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Bureau Veritas Saudi Arabia Testing Services

<b>TEST REPORT</b> <b>IEC 60335-2-29</b> <b>Safety of household and similar electrical appliances</b> <b>Part 2-29: Particular requirements for battery chargers</b>	
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Applicant's name .....	POWER & CONTROL COMPANY FOR TRADING
Address.....	60 ST. Al Malaz district, Ar Riyadh, 46035, Ar Riyadh,KSA
<b>Test specification:</b> <b>Standard .....</b> IEC 60335-2-29:2016, AMD1:2019 <b>Test procedure.....</b> IEC <b>Non-standard test method.....</b> N/A	
 	 
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<b>Test item description .....</b>	<b>Battery charger</b>	
<b>Trade Mark .....</b>	<b>VTEKE</b>	
<b>Manufacturer .....</b>	<b>VTEKE</b>	
<b>Model/Type reference .....</b>	<b>VBC 1210, VBC 1205, VBC 2405, VBC 2410</b>	
<b>Ratings .....</b>	<b>Input: 150-270V~; 50/60Hz; 140W Output: 12/24V DC ; 10A</b>	
<b>Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):</b>		
<input checked="" type="checkbox"/>	<b>Testing Laboratory .....</b>	Bureau Veritas Saudi Arabia Testing Services
<b>Testing location/ address .....</b>		P.O. Box 28019 Dammam 31437, Kingdom of Saudi Arabia
<b>Tested by (name, function, signature) .....</b>		Abderrahmen Toumi, Senior Lab Technician
<b>Reviewed by (name, function, signature) ....</b>		Abdulfattah Saleh, Asst. Lab Manager
<b>Approved by (name, function, signature) ....</b>		Anan Mustafa, Lab Manager
<b>List of Attachments (including a total number of pages in each attachment):</b>		
Appendix 1: Photos of samples under test (1 page)		
<b>Summary of testing:</b>		
<b>Tests performed (name of test and test clause):</b>		<b>Testing location:</b>
The tests were performed on the samples of Battery charger		Bureau Veritas Saudi Arabia Testing Services
The sample was tested according to: IEC 60335-2-29:2016, AMD1:2019		P.O. Box 28019 Dammam 31437, Kingdom of Saudi Arabia
<b>The test results were found satisfactory.</b>		

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

None

☒ **The product fulfils the requirements of IEC 60335-2-29:2016, AMD1:2019****Copy of marking plate:**

N/A

<b>Test item particulars .....</b>	<b>Battery charger</b>
<b>Classification of installation and use .....</b>	Class I. IPX0
<b>Supply Connection.....</b>	Terminal Connections
<b>.....</b>	-
<b>Possible test case verdicts:</b>	
- 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)
<b>Testing .....</b>	Safety Requirements
<b>Date of receipt of test item .....</b>	04-06-2023
<b>Date (s) of performance of tests .....</b>	04-06-2023 to 22-06-2023
<b>General remarks:</b>	
"(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 <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.	
When differences exist; they shall be identified in the General product information section.	
<b>Name and address of factory (ies).....</b>	VTEKE TURKEY
<b>General product information and other remarks :</b>	
1. The Appliance is Battery charger 2. The signal interconnection are provided with the appliance. 3. Tests accredited by: (1) SAC, (2) GAC, (3) <b>SAC &amp; GAC</b>	

Clause	Requirement	Result / Remark	Verdict
5	GENERAL CONDITIONS FOR THE TESTS		
	Tests performed according to clause 5, e.g. nature of supply, sequence of testing, etc.		P
5.2	If the test of 21.101 is carried out two additional battery chargers required (IEC 60335-2-29)		P
5.101	Battery chargers tested as motor-operated appliances (IEC 60335-2-29)		P
6	CLASSIFICATION		
6.1	Protection against electric shock: Class 0, 0I, I, II, III	Class I	P
	For a class III construction with a detachable power supply part the appliance is classified according to the detachable power supply part		N/A
6.2	Protection against harmful ingress of water	IPX0	N/A
	Battery chargers for outdoor use at least IPX4 (IEC 60335-2-29)		N/A
8	PROTECTION AGAINST ACCESS TO LIVE PARTS		
8.1	Appliances shall be constructed and enclosed so that there is adequate protection against accidental contact with live parts.	Adequate protection provided	P
8.1.1	The requirement of 8.1 applies for all positions of the appliance when it is operated as in normal use, and after the removal of detachable parts.		P
	Test probe B of IEC 61032 is applied without appreciable force, the appliance being in every possible position except that appliances normally used on the floor and having a mass exceeding 40 kg are not tilted.		P
	Through openings, the test probe is applied to any depth that the probe will permit and is rotated or angled before, during and after insertion to any position.		P
	If the opening does not allow the entry of the probe, the force on the probe in the straight position is increased to 20 N. If the probe then enters the opening, the test is repeated with the probe in the angled position.		P

Clause	Requirement	Result / Remark	Verdict
	It shall not be possible to touch live parts or live parts protected only by lacquer, enamel, ordinary paper, cotton, oxide film, beads, or sealing compound except self-hardening resins, with the probe.	Not possible	P
8.1.2	Test probe 13 of IEC 61032 is applied with a force not exceeding 1 N through openings in class 0 appliances, class II appliances and class II constructions, except for those giving access to lamp caps and live parts in socket-outlets.		P
	It shall not be possible to touch live parts with the test probe.	Not possible	P
8.1.3	Instead of test probe B and test probe 13, for appliances other than those of class II, test probe 41 of IEC 61032 is applied with a force not exceeding 1 N to live parts of visibly glowing heating elements, all poles of which can be disconnected by a single switching action.		N/A
	It is also applied to parts supporting such elements, provided that it is obvious from the outside of the appliance, without removing covers and similar parts, that these supporting parts are in contact with the element.		N/A
	It shall not be possible to touch these live parts.		N/A
8.1.4	An accessible part is not considered to be live if:		P
	- the part is supplied at safety extra-low voltage, provided that:		P
	• for a.c., the peak value of the voltage does not exceed 42,4 V;		N/A
	• for d.c., the voltage does not exceed 42,4 V;	Measured max. 13,2V without battery fitted	P
	- the part is separated from live parts by protective impedance.		N/A
	If protective impedance is used, the current between the part and the supply source shall not exceed 2 mA for d.c., its peak value shall not exceed 0,7 mA for a.c. and	Max. 0,14mA	P
	- for voltages having a peak value over 42,4 V up to and including 450 V, the capacitance shall not exceed 0,1 $\mu$ F;	0,0011 $\mu$ F	P

Clause	Requirement	Result / Remark	Verdict
	- for voltages having a peak value over 450 V up to and including 15 kV, the discharge shall not exceed 45 $\mu$ F;		N/A
	- for voltages having a peak value over 15 kV, the energy in the discharge shall not exceed 350 mJ.		N/A
8.1.5	Live parts of built-in appliances, fixed appliances and appliances delivered in separate units, shall be protected at least by basic insulation before installation or assembly.		N/A
8.2	Class II appliances and class II constructions shall be constructed and enclosed so that there is adequate protection against accidental contact with basic insulation and metal parts separated from live parts by basic insulation only.	Class I Appliances	N/A
	It shall only be possible to touch parts which are separated from live parts by double insulation or reinforced insulation.		N/A
15	MOISTURE RESISTANCE		
15.1	The enclosure of the appliance shall provide the degree of protection against moisture in accordance with the classification of the appliance.	No IP marking	N/A
15.1.1	Appliances other than those classified IPX0 are subjected to the tests of IEC 60529 as follows:		N/A
	- IPX1 appliances as described in sub clause 14.2.1;		N/A
	- IPX2 appliances as described in sub clause 14.2.2;		N/A
	- IPX3 appliances as described in sub clause 14.2.3a;		N/A
	- IPX4 appliances as described in sub clause 14.2.4a;		N/A
	- IPX5 appliances as described in sub clause 14.2.5;		N/A
	- IPX6 appliances as described in sub clause 14.2.6;		N/A

Clause	Requirement	Result / Remark	Verdict
	- IPX7 appliances as described in sub clause 14.2.7. For this test the appliance is immersed in water containing approximately 1 % NaCl.		N/A
	Water valves containing live parts and that are incorporated in external hoses for connection of an appliance to the water mains are subjected to the test specified for IPX7 appliances.		N/A
15.1.2	Hand-held appliances are turned continuously through the most unfavorable positions during the test.	Not hand-held appliance	N/A
	Built-in appliances are installed in accordance with the instructions.	Not built-in appliance	N/A
	Appliances normally used on the floor or table are placed on a horizontal imperforated support having a diameter of twice the oscillating tube radius minus 15 cm.		N/A
	Appliances normally fixed to a wall and appliances with pins for insertion into socket-outlets are mounted as in normal use in the centre of a wooden board having dimensions which are 15 cm ± 5 cm in excess of those of the orthogonal projection of the appliance on the board.		N/A
	For IPX3 appliances, the base of wall-mounted appliances is placed at the same level as the pivot axis of the oscillating tube.		N/A
	For IPX4 appliances, the horizontal centre line of the appliance is aligned with the pivot axis of the oscillating tube.		N/A
	If the instructions for wall-mounted appliances state that the appliance is to be placed close to the floor level and specifies a distance, a board is placed under the appliance at that distance.		N/A
	Appliances normally fixed to a ceiling are mounted underneath a horizontal unperforated support that is constructed to prevent water spraying onto its top surface.		N/A
	For IPX4 appliances, the movement of the tube is limited to two times 90° from the vertical for a period of 5 min.		N/A



Clause	Requirement	Result / Remark	Verdict
	Appliances with type X attachment, except those having a specially prepared cord, are fitted with the lightest permissible type of flexible cord of the smallest cross-sectional area specified in Table 13.		N/A
	Detachable parts are removed and subjected, if necessary, to the relevant treatment with the main part. However, if the instructions state that a part has to be removed for user maintenance and a tool is needed, this part is not removed.		N/A
	The appliance shall then withstand the electric strength test as follows (§ 16.3)		N/A
	The insulation is subjected to a voltage of substantially sinusoidal waveform having a frequency of 50 Hz or 60 Hz for 1 min.		N/A
	Initially, not more than half the prescribed voltage is applied, then it is raised gradually to the full value.		
	No breakdown shall occur during the test.		N/A
	There shall be no trace of water on insulation which could result in a reduction of clearances and creepage distances below the values specified in clause 29.		N/A
15.2	Appliances subject to spillage of liquid in normal use shall be constructed so that such spillage does not affect their electrical insulation:		N/A
	Appliances with type X attachment, except those having a specially prepared cord, are fitted with the lightest permissible type of flexible cord of the smallest cross-sectional area specified in Table 13.		N/A
	Appliances incorporating an appliance inlet are tested with or without an appropriate connector in position, whichever is most unfavourable.		N/A
	Detachable parts are removed.		N/A
	Compliance is checked by the following test:		N/A

Clause	Requirement	Result / Remark	Verdict
	The liquid container of the appliance is completely filled with water containing approximately 1 % NaCl and a further quantity, equal to 15 % of the capacity of the container or 0.25 l, whichever is the greater, is poured in steadily over a period of 1 min.		N/A
	The appliance shall then withstand the electric strength test as follows (§ 16.3).		N/A
	The insulation is subjected to a voltage of substantially sinusoidal waveform having a frequency of 50 Hz or 60 Hz for 1 min.		N/A
	Initially, not more than half the prescribed voltage is applied, then it is raised gradually to the full value.		N/A
	No breakdown shall occur during the test.		N/A
	There shall be no trace of water on insulation which could result in a reduction of clearances and creepage distances below the values specified in clause 29.		N/A
15.3	Appliances shall be proof against humid conditions that may occur in normal use.		P
	Appliances are placed in normal ambient conditions for 24 h.	As specified	P
	The humidity test is carried out for 48 h in a humidity cabinet containing air with a relative humidity of $(93 \pm 3) \%$ .	48 hours at 93% RH	P
	The temperature of the air is maintained within 1 K of any convenient value $t$ between 20°C and 30°C.	48 hours at 25°C	P
	The appliance shall then withstand the electric strength test as follows (§ 16.3).	No breakdown	P
	The insulation is subjected to a voltage of substantially sinusoidal waveform having a frequency of 50 Hz or 60 Hz for 1 min.	At 60Hz for 01Min.	P
	Initially, not more than half the prescribed voltage is applied, then it is raised gradually to the full value.		P
	No breakdown shall occur during the test.	No breakdown	P

Clause	Requirement	Result / Remark	Verdict
16	LEAKAGE CURRENT AND ELECTRIC STRENGTH		
16.1	The leakage current of the appliance shall not be excessive and its electric strength shall be adequate.		P
	Compliance is checked by the tests of 16.2 and 16.3.		P
16.2	An a.c. test voltage is applied between live parts and accessible metal parts that are connected to metal foil having an area not exceeding 20cm × 10cm in contact with accessible surfaces of insulating materials.	106V/254,4 V	P
	The test voltage is:		P
	- 1.06 times rated voltage, for single-phase appliances;	254.4V	P
	- 1.06 times rated voltage, divided by $\sqrt{3}$ , for three-phase appliances.		N/A
	The leakage current is measured within 5 s after the application of the test voltage.		P
	The leakage current shall not exceed the following values:	See below	P
	- for class II appliances 0.25 mA		N/A
	- for class 0, class 0I and class III appliances 0.5 mA		N/A
	- for portable class I appliances 0.75 mA	0.013mA	P
	- for stationary class I motor-operated appliances 3.5 mA		N/A
	- for stationary class I heating appliances 0.75 mA or 0.75 mA per kW rated power input of the appliance with a maximum of 5 mA, whichever is higher		N/A
	For measuring the leakage current, a low impedance ammeter capable of measuring the true r.m.s. value of current may be used.		P
16.3	The insulation is subjected to a voltage of substantially sinusoidal waveform having a frequency of 50 Hz or 60 Hz for 1 min. The values of the test voltage for different types of insulation are given in table 7.	No breakdown	P

Clause	Requirement	Result / Remark	Verdict
	Initially, not more than half the prescribed voltage is applied, then it is raised gradually to the full value.		P
	No breakdown shall occur during the test.	No breakdown	P
19	ABNORMAL OPERATION		
19.1	Appliances shall be constructed so that as a result of abnormal or careless operation, the risk of fire, mechanical damage impairing safety or protection against electric shock is obviated as far as is practicable.	See Next	P
	Electronic circuits shall be designed and applied so that a fault condition will not render the appliance unsafe with regard to electric shock, fire hazard, mechanical hazard or dangerous malfunction.		P
	Appliances incorporating electronic circuits are also subjected to the tests of 19.11 and 19.12, as applicable.		P
335-2-29: 19.1	Modification:		P
	Instead of the lists specified, battery chargers are subjected to the tests of 19.11, 19.12 and 19.101 to 19.103, as applicable.		P
19.4	Test conditions as in clause 11, any control limiting the temperature during tests of clause 11 short-circuited		N/A
19.5	Test of 19.4 repeated on Class 0I and I appliances with tubular sheathed or embedded heating elements. No short-circuiting, but one end of the element connected to the sheath	No such component	N/A
19.6	Appliances with PTC heating elements tested at rated voltage, establishing steady conditions	No PTC heating elements	N/A
19.7	Stalling test by locking the rotor if the locked rotor torque is smaller than the full load torque, or		N/A
	locking moving parts of other appliances		N/A
	Locked rotor, capacitors open-circuited one at a time		N/A
	Test repeated with capacitors short-circuited one at a time, unless		N/A
	the capacitor is of class S2 or S3 of IEC 60252-1		N/A

Clause	Requirement	Result / Remark	Verdict
	Appliances with timer or programmer supplied with rated voltage for each of the tests, for a period equal to the maximum period allowed		N/A
	An electronic timer or programmer that operates to ensure compliance with the test before the maximum period under the conditions of Clause 11 is reached, is a protective electronic circuit		N/A
	Other appliances supplied with rated voltage for a period as specified		N/A
	Winding temperatures not exceeding values specified in table 8		N/A
19.8	Multi-phase motors operated at rated voltage with one phase disconnected		N/A
19.9	Running overload test on appliances incorporating motors intended to be remotely or automatically controlled or liable to be operated continuously		N/A
19.10	Series motor operated at 1,3 times rated voltage for 1 min (V)		N/A
	During the test, parts not being ejected from the appliance		N/A
19.11	Electronic circuits are 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		P
	Appliances incorporating an electronic circuit that relies upon a programmable component to function correctly are subjected to the test of 19.11.4.8, unless restarting at any point in the operating cycle after interruption of operation due to a supply voltage dip will not result in a hazard. The test is carried out after removal of all batteries and other components intended to maintain the programmable component supply voltage during mains supply voltage dips, interruptions and variations.		N/A
	Appliances having a device with an off position obtained by electronic disconnection, or a device that can place the appliance in a stand-by mode, are subjected to the tests of 19.11.4.		N/A

Clause	Requirement	Result / Remark	Verdict
	If the safety of the appliance under any of the fault conditions depends on the operation of a miniature fuse-link complying with IEC 60127, the test of 19.12 is carried out.		N/A
	During and after each test, the temperature of the windings shall not exceed the values specified in table 8. However, these limits do not apply to fail-safe transformers complying with sub-clause 15.5 of IEC 61558-1. The appliance shall comply with the conditions specified in 19.13. Any current flowing through protective impedance shall not exceed the limits specified in 8.1.4.		N/A
	If a conductor of a printed circuit board becomes open-circuited, the appliance is considered to have withstood the particular test, provided both of the following conditions are met		N/A
	– the base material of the printed circuit board withstands the test of annex E,		N/A
	– any loosened conductor does not reduce clearances or creepage distances between live parts and accessible metal parts below the values specified in clause 29,		N/A
19.11.1	Fault conditions a) to f) specified in 19.11.2 are not applied to circuits or parts of circuits when both of the following conditions are met:	Output circuit is low power circuit	P
	The electronic circuit is a low-power circuit as described below;		P
	Protection against electric shock, fire hazard, mechanical hazard or dangerous malfunction of other parts of the appliance does not rely on the correct functioning of the electronic circuit.		P
19.11.2	The following fault conditions are considered and, if necessary, applied one at a time, consequential faults being taken into consideration:		P
a)	Short circuit of functional insulation if clearances or creepage distances are less than the values specified in clause 29;		N/A
b)	Open circuit at the terminals of any component;	Open circuit of diode	P

Clause	Requirement	Result / Remark	Verdict
c)	Short circuit of capacitors, unless they comply with IEC 60384-14;	Short circuit of capacitor	P
d)	Short circuit of any two terminals of an electronic component, other than an integrated circuit. This fault condition is not applied between the two circuits of an opto-coupler;	Short circuit of diode	P
e)	Failure of triacs in the diode mode;		N/A
f)	Failure of an integrated circuit. All possible output signals are considered for faults occurring within the integrated circuit. If it can be shown that a particular output signal is unlikely to occur, then the relevant fault is not considered		N/A
g)	Failure of an electronic power switching device in a partial turn-on mode with loss of gate (base) control. During this test, winding temperatures shall not exceed the values given in 19.7.		N/A
	Fault condition f) is applied to encapsulated and similar components if the circuit cannot be assessed by other methods.		N/A
	For simulation of the fault conditions, the appliance is operated under the conditions specified in clause 11 but supplied at rated voltage.		N/A
	When any of the fault conditions are simulated, the duration of the test is:		N/A
	As specified in 11.7 but only for one operating cycle and only if the fault cannot be recognized by the user, for example, a change in temperature;		N/A
	As specified in 19.7, if the fault can be recognized by the user, for example, when the motor of a kitchen machine stops;		N/A
	Until steady conditions are established, for circuits continuously connected to the supply mains, for example, stand-by circuits.		N/A
	In each case, the test is ended if a non-self-resetting interruption of the supply occurs within the appliance.		N/A

Clause	Requirement	Result / Remark	Verdict
19.11.3	If the appliance incorporates a protective electronic circuit which operates to ensure compliance with clause 19, the relevant test is repeated with a single fault simulated, as indicated in a) to f) of 19.11.2.		N/A
19.11.4	Appliances having a device with an off position obtained by electronic disconnection, or a device that can be placed in the stand-by mode, are subjected to the tests of 19.11.4.1 to 19.11.4.7. The tests are carried out with the appliance supplied at rated voltage, the device being set in the off position or in the stand-by mode.		N/A
	Appliances incorporating a protective electronic circuit are subjected to the tests of 19.11.4.1 to 19.11.4.7. The tests are carried out after the protective electronic circuit has operated during the relevant tests of Clause 19 except 19.2, 19.6 and 19.11.3. However, appliances that are operated for 30 s or 5 min during the test of 19.7 are not subjected to the tests for electromagnetic phenomena.		N/A
19.11.4.1	The appliance is subjected to electrostatic discharges in accordance with IEC 61000-4-2, test level 4 being applicable. Ten discharges having a positive polarity and ten discharges having a negative polarity are applied at each pre-selected point.		N/A
19.11.4.2	The appliance is subjected to radiated fields in accordance with IEC 61000-4-3, test level 3 being applicable.		N/A
19.11.4.3	The appliance is subjected to fast transient bursts in accordance with IEC 61000-4-4. Test level 3 is applicable for signal and control lines. Test level 4 is applicable for the power supply lines. The bursts are applied for 2 min with a positive polarity and for 2 min with a negative polarity.		N/A



Clause	Requirement	Result / Remark	Verdict
19.11.4	Appliances having a device with an off position obtained by electronic disconnection, or a device that can be placed in the stand-by mode, are subjected to the tests of 19.11.4.1 to 19.11.4.7. The tests are carried out with the appliance supplied at rated voltage, the device being set in the off position or in the stand-by mode.		N/A
19.11.4.4	The power supply terminals of the appliance are subjected to voltage surges in accordance with IEC 61000-4-5, five positive impulses and five negative impulses being applied at the selected points. Test level 3 is applicable for the line-to-line coupling mode, a generator having a source impedance of 2 $\Omega$ being used. Test level 4 is applicable for the line-to-earth coupling mode, a generator having a source impedance of 12 $\Omega$ being used.		N/A
	Earthed heating elements in class I appliances are disconnected during this test.		N/A
19.11.4.5	The appliance is subjected to injected currents in accordance with IEC 61000-4-6, test level 3 being applicable. During the test, all frequencies between 0,15 MHz to 80 MHz are covered.		N/A
19.11.4.6	The appliance is subjected to the Class 3 voltage dips and interruptions in accordance with IEC 61000-4-11. The values specified in Table 1 and Table 2 of IEC 61000-4-11 are applied at zero crossing of the supply voltage.		N/A
19.11.4.7	The appliance is subjected to mains signals in accordance with IEC 61000-4-13, test level class 2 being applicable.		N/A
19.11.4.8	The appliance is supplied at rated voltage and operated under normal operation. After approximately 60 s, the power supply voltage is reduced to a level such that the appliance ceases to respond to user inputs or parts controlled by the programmable component cease to operate, whichever occurs first. This value of supply voltage is recorded.		N/A

Clause	Requirement	Result / Remark	Verdict
	The appliance is supplied at rated voltage and operated under normal operation. The voltage is then reduced to a value of approximately 10 % less than the recorded voltage. It is held at this value for approximately 60 s and then increased to rated voltage. The rate of decrease and increase of the power supply voltage is to be approximately 10 V/s.		N/A
19.12	If safety of the appliance depends upon the operation of a miniature fuse-link complying with IEC 60127 during any of the fault conditions specified in 19.11.2, the test is repeated but with the miniature fuse-link replaced by an ammeter. If the current measured:		N/A
	Does not exceed 2,1 times the rated current of the fuse-link, the circuit is not considered to be adequately protected and the test is carried out with the fuse-link short-circuited;		N/A
	Is at least 2,75 times the rated current of the fuse-link, the circuit is considered to be adequately protected;		N/A
	Is between 2,1 times and 2,75 times the rated current of the fuse-link, the fuse link is short-circuited and the test is carried out		N/A
	For the relevant period or for 30 min, whichever is the shorter, for quick acting fuse links;		N/A
	For the relevant period or for 2 min, whichever is the shorter, for time lag fuse-links.		N/A
19.13	During the tests the appliance shall not emit flames, molten metal, or poisonous or ignitable gas in hazardous amounts,	No flame/No molten	P
	After the tests, and when the appliance has cooled to approximately room temperature, compliance with Clause 8 shall not be impaired and the appliance shall comply with 20.2 if it can still be operated.	See clause 8	P
	When the insulation, other than that of class III appliances, has cooled down to approximately room temperature, it shall withstand the electric strength test of 16.3, the test voltage, however, being as specified in table 4.	No Breakdown occurred	p
335-2-29: 19.13	Addition:		P

Clause	Requirement	Result / Remark	Verdict
	During the tests, the values of table 8 apply.	During short circuit of component test as switched on, the circuit become damage	P
	There shall be no rupture of the battery.	No rupture of the battery	P
19.14	Appliances are operated under the conditions of Clause 11. Any contactor or relay contact that operates under the conditions of Clause 11 is short-circuited.	No relay or contactor	N/A
335-2-29: 19.101	Battery chargers are supplied at rated voltage and operated under normal operation, any control which operates during the test of clause 11 being short circuited.	No control	N/A
335-2-29: 19.102	The battery charger is connected to a fully charged battery, the connections being in reverse to normal use. The battery is of the type and has the largest capacity specified in the instructions for use; the capacity, however, of a lead acid battery being 70 Ah. The battery charger is operated while supplied at rated voltage.	Not possible to revrese polarity	N/A
335-2-29: 19.103	Battery chargers in combination with a d.c. distribution board are supplied at rated voltage and operated under normal operation until steady conditions are established.		N/A
	The load is increased to raise the output current by 10% until steady conditions are again established. This procedure is repeated until the protective device operates.		N/A
23	INTERNAL WIRING		
23.1	Wire ways shall be smooth and free from sharp edges.		P
	Wires shall be protected so that they do not come into contact with burrs, cooling fins or similar edges which may cause damage to their insulation.		P
	Holes in metal through which insulated wires pass shall have smooth well-rounded surfaces or be provided with bushings.		N/A
	Wiring shall be effectively prevented from coming into contact with moving parts.		N/A

Clause	Requirement	Result / Remark	Verdict
23.2	Beads and similar ceramic insulators on live wires shall be fixed or located so that they cannot change their position or rest on sharp edges.	No beads	N/A
23.3	Different parts of an appliance that can move relative to each other in normal use or during user maintenance shall not cause undue stress to electrical connections and internal conductors, including those providing earthing continuity.	No movable conductors	N/A
	Flexible metallic tubes shall not cause damage to the insulation of the conductors contained within them.		N/A
	Open-coil springs shall not be used to protect the wiring.		N/A
	Compliance is checked by inspection and by the following test.		N/A
	If flexing occurs in normal use, the appliance is placed in the normal position of use and is supplied at rated voltage and operated under normal operation.		N/A
	The movable part is moved backwards and forwards, so that the conductor is flexed through the largest angle allowed by the construction, the rate of flexing being 30 per minute. The number of flexing is		N/A
	– 10 000, for conductors flexed during normal use;		N/A
	– 100, for conductors flexed during user maintenance.		N/A
	The appliance shall not be damaged to the extent that compliance with this standard is impaired and it shall be fit for further use.		N/A
	The wiring and its connections shall withstand the electric strength test of 16.3, the test voltage being reduced to 1 000 V and applied between live parts and accessible metal parts only		N/A
23.4	Bare internal wiring shall be rigid and fixed so that, in normal use, clearances or creepage distances cannot be reduced below the values specified in clause 29.		N/A

Clause	Requirement	Result / Remark	Verdict
23.5	The insulation of internal wiring shall withstand the electrical stress likely to occur in normal use.		P
	Compliance is checked as follows:		P
	A voltage of 2000 V is applied for 15 min between the conductor and metal foil wrapped around the insulation.	2000V applied between Conductor and its insulation	P
	There shall be no breakdown.	No breakdown	P
23.6	When sleeving is used as supplementary insulation on internal wiring, it shall be retained in position by positive means.		N/A
23.7	Conductors identified by the colour combination green/yellow shall only be used for earthing conductors.		N/A
23.8	Aluminum wires shall not be used for internal wiring.	Not used	P
23.9	Stranded conductors shall not be consolidated by lead-tin soldering		P
23.10	The insulation and sheath of internal wiring, incorporated in external hoses for the connection of an appliance to the water mains, shall be at least equivalent to that of light polyvinyl chloride sheathed flexible cord (code designation 60227 IEC 52)		N/A
26	TERMINALS FOR EXTERNAL CONDUCTORS		
26.1	Appliances shall be provided with terminals or equally effective devices for the connection of external conductors. The terminals shall only be accessible after the removal of a non-detachable cover. However, earthing terminals may be accessible if a tool is required to make the connections and means are provided to clamp the wire independently from its connection.	No terminal Provided with plug adaptor (Consider as specially prepared cord, Type X attachment)	P
26.2	Appliances having type X attachment, except those having a specially prepared cord, and appliances for connection to fixed wiring shall be provided with terminals in which the connections are made by means of screws, nuts or similar devices, unless the connections are soldered.		N/A

Clause	Requirement	Result / Remark	Verdict
	The screws and nuts shall not be used to fix any other component except that they may also clamp internal conductors if these are arranged so that they are unlikely to be displaced when fitting the supply conductors.		N/A
	If soldered connections are used, the conductor shall be positioned or fixed so that reliance is not placed upon the soldering alone to maintain it in position.		N/A
26.3	Terminals for type X attachment and those for connection to fixed wiring shall be constructed so that they clamp the conductor between metal surfaces with sufficient contact pressure but without causing damage to the conductor.		N/A
26.4	Terminals for type X attachment, except type X attachments having a specially prepared cord, and terminals for connection to fixed wiring, shall not require special preparation of the conductor. They shall be constructed or placed so that the conductor cannot slip out when clamping screws or nuts are tightened.		N/A
26.5	Terminals for type X attachment shall be located or shielded so that if a wire of a stranded conductor escapes when the conductors are fitted, there is no risk of accidental connection to other parts that could result in a hazard.		N/A
<sup>335-2-29</sup> 26.5	Modification:		N/A
	This requirement does not apply to the terminals of the output circuit.		N/A
26.6	Terminals for type X attachment and for connection to fixed wiring shall allow the connection of conductors having the nominal cross-sectional areas shown in table 13.		N/A
26.7	Terminals for type X attachment shall be accessible after removal of a cover or part of the enclosure.		N/A
26.8	Terminals for the connection of fixed wiring, including the earthing terminal, shall be close to each other.		N/A

Clause	Requirement	Result / Remark	Verdict
26.9	Terminals of the pillar type shall be constructed and located so that the end of a conductor introduced into the hole is visible, or can pass beyond the threaded hole for a distance equal to half the nominal diameter of the screw but at least 2,5 mm.		N/A
26.10	Terminals with screw clamping and screw less terminals shall not be used for the connection of the conductors of flat twin tinsel cords unless the ends of the conductors are fitted with means suitable for use with screw terminals.		N/A
26.11	For appliances having type Y attachment or type Z attachment, soldered, welded, crimped or similar connections may be used for the connection of external conductors.		N/A
	For class II appliances, the conductor shall be positioned or fixed so that reliance is not placed upon the soldering, crimping or welding alone to maintain the conductor in position.		N/A
27	PROVISION FOR EARTHING		
27.1	Accessible metal parts of class 0I appliances and class I appliances that may become live in the event of an insulation fault, shall be permanently and reliably connected to an earthing terminal within the appliance or to the earthing contact of the appliance inlet.	Comply	P
	Earthing terminals and earthing conductors should not be connected to neutral terminal	Not connected	P
	Class 0, II and III appliances should have no provision for earthing	Class I	N/A
	Safety extra-low voltage circuits shall not be earthed unless they are protective extra-low voltage circuits		P
27.2	The clamping means of earthing terminals shall be adequately secured against accidental loosening.	Adequately secured	P
27.3	If a detachable part having an earth connection is plugged into another part of the appliance.		N/A

Clause	Requirement	Result / Remark	Verdict
27.4	All parts of the earthing terminal intended for the connection of external conductors shall be such that there is no risk of corrosion resulting from contact between these parts and the copper of the earthing conductor or any other metal in contact with these parts.		N/A
27.5	The connection between the earthing terminal or earthing contact and earthed metal parts shall have low resistance.		P
	Resistance not exceeding 0,1 $\Omega$ at the specified low-resistance test ( $\Omega$ )	Measured: 0.012 $\Omega$	P
27.6	The printed conductors of printed circuit boards shall not be used to provide earthing continuity in hand-held appliances.		P
30	RESISTANCE TO HEAT AND FIRE		
30.1	External parts of non-metallic material,	Enclosure and output termina	P
	parts supporting live parts, and	PCB and bobbin	P
	parts of thermoplastic material providing supplementary or reinforced insulation	Enclosure	P
	sufficiently resistant to heat		P
	Ball-pressure test according to IEC 60695-10-2		P
	External parts tested at 40 °C plus the maximum temperature rise determined during the test of clause 11, or at 75 °C, whichever is the higher; temperature (°C)	( see appended table)	P
	Parts supporting live parts tested at 40°C plus the maximum temperature rise determined during the test of clause 11, or at 125 °C, whichever is the higher; temperature (°C)	( see appended table)	P
30.2	Parts of non-metallic material resistant to ignition and spread of fire		P
30.2.1	Parts of non-metallic material subjected to the glow-wire test of IEC 60695-2-11 at 550°C	( see appended table)	P
30.2.2	Appliances operated while attended, parts of non-metallic material supporting current-carrying connections, and		N/A
	parts of non-metallic material within a distance of 3mm of such connections,		N/A



Clause	Requirement	Result / Remark	Verdict
30.2.3	Appliances operated while unattended, tested as specified in 30.2.3.1 and 30.2.3.2		P
	The tests are not applicable to conditions as specified:	Soldered connections on PCB and parts within a distance of 3 mm of these connections	P
30.2.4	Base material of printed circuit boards subjected to the needle-flame test of Annex E		N/A
	Test not applicable to conditions as specified	94V-0	P
31	RESISTANCE TO RUSTING		
	Relevant ferrous parts adequately protected against rusting		N/A
	Tests specified in part 2 when necessary		N/A
32	RADIATION, TOXICITY AND SIMILAR HAZARDS		
	Appliance does not emit harmful radiation or present a toxic or similar hazard due to their operation in normal use		P
	Compliance is checked by the limits or tests specified in part 2, if relevant		N/A

Appendix 1	Photo Documentation
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VBC 1210

