
| 11.4                     | Heating appliances operated under normal operation at 1,15 times rated power input                                                                                                                 | Not heating appliances | N        |
| 11.5                     | Motor-operated appliances operated under normal operation at most unfavourable voltage between 0.94 and 1.06 times rated voltage.....:                                                             |                        | N        |
| 11.6                     | Combined appliances operated under normal operation, supply voltage at most unfavourable voltage between 0,94 and 1,06 times rated voltage                                                         |                        | N        |
| 11.7                     | Operation duration corresponding to the most unfavourable conditions of normal use                                                                                                                 |                        | P        |
| 11.8                     | Protective devices do not operate                                                                                                                                                                  |                        | P        |
|                          | Sealing compound not flowing out                                                                                                                                                                   |                        | P        |
|                          | Temperatures not exceeding values in table 3                                                                                                                                                       | See appended table     | P        |
|                          |                                                                                                                                                                                                    |                        |          |
| <b>13</b>                | <b>LEAKAGE CURRENT</b>                                                                                                                                                                             |                        | <b>P</b> |



| EN 60335-1:2012/A15:2021 |                                                                                                                            |                         |          |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------|-------------------------|----------|
| CL.                      | Requirement of the test                                                                                                    | Result--Remark          | Verdict  |
| 13.1                     | Leakage current not excessive and electric strength adequate                                                               |                         | P        |
|                          | Heating appliances operated at 1.15 times rated power input:                                                               |                         | N        |
|                          | Motor-operated appliances and combined appliances supplied at 1.06 times rated voltage :                                   |                         | P        |
|                          | Protective impedance and radio interference filters disconnected before carrying out the tests                             |                         | N        |
| 13.2                     | Leakage current measured by means of circuit described in Annex G                                                          |                         | P        |
|                          | Leakage current measurements                                                                                               | See appended table      | P        |
| 13.3                     | Electric strength test of insulation                                                                                       | See appended table      | P        |
|                          | No breakdown during the test                                                                                               |                         | P        |
|                          |                                                                                                                            |                         |          |
| <b>15</b>                | <b>MOISTURE RESISTANCE</b>                                                                                                 |                         | <b>P</b> |
| 15.1                     | Enclosure provides the degree of moisture protection according to classification of appliance                              | IP20                    | P        |
| 15.1.1                   | Appliance subjected to test as specified                                                                                   |                         | N        |
|                          | Withstand electric strength test specified in 16.3                                                                         |                         | N        |
|                          | No trace of water on insulation which can result in a reduction of distances and clearances below values specified in 29.1 |                         | N        |
| 15.1.2                   | Hand-held appliance turned continuously through the most unfavourable positions during the test                            | Not hand-held equipment | N        |
|                          | Built-in appliance installed according to the manufacturer's instruction                                                   |                         | N        |
|                          | Other appliances tested as specified                                                                                       |                         | N        |
| 15.2                     | Spillage of liquid does not affect the electrical insulation                                                               |                         | N        |
|                          | Overfilling test with additional amount of liquid (I) :                                                                    |                         | N        |
|                          | Withstand electric strength test in 16.3                                                                                   |                         | N        |
|                          | No trace of water on insulation which can result in reduction of distances and clearances below values specified in 29.1   |                         | N        |
| 15.3                     | Humidity treatment for 48 h                                                                                                | 93%, 25°C, 48h          | P        |
|                          | Withstanding the test of Cl. 16                                                                                            |                         | P        |
|                          |                                                                                                                            |                         |          |
| <b>16</b>                | <b>LEAKAGE CURRENT AND ELECTRIC STRENGTH</b>                                                                               |                         | <b>P</b> |



| EN 60335-1:2012/A15:2021 |                                                                                                                                                                                         |                     |          |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|----------|
| CL.                      | Requirement of the test                                                                                                                                                                 | Result--Remark      | Verdict  |
| 16.1                     | No excessive leakage current and adequate insulation and electric strength (tests 16.2 and 16.3)                                                                                        |                     | P        |
| 16.2                     | Leakage current measurements                                                                                                                                                            | See appended table  | P        |
| 16.3                     | Electric strength tests (values in table 5)                                                                                                                                             |                     | P        |
|                          |                                                                                                                                                                                         |                     |          |
| <b>17</b>                | <b>OVERLOAD PROTECTION OF TRANSFORMERS AND ASSOCIATED CIRCUITS</b>                                                                                                                      |                     | <b>N</b> |
|                          | No excessive temperatures in transformer or associated circuits in event of short-circuits likely to occur in normal use                                                                |                     | N        |
|                          | Appliance supplied with 1,06 or 0,94 times rated voltage and the most unfavourable short-circuit or overload likely to occur in normal use applied                                      |                     | 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                           |                     | N        |
|                          | Temperature of the winding not exceeding the value specified in table 6                                                                                                                 |                     | N        |
|                          |                                                                                                                                                                                         |                     |          |
| <b>19</b>                | <b>ABNORMAL OPERATION</b>                                                                                                                                                               |                     | <b>P</b> |
| 19.1                     | The risk of fire or mechanical damage under abnormal or careless operation obviated                                                                                                     |                     | P        |
|                          | Electronic circuits so designed and applied that a fault will not render the appliance unsafe                                                                                           |                     | P        |
| 19.2                     | Test of appliance with heating elements with restricted heat dissipation; test voltage (V): power input of 0,85 times rated power input .....                                           | No heating elements | N        |
| 19.3                     | Test of 19.2 repeated; test voltage (V): power input of 1,24 times rated power input .....                                                                                              |                     | N        |
| 19.4                     | Test conditions as in Cl. 11, the power input being 1,15 times rated power input, any control limiting the temperature during tests of Cl. 11 short-circuited                           | No this device.     | 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 elements 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        |



| EN 60335-1:2012/A15:2021 |                                                                                                                                                                                                                                                                                                                             |                         |         |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------|
| CL.                      | Requirement of the test                                                                                                                                                                                                                                                                                                     | Result--Remark          | Verdict |
| 19.6                     | Appliances with PTC heating elements tested as specified. Supplied at rated voltage, establishing steady conditions, then the voltage increased in steps by 5% until 1,5 times rated voltage is reached or until the heating element ruptures                                                                               | No PTC heating elements | 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 is reached or until the PTC heating element ruptures, whichever occurs first (EN 60335- 1/A2:00) |                         | N       |
| 19.7                     | Stalling test by locking the rotor if the locked rotor torque is smaller than the full load torque or locking moving parts                                                                                                                                                                                                  |                         | P       |
|                          | Locked rotor, motor capacitors open circuited or short-circuited, unless they are of class P2 of IEC 60252 (                                                                                                                                                                                                                |                         | P       |
|                          | Appliances with timer or controller supplied with rated voltage for each of the tests, for a period equal to the maximum period allowed                                                                                                                                                                                     |                         | N       |
|                          | Test period at rated voltage (s or min) or until steady state conditions established .....                                                                                                                                                                                                                                  |                         | P       |
|                          | Winding temperatures not exceeding limiting temperature; type of appliance; insulation class; measured temperature ( C) .....                                                                                                                                                                                               |                         | P       |
| 19.8                     | Three- phase motors operated at rated voltage with one phase disconnected                                                                                                                                                                                                                                                   |                         | P       |
| 19.9                     | Running overload test of appliance incorporating motors at rated voltage; motor windings insulation class; measured temperature; allowed temperature :                                                                                                                                                                      |                         | N       |
| 19.10                    | Series motor operated at 1,3 times rated voltage for 1 min                                                                                                                                                                                                                                                                  |                         | P       |
|                          | Parts not ejected from the appliance during test                                                                                                                                                                                                                                                                            |                         | P       |
| 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 they comply with the conditions specified in 19.11.1                                                                                                                       |                         | N       |
| 19.11.1                  | Before applying the fault conditions a) to f) in 19.11.2, it is checked if circuits or parts of circuit meet both of the following conditions:                                                                                                                                                                              |                         | P       |
|                          | - the electronic circuit is a low-power circuit, that is, the maximum power at low-power points does not exceed 15 W according to the tests specified                                                                                                                                                                       |                         | N       |



| EN 60335-1:2012/A15:2021 |                                                                                                                                                                                                                     |                |         |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------|
| CL.                      | Requirement of the test                                                                                                                                                                                             | Result--Remark | Verdict |
|                          | - the protection against electric shock, fire hazard, mechanical hazard or dangerous malfunction in other parts of the appliance does not rely on the correct functioning of the electronic circuit                 |                | P       |
| 19.11.2                  | Fault conditions applied one at a time, the appliance operated under conditions specified in Cl. 11, but supplied at rated voltage, the duration of the tests as specified:                                         |                | N       |
|                          | a) short-circuit of creepage distances and clearances between live parts of different potential, if these distances are less than the values specified in 29.1, unless the relevant part is adequately encapsulated |                | N       |
|                          | b) open circuit at the terminals of any component                                                                                                                                                                   |                | N       |
|                          | c) short-circuit of capacitors, unless they comply with IEC 60384- 14                                                                                                                                               |                | N       |
|                          | d) short-circuit of any two terminals of an electronic component, other than integrated circuits. This fault condition is not applied between the circuits of an optocoupler                                        |                | N       |
|                          | e) failure of triacs in the diode mode                                                                                                                                                                              |                | N       |
|                          | f) failure of an integrated circuit. In this case the possible hazardous situations of the appliance are assessed to ensure that safety does not rely on the correct functioning of such a component                |                | 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 f) of 19.11.2  |                | N       |
|                          | During and after each test the following is checked:                                                                                                                                                                |                | N       |
|                          | - the temperature rise of the windings do not exceed the values specified in table 6                                                                                                                                |                | N       |
|                          | - the appliance complies with the conditions specified in 19.13                                                                                                                                                     |                | N       |
|                          | - live parts not accessible to the test finger or test pin as specified in Cl. 8                                                                                                                                    |                | N       |
|                          | - 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 all three of the following conditions are met:                                |                | N       |
|                          | - the material of the printed circuit board withstands the burning test of 20.1 of IEC 65                                                                                                                           |                | N       |
|                          | - any loosened conductor does not reduce the creepage distances or clearances between live part and accessible metal parts                                                                                          |                | N       |



| EN 60335-1:2012/A15:2021 |                                                                                                                                                                                                                                                                                                         |                                                           |          |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|----------|
| CL.                      | Requirement of the test                                                                                                                                                                                                                                                                                 | Result--Remark                                            | Verdict  |
|                          | - the appliance withstands the tests of 19.11.2 with open circuited conductor bridged                                                                                                                                                                                                                   |                                                           | 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 127, the test is repeated, measuring the current flowing through the fuse-link; measured current (A); rated current of the fuse-link (A) ..... |                                                           | N        |
| 19.13                    | During the tests the appliance does not emit flames, molten metal, poisonous or ignitable gas in hazardous amounts                                                                                                                                                                                      | Not emit flames, molten metal, poisonous or ignitable gas | P        |
|                          | Temperature rises not exceeding the values shown in table 6                                                                                                                                                                                                                                             |                                                           | P        |
|                          | Enclosures not deformed to such an extent that compliance with Cl. 8 is impaired                                                                                                                                                                                                                        |                                                           | P        |
|                          | Appliance still operable and complying with 20.2                                                                                                                                                                                                                                                        |                                                           | P        |
|                          | Appliance, other than Class III, withstands the electric strength test of 16.3, however, the test voltage being:                                                                                                                                                                                        |                                                           | P        |
|                          | - basic insulation: 1000 V                                                                                                                                                                                                                                                                              |                                                           | P        |
|                          | - supplementary insulation: 1750 V                                                                                                                                                                                                                                                                      |                                                           | P        |
|                          | - reinforced insulation: 3000 V                                                                                                                                                                                                                                                                         |                                                           | P        |
| <b>20</b>                | <b>STABILITY AND MECHANICAL HAZARDS</b>                                                                                                                                                                                                                                                                 |                                                           | <b>N</b> |
| 20.1                     | Adequate stability                                                                                                                                                                                                                                                                                      |                                                           | N        |
|                          | Tilting test through an angle of 10 (appliance placed on an inclined plane/horizontal plane); appliance does not overturn                                                                                                                                                                               |                                                           | N        |
|                          | 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 7                                                                                                                                                                                                  |                                                           | 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                                                                                                                                                                                                                                      | No moving parts                                           | N        |
|                          | Adequate mechanical strength and fixing of protective enclosures                                                                                                                                                                                                                                        |                                                           | N        |
|                          | Self-resetting thermal cut-outs and overcurrent protective devices not causing a hazard, if unexpectedly reclosed                                                                                                                                                                                       |                                                           | N        |



| EN 60335-1:2012/A15:2021 |                                                                                                                                                                                                                                                                                               |                         |          |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------|
| CL.                      | Requirement of the test                                                                                                                                                                                                                                                                       | Result--Remark          | Verdict  |
|                          | Not possible to touch dangerous moving parts with test finger                                                                                                                                                                                                                                 |                         | N        |
| <b>21</b>                | <b>MECHANICAL STRENGTH</b>                                                                                                                                                                                                                                                                    |                         | <b>P</b> |
|                          | Appliance has adequate mechanical strength and is constructed as to withstand rough handling                                                                                                                                                                                                  |                         | P        |
|                          | No damage after three blows applied to various parts of the enclosure, impact energy $0,5 \pm 0,04$ J                                                                                                                                                                                         |                         | P        |
|                          | If necessary, supplementary or reinforced insulation subjected to the electric strength test of 16.3                                                                                                                                                                                          |                         | P        |
|                          | If necessary, repetition of groups of three blows on a new sample                                                                                                                                                                                                                             |                         | N        |
| <b>22</b>                | <b>CONSTRUCTION</b>                                                                                                                                                                                                                                                                           |                         | <b>P</b> |
| 22.1                     | Appliance marked with the first numeral of the IP system: relevant requirements of IEC 529 are fulfilled                                                                                                                                                                                      | IP20                    | N        |
| 22.2                     | Stationary appliance: means to provide all-pole disconnection from the supply provided, the following means being available:                                                                                                                                                                  |                         | N        |
|                          | - a supply cord fitted with a plug                                                                                                                                                                                                                                                            |                         | N        |
|                          | - a switch complying with 24.3                                                                                                                                                                                                                                                                |                         | N        |
|                          | - a statement in the instruction sheet that a disconnection incorporated in the fixed wiring is to be provided                                                                                                                                                                                |                         | N        |
|                          | - an appliance coupler                                                                                                                                                                                                                                                                        |                         | N        |
|                          | Single-phase Class I appliance with heating elements, intended to be permanently connected to fixed wiring, incorporating single-pole switches or single-pole protective devices for the disconnection of the heating element(s): the switches/devices being connected in the phase conductor |                         | N        |
| 22.3                     | Appliance provided with pins: no undue strain on socket-outlets                                                                                                                                                                                                                               |                         | N        |
|                          | Applied torque not exceeding 0,25 Nm                                                                                                                                                                                                                                                          |                         | N        |
| 22.4                     | Appliance for heating liquids and appliance causing undue vibration not provided with pins for insertion into socket-outlets                                                                                                                                                                  | Not for heating liquids | N        |
| 22.5                     | No risk of electric shock when touching the pins of the plug                                                                                                                                                                                                                                  |                         | N        |
| 22.6                     | Electrical insulation not affected by condensing water or leaking liquid                                                                                                                                                                                                                      |                         | N        |



| EN 60335-1:2012/A15:2021 |                                                                                                                                                                                                     |                            |         |
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| CL.                      | Requirement of the test                                                                                                                                                                             | Result--Remark             | Verdict |
|                          | Electrical insulation of Class II appliances not affected in case of a hose rupture or seal leak                                                                                                    |                            | N       |
| 22.7                     | Adequate safeguards against the risk of excessive pressure in appliances provided with steam-producing devices                                                                                      | No steam-producing devices | N       |
| 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 which are likely to be cleaned in normal use             |                            | N       |
| 22.9                     | Insulation, internal wiring, windings, commutators and slip rings not exposed to oil, grease or similar substances                                                                                  |                            | N       |
|                          | Adequate insulating properties of oil or grease to which insulation is exposed                                                                                                                      |                            | N       |
| 22.10                    | Location or protection of reset buttons of non-self-resetting controls is so that accidental resetting is unlikely                                                                                  |                            | N       |
| 22.11                    | Reliable fixing of non-detachable parts which provide the necessary degree of protection against electric shock, moisture or contact with moving parts                                              |                            | N       |
|                          | 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 which are likely to be removed during installation or servicing                                                          |                            | N       |
| 22.12                    | Handles, knobs etc. fixed in a reliable manner                                                                                                                                                      |                            | N       |
|                          | Fixing in wrong position of handles, knobs etc. indicating position of switches or similar components not possible                                                                                  |                            | N       |
|                          | Axial force 15 N applied to parts, the shape of which being so that an axial pull is unlikely to be applied                                                                                         |                            | N       |
|                          | Axial force 30 N applied to parts, the shape of which being so that an axial pull is likely to be applied                                                                                           |                            | N       |
| 22.13                    | Unlikely that handles, when gripped as in normal use, make the operators 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                                                                                                   | No sharp edges             | N       |



| EN 60335-1:2012/A15:2021 |                                                                                                                                                               |                               |         |
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| CL.                      | Requirement of the test                                                                                                                                       | Result--Remark                | Verdict |
|                          | No exposed pointed ends of self tapping screws etc., liable to be touched by the user in normal use or during user maintenance                                |                               | N       |
| 22.15                    | Storage hooks and the like for flexible cords smooth and well rounded                                                                                         | No storage hooks              | N       |
| 22.16                    | Automatic cord reels cause no undue abrasion or damage to the sheath of the flexible cord, no breakage of conductors strands, no undue wear of contacts       | No automatic cord reels       | 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 under normal conditions of use                                                            |                               | N       |
| 22.19                    | Driving belts not used as electrical insulation                                                                                                               |                               | N       |
| 22.20                    | Direct contact between live parts and thermal insulation effectively prevented, unless 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 impregnated                                             |                               | N       |
| 22.22                    | Appliances shall not contain asbestos                                                                                                                         |                               | N       |
| 22.23                    | Oils containing polychlorinated biphenyl (PCB) not used                                                                                                       |                               | N       |
| 22.24                    | Bare heating elements adequately supported                                                                                                                    | No heating elements           | N       |
|                          | In case of rupture, the heating conductor is unlikely to come in contact with earthed metal parts or accessible metal parts                                   |                               | N       |
| 22.25                    | Sagging heating conductors cannot come into contact with accessible metal parts                                                                               | No sagging heating conductors | N       |
| 22.26                    | The insulation between parts operating at safety extra-low voltage and other live parts complies with the requirements for double or reinforced insulation    |                               | N       |
| 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       |



| EN 60335-1:2012/A15:2021 |                                                                                                                                                                                    |                     |         |
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| CL.                      | Requirement of the test                                                                                                                                                            | Result--Remark      | Verdict |
| 22.29                    | Class II appliances permanently connected to fixed wiring so constructed that the required degree of protection against electric shock 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                                                       |                     | N       |
|                          | so constructed that they cannot be replaced in an incorrect position, and so that if they are omitted, the appliance is rendered inoperable or manifestly incomplete               |                     | N       |
| 22.31                    | Creepage distances and clearances over supplementary and reinforced insulation not reduced below values specified in 29.1 as a result of wear                                      |                     | N       |
|                          | Creepage distances and clearances over supplementary or reinforced insulation not reduced to less than 50% of values specified in 29.1 if wires, screws etc. becomes loose         |                     | N       |
| 22.32                    | Supplementary and reinforced insulation designed or protected against deposition of dirt or dust                                                                                   |                     | N       |
|                          | Ceramic material not tightly sintered, similar material or beads alone not used as supplementary or reinforced insulation                                                          | No ceramic material | N       |
|                          | 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 29.1 |                     | N       |
|                          | Oxygen bomb test at 70°C for 96 h and 16 h at room temperature                                                                                                                     |                     | N       |
| 22.33                    | Conductive liquids which are or may become accessible in normal use shall not be in direct contact with live parts. Electrodes shall not be used for heating liquids.              |                     | N       |
|                          | For class II construction, conductive liquids which are or may become accessible in normal use shall not be in direct contact with basic insulation or reinforced insulation.      |                     | N       |
|                          | For class II construction, conductive liquids which are in direct contact with live parts, shall not be in direct contact with reinforced insulation.                              |                     | N       |
| 22.34                    | Shafts of operating knobs, handles, levers etc. not live, unless the shaft is not accessible when the part is removed                                                              | No shaft            | N       |
| 22.35                    | Handles, levers and knobs, held or actuated in normal use, not becoming live in the event of an insulation fault                                                                   |                     | N       |



| EN 60335-1:2012/A15:2021 |                                                                                                                                                                                                                                                                                   |                   |         |
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| CL.                      | Requirement of the test                                                                                                                                                                                                                                                           | Result--Remark    | Verdict |
|                          | Such parts being of metal, and their shafts or fixings are likely to become live in the event of an insulation fault, they 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 either reliably connected to an earthing terminal or earthing contact, or separated from live parts by earthed metal           |                   | N       |
| 22.36                    | Handles continuously held in the hand in normal use are so constructed that when gripped as in normal use, the operators hand is not likely to touch metal parts, unless 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, unless complying with 22.42                                                                                                                                                                            |                   | N       |
|                          | Metal casings of capacitors in Class II appliances separated from accessible metal parts by supplementary insulation, unless complying with 22.42                                                                                                                                 |                   | N       |
| 22.38                    | Capacitors not connected between the contacts of a thermal cut-out                                                                                                                                                                                                                |                   | N       |
| 22.39                    | Lampholders only used for the connection of lamps                                                                                                                                                                                                                                 | No lampholder     | N       |
| 22.40                    | Motor-operated appliances and combined appliances, intended to be moved while in operation or which have accessible moving parts, are fitted with a switch to control the motor                                                                                                   |                   | N       |
|                          | The actuating member of this switch easily visible and accessible                                                                                                                                                                                                                 |                   | N       |
| 22.41                    | Appliance shall not incorporate components containing liquid mercury                                                                                                                                                                                                              |                   | N       |
| 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 is short-circuited or open circuited                                                                                                                                                                          |                   | N       |
| 22.43                    | Appliances adjustable for different voltages, accidental changing of the setting of the voltage unlikely to occur                                                                                                                                                                 | No such component | N       |
| 22.44                    | Appliance enclosure not shaped and decorated so that the appliance is likely to be treated as a toy by children                                                                                                                                                                   |                   | N       |



| EN 60335-1:2012/A15:2021 |                                                                                                                                                                                      |                  |          |
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| CL.                      | Requirement of the test                                                                                                                                                              | Result--Remark   | Verdict  |
| 22.45                    | When air is used as reinforced insulation, clearances not reduced below the values specified in 29.1.4 due to deformation as a result of and external force applied to the enclosure | Rigid enclosure. | N        |
| 22.46                    | Software used in protective electronic circuits is software class B or C                                                                                                             |                  | 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 shall 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                    | A control on the appliance being 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        |
|                          | Manual setting and visual indication not necessary on appliances that can operate as follows, without giving rise to a hazard;                                                       |                  | N        |
|                          | - operate continuously,                                                                                                                                                              |                  | N        |
|                          | - operate automatically, or                                                                                                                                                          |                  | N        |
|                          | - be operated 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        |
|                          |                                                                                                                                                                                      |                  |          |
| <b>23</b>                | <b>INTERNAL WIRING</b>                                                                                                                                                               |                  | <b>P</b> |
| 23.1                     | Wireways smooth and free from sharp edges                                                                                                                                            |                  | P        |
|                          | Wires protected against contact with burrs, cooling fins etc.                                                                                                                        |                  | P        |
|                          | Wire holes in metal well rounded or provided with bushings                                                                                                                           |                  | N        |



| EN 60335-1:2012/A15:2021 |                                                                                                                                                                                                                    |                         |          |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------|
| CL.                      | Requirement of the test                                                                                                                                                                                            | Result--Remark          | Verdict  |
|                          | Wiring effectively prevented from coming into contact with moving parts                                                                                                                                            |                         | P        |
| 23.2                     | Beads etc. on live wires cannot change their position, and are not resting on sharp edges or corners                                                                                                               |                         | 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                                                                                                                                             |                         | N        |
|                          | Open-coil springs not used                                                                                                                                                                                         |                         | N        |
|                          | Adequate insulating lining provided inside a coiled spring, the turns of which touch one another                                                                                                                   |                         | N        |
|                          | No damage after 10000 flexings                                                                                                                                                                                     |                         | N        |
|                          | Electric strength test, 1000 V between live parts and metal parts                                                                                                                                                  |                         | N        |
| 23.4                     | Bare internal wiring sufficiently rigid and fixed                                                                                                                                                                  | No bare internal wiring | N        |
| 23.5                     | The basic insulation of internal wiring withstanding the electrical stress likely to occur in normal use                                                                                                           |                         | P        |
|                          | No breakdown when a voltage of 2000 V is applied for 15 min between the conductor and metal foil wrapped around the insulation                                                                                     |                         | P        |
| 23.6                     | Sleeving used as supplementary insulation on internal wiring retained in position by positive means                                                                                                                |                         | N        |
| 23.7                     | Only the colour combination green/yellow used for earthing conductors                                                                                                                                              |                         | P        |
| 23.8                     | Aluminium wires not used for internal wiring                                                                                                                                                                       |                         | P        |
| 23.9                     | No lead-tin soldering of stranded conductors where they are subject to contact pressure, unless                                                                                                                    |                         | P        |
|                          | clamping means so constructed that there is no risk of bad contact due to cold flow of the solder                                                                                                                  |                         | 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 |                         | N        |
| 24                       | <b>COMPONENTS</b>                                                                                                                                                                                                  |                         | <b>P</b> |



| EN 60335-1:2012/A15:2021 |                                                                                                                                                                                                |                    |         |
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| CL.                      | Requirement of the test                                                                                                                                                                        | Result--Remark     | Verdict |
| 24.1                     | Components comply with safety requirements in relevant IEC standards                                                                                                                           |                    | P       |
|                          | List of components                                                                                                                                                                             | See appended table | P       |
|                          | Components not tested and found to comply with relevant IEC standard for the number of cycles specified are tested in accordance with 24.1.1 to 24.1.6                                         |                    | P       |
|                          | Components not tested and found to comply with relevant IEC standard, components not marked or not used in accordance with its marking, tested under the conditions occurring in the appliance |                    | P       |
| 24.1.1                   | Capacitors likely to be subjected to the supply mains voltage and used for radio interference suppression or voltage dividing, comply with IEC 60384-14, or                                    |                    | N       |
|                          | Tested according to annex F                                                                                                                                                                    |                    | N       |
| 24.1.2                   | Safety isolating transformers complying with IEC 61558-2-6, or                                                                                                                                 |                    | N       |
|                          | 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, or                                                                                               |                    | N       |
|                          | Tested according to annex H                                                                                                                                                                    |                    | N       |
| 24.1.4                   | Automatic controls complying with IEC 60730-1 with relevant part 2. the number of cycles of operation being:                                                                                   |                    | N       |
|                          | - thermostats: 10 000                                                                                                                                                                          | No such part       | N       |
|                          | - temperature limiters: 1000                                                                                                                                                                   | No such part       | N       |
|                          | - self-resetting thermal cut-outs: 300                                                                                                                                                         | No such part       | N       |
|                          | - non-self-resetting thermal cut-outs: 30                                                                                                                                                      | No such part       | N       |
|                          | - energy regulators: 10 000 (EN 60335- 1/A2:00)                                                                                                                                                |                    | N       |
| 24.1.5                   | Appliance couplers complying with IEC 60320-1                                                                                                                                                  |                    | N       |
|                          | However, appliances classified higher than IPX0, the appliance couplers complying with IEC 60320-2-3                                                                                           |                    | N       |
| 24.1.6                   | Small lamp holders similar to E10 lampholders complying with IEC60238, the requirements for E10 lampholders being applicable                                                                   |                    | 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 IEC 62151                 |                    | N       |



| EN 60335-1:2012/A15:2021 |                                                                                                                                                                                                                                                              |                |          |
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| CL.                      | Requirement of the test                                                                                                                                                                                                                                      | Result--Remark | Verdict  |
| 24.1.8                   | The relevant standard for thermal links is IEC 60691. 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                   | Relays, other than motor starting relays, tested as part of the appliance                                                                                                                                                                                    |                | N        |
|                          | The are also tested in accordance with Clause 17 of IEC 60730-1, the number of operations in 24.1.4 selected according to the relay function in the appliance                                                                                                |                | N        |
| 24.2                     | No switches or automatic controls in flexible cords                                                                                                                                                                                                          |                | P        |
|                          | No devices causing the protective device in the fixed wiring to operate in the event of a fault in the appliance                                                                                                                                             |                | P        |
|                          | No thermal cut-outs which can be reset by soldering                                                                                                                                                                                                          |                | P        |
| 24.3                     | Switch intended for all-pole disconnection of stationary appliances is directly connected to the supply terminals, having a contact separation of at least 3 mm in each pole                                                                                 |                | 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 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        |
|                          | 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 42V.                                                                                            |                | N        |
|                          | In addition, the motors are complying with the requirements of Annex I                                                                                                                                                                                       |                | N        |
| 24.7                     | Hose-sets for connection of appliances to the water mains, complying with IEC 61770 and supplied with the appliance                                                                                                                                          |                | N        |
|                          |                                                                                                                                                                                                                                                              |                |          |
| <b>25</b>                | <b>SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS</b>                                                                                                                                                                                                         |                | <b>P</b> |
| 25.1                     | Appliance not intended for permanent connection to fixed wiring, means for connection to the supply:                                                                                                                                                         |                | P        |



| EN 60335-1:2012/A15:2021 |                                                                                                                                                                                                           |                |         |
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| CL.                      | Requirement of the test                                                                                                                                                                                   | Result--Remark | Verdict |
|                          | - supply cord fitted with a plug                                                                                                                                                                          |                | N       |
|                          | - an appliance inlet having at least the same degree of protection against moisture as required for the appliance                                                                                         |                | N       |
|                          | - pins for insertion into socket-outlets                                                                                                                                                                  |                | N       |
| 25.2                     | Appliance provided with more than one means of connection to the supply                                                                                                                                   |                | N       |
|                          | 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                     | Connection of supply wires for appliance intended to be permanently connected to fixed wiring possible after the appliance has been fixed to its support                                                  |                | P       |
|                          | Appliance provided with a set of terminals for the connection of cables or fixed wiring, cross-sectional areas specified in 26.2                                                                          |                | N       |
|                          | Appliance provided with a set of terminals allowing the connection of a flexible cord                                                                                                                     |                | P       |
|                          | Appliance provided with a set of terminals and cable entries, conduit entries, knock-outs or glands, allowing connection of appropriate type of cable or conduit                                          |                | N       |
| 25.4                     | Cable and conduit entries, rated current of appliance not exceeding 16 A, dimensions according to table 8                                                                                                 |                | P       |
|                          | Introduction of conduit or cable does not affect the protection against electric shock or reduce creepage distances and clearances below values specified in 29.1                                         |                | P       |
| 25.5                     | Method for assemble supply cord with the appliance:                                                                                                                                                       |                | --      |
|                          | - type X attachment                                                                                                                                                                                       |                | N       |
|                          | - type Y attachment                                                                                                                                                                                       |                | N       |
|                          | - type Z attachment, if allowed in part 2                                                                                                                                                                 |                | P       |
|                          | Type X attachment: specially prepared cord                                                                                                                                                                |                | N       |
|                          | Type X attachment not used for flat twin tinsel cord                                                                                                                                                      |                | N       |
| 25.6                     | Plugs fitted with only one flexible cord                                                                                                                                                                  |                | P       |
|                          | Supply cords of single-phase portable appliances having a rated current not exceeding 16 A, provided with a plug complying with the following Standard Sheets of IEC 83:                                  |                | N       |
|                          | - for Class I appliances: Standard Sheet C2b, C3b or C4                                                                                                                                                   |                | P       |



| EN 60335-1:2012/A15:2021 |                                                                                                                                      |                |         |
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| CL.                      | Requirement of the test                                                                                                              | Result--Remark | Verdict |
|                          | - for Class II appliances: Standard Sheet C5 or C6                                                                                   |                | N       |
| 25.7                     | Appliance supply cord not lighter than:                                                                                              |                | --      |
|                          | - braided cord (245 IEC 51)                                                                                                          |                | N       |
|                          | - ordinary tough rubber sheathed cord (245 IEC 53)                                                                                   |                | N       |
|                          | - ordinary polychloroprene sheathed flexible cord (245 IEC 57)                                                                       |                | N       |
|                          | - natural rubber cords not used for battery chargers for charging automobile batteries (EN 60335-2-29:2004)                          |                | N       |
|                          | - flat twin tinsel cord (227 IEC 41)                                                                                                 |                | N       |
|                          | - light polyvinyl chloride sheathed cord (227 IEC 52), appliance not exceeding 3 kg                                                  |                | N       |
|                          | - ordinary polyvinyl chloride sheathed cord (227 IEC 53), appliance exceeding 3 kg                                                   |                | N       |
|                          | - rubber insulated and sheathed cord (245 IEC 86)                                                                                    |                | N       |
|                          | - rubber insulated crosslinked PVC sheathed cord (245 IEC 87)                                                                        |                | N       |
|                          | - crosslinked PVC insulated and sheathed cord (245 IEC 88)                                                                           |                | N       |
|                          | Temperature rise of external metal parts exceeding 75 K, PVC cord not used                                                           |                | N       |
|                          | PVC cord used: appliance so constructed that the supply cord is not likely to touch external metal parts in normal use               |                | N       |
|                          | PVC supply cord appropriate for higher temperatures, type Y or type Z attachment used                                                |                | P       |
| 25.8                     | Nominal cross-sectional area of supply cords according to table 9; rated current (A); cross-sectional area (mm <sup>2</sup> )..... : |                | N       |
| 25.9                     | Supply cord not in contact with sharp points or edges                                                                                |                | N       |
| 25.10                    | Green/yellow core for earthing purposes in Class I appliance                                                                         |                | N       |
| 25.11                    | Conductors of supply cords not consolidated by lead-tin soldering                                                                    |                | N       |
|                          | clamping means so constructed that there is no risk of bad contacts due to cold flow of the solder                                   |                | N       |
| 25.12                    | Moulding the cord to part of the enclosure does not damage the insulation of the supply cord                                         |                | N       |



| EN 60335-1:2012/A15:2021 |                                                                                                                                 |                |         |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------|----------------|---------|
| CL.                      | Requirement of the test                                                                                                         | Result--Remark | Verdict |
| 25.13                    | Inlet opening provided with a bushing, or is so constructed, that there is no risk of damage to the supply cord when introduced |                | N       |
| 25.14                    | Supply cords adequately protected against excessive flexing                                                                     |                | N       |
|                          | Flexing test; applied force (N); number of flexings :                                                                           | 5N             | N       |
|                          | The test does not result in:                                                                                                    |                | --      |
|                          | - short-circuit between the conductors                                                                                          |                | 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, within the meaning of the standard, to the cord or the cord guard                                                     |                | N       |
|                          | - broken strands piercing the insulation and becoming accessible                                                                |                | N       |
| 25.15                    | Conductors of the supply cord relieved from strain, twisting and abrasion by use of cord anchorages                             |                | 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 10: pull (N); torque (Nm) (not on automatic cord reel) .....         | 30N, 0.1Nm     | N       |
|                          | Max. 2 mm displacement of the cord, and conductors not moved more than 1 mm in the terminals                                    |                | N       |
|                          | Creepage distances and clearances not reduced below values specified in 29.1                                                    |                | N       |
| 25.16                    | Cord anchorages for type X attachments so constructed and located 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       |
|                          | - they are suitable for different types of cord                                                                                 |                | N       |
|                          | - cord cannot touch the clamping screws of cord anchorage if these screws are accessible, unless separated from                 |                | N       |
|                          | - accessible metal parts by supplementary insulation                                                                            |                | N       |
|                          | - the cord is not clamped by a metal screw which bears directly on the cord                                                     |                | N       |



| EN 60335-1:2012/A15:2021 |                                                                                                                                                                                                                                                                                                     |                |         |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------|
| CL.                      | Requirement of the test                                                                                                                                                                                                                                                                             | Result--Remark | Verdict |
|                          | - at least one part of the cord anchorage securely fixed to the appliance, unless part of a specially prepared cord                                                                                                                                                                                 |                | N       |
|                          | - screws which have to be operated when replacing the cord do not fix any other component, if applicable                                                                                                                                                                                            |                | 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 a 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 if of metal, they are insulated from accessible metal parts by supplementary insulation                                                                                                                                              |                | N       |
| 25.17                    | Adequate cord anchorages for type Y and Z attachment                                                                                                                                                                                                                                                |                | P       |
| 25.18                    | Cord anchorages only accessible with the aid of a tool, or                                                                                                                                                                                                                                          |                | P       |
|                          | so constructed that the cord only can be fitted with the aid of a tool                                                                                                                                                                                                                              |                | P       |
| 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                    | Conductors of the supply cord for type Y and Z attachment adequately additionally insulated                                                                                                                                                                                                         |                | P       |
| 25.21                    | Space for supply cable for fixed wiring or supply cord for type X attachment constructed to permit checking of conductors with respect to correct positioning and connection before fitting any cover, no risk of damage, no contact with accessible metal parts if a conductor becomes loose, etc. |                | N       |
|                          | For portable appliances, the uninsulated end of a conductor prevented from any contact with accessible metal parts, unless the end of the cord is such that the conductors are unlikely to slip free                                                                                                |                | N       |
| 25.22                    | Appliance inlet:                                                                                                                                                                                                                                                                                    |                | N       |
|                          | - live parts not accessible during insertion or removal                                                                                                                                                                                                                                             |                | N       |
|                          | - connector can be inserted without difficulty                                                                                                                                                                                                                                                      |                | N       |
|                          | - the appliance is not supported by the connector                                                                                                                                                                                                                                                   |                | N       |



| EN 60335-1:2012/A15:2021 |                                                                                                                                                                                                                                             |                |          |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------|
| CL.                      | Requirement of the test                                                                                                                                                                                                                     | Result--Remark | Verdict  |
|                          | - is not for cold conditions if temperature rise of external metal parts exceeds 75 K, unless the supply cord is not likely to touch such metal parts                                                                                       |                | N        |
| 25.23                    | Interconnection cords comply with the requirements for the supply cord, except as specified                                                                                                                                                 |                | P        |
|                          | If necessary, electric strength test of 16.3                                                                                                                                                                                                |                | P        |
| 25.24                    | Interconnection cords not detachable without the aid of a tool                                                                                                                                                                              |                | P        |
| 25.25                    | Dimensions of pins compatible with the dimensions of the relevant socket-outlet. Dimensions of pins and engagement face in accordance with the relevant plug in IEC 60083                                                                   |                | P        |
|                          |                                                                                                                                                                                                                                             |                |          |
| <b>26</b>                | <b>TERMINALS FOR EXTERNAL CONDUCTORS</b>                                                                                                                                                                                                    |                | <b>N</b> |
| 26.1.1                   | Appliances with type X attachment and appliances for connection to fixed wiring provided with terminals in which connection is made by means of screws, nuts or equally effective devices                                                   |                | N        |
|                          | Screws and nuts serve only to clamp supply conductors, except                                                                                                                                                                               |                | N        |
|                          | internal conductors, if so arranged that they are unlikely to be displaced when fitting the supply conductors                                                                                                                               |                | N        |
| 26.1.2                   | For type X attachment soldered connections used, the conductor so positioned or fixed that reliance is not placed on soldering alone                                                                                                        |                | N        |
|                          | Soldering alone used, barriers provided, creepage distances and clearances satisfactory if the conductor becomes free                                                                                                                       |                | N        |
|                          | For type Y and Z attachment: soldered, welded, crimped and similar connections used                                                                                                                                                         |                | N        |
|                          | For Class II appliances: the conductor so positioned or fixed that reliance is not placed on soldering, welding or crimping alone                                                                                                           |                | N        |
|                          | For Class II appliances: soldering, welding or crimping alone used, barriers provided, creepage distances and clearances satisfactory if the conductor becomes free                                                                         |                | N        |
| 26.2                     | Terminals for type X attachment and for connection to fixed wiring suitable for connection of conductors with required cross-sectional area according to table 11; rated current (A); nominal cross-sectional area (mm <sup>2</sup> ) ..... |                | N        |
|                          | Terminals only suitable for a specially prepared cord                                                                                                                                                                                       |                | N        |



| EN 60335-1:2012/A15:2021 |                                                                                                                                                                                                                                                 |                                                        |         |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|---------|
| CL.                      | Requirement of the test                                                                                                                                                                                                                         | Result--Remark                                         | Verdict |
| 26.3                     | Terminals for the supply cord suitable for their purpose                                                                                                                                                                                        |                                                        | N       |
|                          | Terminals with screw clamping and screwless terminals not used for flat twin tinsel cords, unless conductors ends fitted with a device suitable for screw terminals                                                                             |                                                        | N       |
|                          | Pull test of 5 N to the connection                                                                                                                                                                                                              |                                                        | N       |
| 26.4                     | Terminals for type X attachment and those for connection to fixed wiring so fixed that when tightening or loosening the clamping means:                                                                                                         |                                                        | N       |
|                          | - the terminal does not loosen                                                                                                                                                                                                                  |                                                        | N       |
|                          | - internal wiring is not subjected to stress                                                                                                                                                                                                    |                                                        | N       |
|                          | - creepage distances and clearances are not reduced below the values in 29.1                                                                                                                                                                    |                                                        | N       |
| 26.5                     | Terminals for type X attachment and for connection to fixed wiring so constructed that the conductor is clamped between metal surfaces with sufficient contact pressure and without damaging the conductor                                      |                                                        | N       |
| 26.6                     | Terminals for type X attachment, no special preparation of conductors required, and so constructed and placed that conductors prevented from slipping out, except those with a specially prepared cord and those for connection to fixed wiring |                                                        | N       |
| 26.7                     | Terminals of the pillar type constructed and located as specified                                                                                                                                                                               |                                                        | N       |
| 26.8                     | Terminals for the connection to fixed wiring located close to each other, including the earthing terminal                                                                                                                                       |                                                        | N       |
| 26.9                     | Terminals for type X attachment accessible after removal of a cover or part of the enclosure                                                                                                                                                    |                                                        | N       |
| 26.10                    | Terminals shall only be accessible after removal of a non-detachable part (EN 60335- 1/A2:00)                                                                                                                                                   |                                                        | N       |
| 26.11                    | Terminals for type X attachment so located or shielded that if a wire of a stranded conductor escapes, no risk of accidental connection between live parts and accessible metal parts,                                                          |                                                        | N       |
|                          | For class II appliances: the conductor so positioned or fixed that reliance is not places on soldering, welding or crimping alone                                                                                                               | Hooking the wire into the hole in PCB before soldering | N       |
|                          | For class II appliances: soldering, welding or crimping alone used, barriers provided, clearances and creepage distances satisfactory if the conductr becomes free                                                                              |                                                        | N       |



| EN 60335-1:2012/A15:2021 |                                                                                                                                                 |                |          |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------|
| CL.                      | Requirement of the test                                                                                                                         | Result--Remark | Verdict  |
| <b>27</b>                | <b>PROVISION FOR EARTHING</b>                                                                                                                   |                | <b>P</b> |
| 27.1                     | Accessible metal parts of Class 0I and I appliances, permanently and reliably connected to an earthing terminal                                 |                | P        |
|                          | Earthing terminals not connected to neutral terminal                                                                                            |                | P        |
|                          | Class 0, II and III appliance have no provision for earthing                                                                                    |                | P        |
| 27.2                     | Screw clamping terminals comply with Cl. 26                                                                                                     |                | N        |
|                          | Screwless terminals comply with IEC 998-2-2 (EN 60335-1:94)                                                                                     |                | N        |
|                          | Terminals used for the connection of external equipotential bonding conductors allow connection of conductors of 2,5 to 6 mm <sup>2</sup> , and |                | N        |
|                          | do not provide earthing continuity between different parts of the appliance                                                                     |                | N        |
|                          | Conductors cannot be loosened without the aid of a tool                                                                                         |                | P        |
|                          | Clamping means adequately secured against accidental loosening                                                                                  |                | N        |
| 27.3                     | Earth connection "made before" and "separated after" current-carrying connections                                                               |                | N        |
|                          | 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 metal of earthing terminal and other metal                                                  |                | P        |
|                          | Adequate resistance to corrosion of coated or uncoated parts providing earthing continuity, other than parts of a metal frame or enclosure      |                | P        |
|                          | Parts of steel providing earthing continuity provided at the essential areas with an electroplated coating, thickness at least 5μm              |                | N        |
|                          | Adequate protection against rusting of parts of coated or uncoated steel, only intended to provide or transmit contact pressure                 |                | N        |
|                          | In case of aluminium alloys precautions taken to avoid risk of corrosion                                                                        |                | N        |
| 27.5                     | Low resistance of connection between earthing terminal and earthed metal parts                                                                  |                | N        |
|                          | Resistance not exceeding 0,1Ω at the specified low-resistance test                                                                              |                | N        |



| EN 60335-1:2012/A15:2021 |                                                                                                                                                                                                |                |          |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------|
| CL.                      | Requirement of the test                                                                                                                                                                        | Result--Remark | Verdict  |
| 27.6                     | The printed conductors of printed circuit boards shall not be used to provide earthing continuity in handheld 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        |
|                          |                                                                                                                                                                                                |                |          |
| <b>28</b>                | <b>SCREWS AND CONNECTIONS</b>                                                                                                                                                                  |                | <b>P</b> |
| 28.1                     | Fixings and electrical connections 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                                                                                                                                            |                | P        |
|                          | Screws used for electrical connections or connections providing earthing continuity shall screw into metal                                                                                     |                | N        |
|                          | Screws not of insulating material if their replacement by a metal screw can impair supplementary or reinforced insulation                                                                      |                | N        |
|                          | Type X attachment, screws to be removed for replacement of supply cord, or for users maintenance, not of insulating material if their replacement by a metal screw can impair basic insulation |                | N        |
|                          | Screws and nuts transmitting contact pressure subjected to torque test as specified, applying torque as shown in table 12                                                                      |                | N        |
| 28.2                     | Contact pressure not transmitted through insulating material liable to shrink or distort, unless shrinkage or distortion compensated                                                           |                | N        |
|                          | This requirement does not apply to electrical connections in circuits carrying a current not exceeding 0,5 A                                                                                   |                | N        |
| 28.3                     | Space-threaded (sheet metal) screws only used for the connection of current-carrying parts if they clamp these parts directly in contact with each other                                       |                | N        |
|                          | Thread-cutting (self-tapping) screws not used for electrical connection of current-carrying parts, unless generating 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 unless the thread is formed by a swaging action                                       |                | N        |



| EN 60335-1:2012/A15:2021 |                                                                                                                                                                                         |                    |          |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|
| CL.                      | Requirement of the test                                                                                                                                                                 | Result--Remark     | Verdict  |
|                          | Thread-cutting and space-threaded screws used provide earthing continuity:                                                                                                              |                    | N        |
|                          | - it is not necessary to disturb the connection in normal use                                                                                                                           |                    | N        |
|                          | - two screws used for each connection                                                                                                                                                   |                    | N        |
| 28.4                     | Screws and nuts making mechanical connection between different parts of the appliance, and also making electrical connection or providing earthing continuity secured against loosening |                    | N        |
|                          | Rivets for current-carrying connections subject to torsion secured against loosening                                                                                                    |                    | N        |
| <b>29</b>                | <b>CREEPAGE DISTANCES, CLEARANCES AND DISTANCES THROUGH INSULATION</b>                                                                                                                  |                    | <b>P</b> |
|                          | Clearances, creepage distances and solid insulation withstand electrical stress                                                                                                         |                    | P        |
|                          | For coatings used on printed circuits boards to protect the microenvironment or to provide basic insulation, annex J applies                                                            |                    | N        |
| 29.1                     | Clearances not less than the values specified in table 15. taking into account the rated impulse voltage for the overvoltage categories of table 15                                     | See appended table | P        |
|                          | The values specified may be smaller for basic insulation and functional insulation if the clearance meets the impulse voltage test of clause 14                                         |                    | N        |
|                          | Appliances are in overvoltage category II                                                                                                                                               |                    | P        |
|                          | Clearances less than specified in table 16 not allowed for basic insulation of class 0 and class 01 appliance.                                                                          |                    | N        |
|                          | Or if pollution degree 3 is applicable                                                                                                                                                  |                    | N        |
|                          | Compliance is checked by inspection and measurements as specified                                                                                                                       |                    | P        |
| 29.1.1                   | Clearances of basic insulation withstand the overvoltages, taking into account the rated impulse voltage                                                                                |                    | N        |
|                          | 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 assumed to be bare conductors, but the clearances specified in table 16 are reduced by 0.5mm for rated impulse voltages of at least 1500V              |                    | N        |



| EN 60335-1:2012/A15:2021 |                                                                                                                                                                                                                                                                                                      |                |         |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------|
| CL.                      | Requirement of the test                                                                                                                                                                                                                                                                              | Result--Remark | Verdict |
| 29.1.2                   | Clearances of supplementary insulation not less than those specified for basic insulation in table 16                                                                                                                                                                                                |                | N       |
| 29.1.3                   | Cearances of reinforced insulation not less than those specified for basic insulation in table 16, but using the next higher step for rated impulse voltage                                                                                                                                          |                | N       |
| 29.1.4                   | For functional insulation, the values of table 16 are applicable, unless                                                                                                                                                                                                                             |                | P       |
|                          | The appliance complies with clause 19 with the functional insulation short-circuited                                                                                                                                                                                                                 |                | N       |
|                          | Clearances at crossover points of lacquered conductors not measured                                                                                                                                                                                                                                  |                | N       |
|                          | Clearance between surfaces of PTC heating elements may be reduced to 1mm                                                                                                                                                                                                                             |                | N       |
|                          | Lacquered conductors of windings assumed to be bare conductors, but the clearances specified in table 16 are reduced by 0.5mm for rated impulse voltages of at least 1500V                                                                                                                           |                | N       |
| 29.1.5                   | Appliances having higher working voltage than rated voltage, the voltage used for determining clearances from table 16 is the sum of the rated impulse voltage and the difference between the peak value of the working voltage and the peak value of the rated voltage                              |                | 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, gut using the next lower step for rated impulse voltage |                | N       |
|                          | Circuits supplied with a voltage lower than rated voltage, clearances of functional insulation 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                                                                                                                                                          |                | P       |
|                          | Pollution degree 2 applies, unless                                                                                                                                                                                                                                                                   |                | N       |
|                          | Precautions taken to protect the insulation; pollution degree 1                                                                                                                                                                                                                                      |                | N       |
|                          | Insulation subjected to conductive pollution; pollution degree 3                                                                                                                                                                                                                                     |                | N       |



| EN 60335-1:2012/A15:2021 |                                                                                                                                                                                                                  |                |          |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------|
| CL.                      | Requirement of the test                                                                                                                                                                                          | Result--Remark | Verdict  |
|                          | Compliance is checked by inspection and measurements as specified                                                                                                                                                |                | N        |
| 29.2.1                   | Creepage distances of basic insulation not less than specified in table 17                                                                                                                                       |                | P        |
|                          | For pollution degree 1, 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 as specified for basic insulation in table 17                                                                                                            |                | P        |
| 29.2.3                   | Creepage distances of reinforced insulation at least double as specified for basic insulation in table 17                                                                                                        |                | P        |
| 29.2.4                   | Creepage distances of functional insulation not less than specified in table 18                                                                                                                                  |                | P        |
|                          | Creepage distances may be reduced if the appliance complies with clause 19 with the functional insulation short-circuited                                                                                        |                | N        |
| 29.3                     | Solid insulation having a minimum thickness of 1mm for supplementary insulation.                                                                                                                                 |                | P        |
|                          | And 2mm of reinforced insulation                                                                                                                                                                                 |                | P        |
|                          | This requirement does not apply if the supplementary insulation, other than mica or similar scaly material. Consists of at least two layers, each of the layers withstands the electric strength of 16.3         |                | N        |
|                          | This requirement does not apply if the reinforced insulation, other than mica or similar scaly material, consists of at least three layers, any two layers together withstand the electric strength test of 16.3 |                | P        |
|                          | This requirement also does not apply to inaccessible insulation and does not exceed the maximum permissible temperature values, or                                                                               |                | P        |
|                          | If the insulation, after conditioning as specified, withstands the electric strength test of 16.3                                                                                                                |                | P        |
|                          |                                                                                                                                                                                                                  |                |          |
| <b>30</b>                | <b>RESISTANCE TO HEAT, FIRE AND TRACKING</b>                                                                                                                                                                     |                | <b>P</b> |
| 30.1                     | External parts of non-metallic material                                                                                                                                                                          |                | P        |
|                          | Parts supporting live parts and                                                                                                                                                                                  |                | P        |
|                          | parts providing supplementary or reinforced insulation sufficiently resistant to heat                                                                                                                            |                | N        |
|                          | Sufficiently resistant to heat                                                                                                                                                                                   |                | N        |



| EN 60335-1:2012/A15:2021 |                                                                                                                                                                                                                   |                |         |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------|
| CL.                      | Requirement of the test                                                                                                                                                                                           | Result--Remark | Verdict |
|                          | Ball-pressure test according to IEC 60695-10-2                                                                                                                                                                    |                | P       |
|                          | External parts:at 40°C plus the maximum temperature rise determined during the test of clause 11, or at 75°C, whichever is the higher;                                                                            |                | P       |
|                          | Parts supporting live parts: at 40°C plus the maximum temperature rise determined during the test of clause 11, or at 125°C, whichever is the higher;                                                             |                | P       |
|                          | Parts providing supplementary or reinforced insulation, 25°C plus maximum temperature rise determined during the test of clause 19, if higher;                                                                    |                | N       |
| 30.2                     | Relevant parts of non-metallic material adequately resistant to ignition and spread of fire                                                                                                                       |                | N       |
|                          | For other appliances, 30.2.2 is applicable                                                                                                                                                                        |                | N       |
| 30.2.1                   | Glow-wire test of IEC 60695-2-11 at 550°C, unless                                                                                                                                                                 |                | 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 meet the requirements is ISO9772 for category FH3 material                                                                                               |                | N       |
| 30.2.2                   | Appliance operated while attended, parts of insulating material supporting current-carrying connections and parts within a distance of 3mm subjected to the glow-wire test of IEC 60695-2-11 at a temperature of: |                | P       |
|                          | -750°C, for connections carrying a current exceeding 0.5A during normal operation                                                                                                                                 |                | P       |
|                          | -650°C, for other connections                                                                                                                                                                                     |                | N       |
|                          | Test not applicable to conditions as specified                                                                                                                                                                    |                | N       |
| 30.2.3                   | Appliances operated while unattended, tested as specified in 30.2.3.1 and 30.2.3.2                                                                                                                                |                | N       |
|                          | Test not applicable to conditions as specified                                                                                                                                                                    |                | N       |
| 30.2.3.1                 | Parts of insulating material supporting connections carrying a current exceeding 0.2A during normal operation, and                                                                                                |                | P       |
|                          | Parts of insulating material within a distance of 3mm                                                                                                                                                             |                | N       |
|                          | Having a glow-wire flammability index of at least 850°C according to IEC 60695-2-12                                                                                                                               |                | P       |
| 30.2.3.2                 | Parts of insulating material supporting current-carrying connetions, and                                                                                                                                          |                | N       |



| EN 60335-1:2012/A15:2021 |                                                                                                                                                      |                |          |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------|
| CL.                      | Requirement of the test                                                                                                                              | Result--Remark | Verdict  |
|                          | Parts of insulating material within a distance of 3mm                                                                                                |                | N        |
|                          | Subjected to glow-wire test of IEC 60695-2-11                                                                                                        |                | N        |
|                          | Test not carried out on material having a glow-wire ignition temperature according to IEC 60695-2-13 as specified                                    |                | N        |
|                          | Glow-wire test of IEC 60695-2-11, the temperature being:                                                                                             |                | N        |
|                          | - 750°C, for connections carrying a current exceeding 0.2A during normal operation                                                                   |                | N        |
|                          | -650°C, for other connections                                                                                                                        |                | N        |
|                          | Parts that during the test produce a flame persisting longer than 2 s, tested as specified                                                           |                | N        |
|                          | If a flame persists longer than 2 s during the test, parts above the connection, as specified, subjected to the needle-flame test of annex E, unless |                | N        |
|                          | The material is 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 needle-flame test of annex E                                                                    |                | N        |
|                          | Test not applicable to conditions as specified                                                                                                       |                | N        |
|                          |                                                                                                                                                      |                |          |
| <b>31</b>                | <b>RESISTANCE TO RUSTING</b>                                                                                                                         |                | <b>P</b> |
|                          | Relevant ferrous parts adequately protected against rusting                                                                                          |                | P        |
|                          |                                                                                                                                                      |                |          |
| <b>32</b>                | <b>RADIATION, TOXICITY AND SIMILAR HAZARDS</b>                                                                                                       |                | <b>P</b> |
|                          | Appliance does not emit harmful radiation                                                                                                            |                | P        |
|                          | Appliance does not present a toxic or similar hazard                                                                                                 |                | P        |



| TABLE: Critical components list |              |           |                       |                |
|---------------------------------|--------------|-----------|-----------------------|----------------|
| components                      | Manufacturer | Type/mode | Technical data        | Certified mark |
| Housing                         | various      | various   | V-0, Min. 130°C       | UL             |
| Plastic                         | various      | various   | AC500V 120°C          | UL             |
| Screw                           | various      | various   | AC230V 50/60Hz 5r/min | UL             |
| Plug                            | various      | various   | AC230V 50/60Hz 5r/min | UL             |
| PCB board                       | various      | various   | AC230V 50/60Hz 5r/min | UL             |
| Supplementary information:      |              |           |                       |                |

## Photographs - Constructional Details

Photo 1 Appearance of EUT



Photo 2 Appearance of EUT



**Photo 3 Appearance of EUT**



**Photo 4 Appearance of EUT**



**Photo 5 Appearance of EUT**



**END OF REPORT**