



Boulder Developments Ltd

LVD REPORT

Prepared For :	Boulder Developments Ltd Boulder Business Park Pioneer Way Lincoln LN6 0QR UK
Product Name:	Heat recovery ventilators and ventilators
Trade Name:	/
Main Test Model:	See model list
Additional:	/
Prepared By :	CTIC Testing Group (Guangdong) Co., Ltd. 201, Building A1 Lilang International Jewelry industrial Park, No.31, 2 07, No.154, Huachang Road, No.156, Huachang Road, Langkou Community, Dalang Street, Longhua District, Shenzhen City
Test Date:	Apr.23,2024-May.10,2024
Date of Report:	May.10,2024
Report No.:	CTICAB500249260042970AR

4Vvbah

C2HjaJ



Model list				
DHV-04/100B	DHV-15B	DHV-20B	DHV-25N	DHV-35N
DHV-40N	DHV-50N	DHV-60N	DHV-80N	DHV-100N
DHV-15DC	DHV-25DC	DHV-35DC	DHV-40DC	DHV-50DC
DHV-60DC	DHV-80DC	DHV-120DC	DHV-40DC(LH)	DHV-50DC(LH)
DHV-60DC(LH)	DHV-80DC(LH)	DHV-120DC(LH)	DHV-180DC	DHV-270DC
DHV-150M	DHV-200M	DHV-250M	DHV-300M	DHV-400M
DHV-500M	DHV-600M	EVM-32	EVM-42	EVP-32
EVP-42	/	/	/	/



Test judgement terms:	
Possible test case verdicts:	
- test case does not apply to the test object:	N/A
- test object does meet the requirement	P (Pass)
- test object does not meet the requirement:	F (Fail)
testing environment:	
temperature	15-25°C
Humidity	50-65%RH
Pressure	101kPa
General remarks:	
1. The report is invalid without "special test seal". 2. If the report is not tested, the signature of the approving personnel is invalid. 3. The report is invalid if altered. 4. This report may not be partially reproduced without permission. 5. The test results in this report are only valid for the tested samples. 6. Objections to this report should be raised within 15 days of receipt of the report.	

TEST REPORT DECLARATION

Applicant	:	Boulder Developments Ltd
Address	:	Boulder Business Park Pioneer Way Lincoln LN6 0QR UK
EUT Description	:	Heat recovery ventilators and ventilators
Model Number	:	See model list
Testing laboratory		
Name	:	CTIC Testing Group (Guangdong) Co., Ltd.
Address	:	201, Building A1 Lilang International Jewelry industrial Park, No.31, 207, No.154, Huachang Road, No.156, Huachang Road, Langkou Community, Dalang Street, Longhua District, Shenzhen City

Test Standards:

BS EN 60335-1:2012 + A2:2019

BS EN 60335-2-65:2003 + A11:2012

BS EN 62233:2008

The EUT described above is tested by CTIC Testing Group (Guangdong) Co., Ltd. Reliability Laboratory to determine the harsh environments from the EUT and ensure the Reliability to be compliance with the environments requirements of the EUT. CTIC Testing Group (Guangdong) Co., Ltd. Reliability Laboratory is assumed full responsibility for the accuracy of the test results.

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

Tested by:

Chen Gany

Reviewer:

Jack Zhou

Approved:

Wald

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Copy of marking plate:

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

(Typical)

Heat recovery ventilators and ventilators

Model: See model list

Rating: 220V

**UK
CA**



Boulder Developments Ltd

Made in China

Note:

- The above marking is the minimum requirements required by the safety standard. For the final production sample, the marking which do not give rise to misunderstanding may be added.
- Representative marking of model M1, marking of all models is identical except for model names.
- Caution markings are placed on rear enclosure surface.
- The height of CE mark shall not less than 5 mm.
- The height of WEEE mark shall not less than 7 mm.

For EU market, manufacturer's address is also marked. Full name and full address of EU importer and series number are also marked.



BS EN 60335-2-65:2003 + A11:2012			
Clause	Requirement Test	Result - Remark	Verdict
4	GENERAL REQUIREMENT		---
	Appliance shall be constructed so that in normal use they function safely so as to cause no danger to persons or surroundings, even in the event of carelessness that may occur in normal use		P
	In general this principle is achieved by fulfilling the relevant requirements specified in this standard and compliance is checked by carrying out all the relevant tests		P
5	GENERAL CONDITIONS FOR THE TESTS		---
	Unless otherwise specified, the tests are carried out in accordance with this clause		P
5.1	Tests according to this standard are type tests		P
5.2	Tests are carried out on a single appliance that shall withstand all the relevant tests		P
5.3	The tests are carried out in the order of the clauses		P
5.4	When testing appliances that are also supplied by other energies such as gas, the influence of their consumption has to be taken into account		N
5.5	The tests are carried out with the appliance placed in the most unfavourable position that may occur in normal use.		P
5.6	If the setting can be altered by the user, tests shall be adjusted to their most unfavourable setting		N
5.7	Tests are carried out at a temperature of 20°C+ ₋ 5°C.		P
5.8.1	For a.c. only, tested at rated frequency (EN 60 335-1:02)		N
5.8.2	For a.c./d.c., tested at the most unfavourable supply (EN 60 335-1:02)		P
5.8.3	For heating appliance, it operated at rated power input range		N
5.9	Alternative heating elements, the appliance is tested in the most unfavourable results		N
5.10	The tests are carried out on the appliance as supplied		P
6	CLASSIFICATION		---
6.1	Protection against electric shock: Class I, II, III	Class I	P
6.2	Protection against harmful ingress of water		N



7	MARKING		---
7.1	Rated voltage or voltage range (V)	220-240V	P
	Single-phase appliances: 230 V covered (EN 60 335-1:02)		P
	Multi-phase appliances: 400 V covered (EN 60 335-1:02)		N
	Nature of supply	AC	P
	Rated frequency or frequency range (Hz)	50Hz	P
	Rated input or rated current	90W	P
	Manufacturer's or responsible vendor's name, trademark or identification mark		P
	Model or type reference	-	P
	Symbol for Class II		N
	IP number		N
7.2	Warning for stationary appliances	IP20	P
N	Warning placed in vicinity of terminal cover		P
7.3	Range of rated values correctly marked		P
7.4	Voltage setting clearly discernible	No such setting	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	See marking label	P
7.7	Correct connection diagram, fixed to the appliance	No connection diagram	N
7.8	Not for type Z attachment:		N
	- marking of terminals for the neutral conductor (N)		N
	- marking of protect earthing terminals		N
	- marking not placed on removable parts		N
	- marking of terminal for single-pole protective device	No such protective device	N
7.9	Marking or placing of switches which may cause a hazard		P
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		N
7.12	Instructions for safe use provided	See product manual	P



	Appliances incorporating batteries which contain materials hazardous to the environment: statement in the instructions how to remove, scrap and dispose of the battery safely	No batteries	N
	Statement in the instructions that the appliance must be disconnected from the supply		P
	Disconnected from the supply main, the instructions shall include details for cleaning and other user maintenance of appliance.		N
7.12.1	Sufficient details for installation or maintenance supplied		N
7.12.2	Means for disconnection with contact separation at least 3 mm		N
	Stationary appliance with supply cord and plug: statement in the instructions that the appliance is so positioned that the plug is accessible		N
7.12.3	Insulation in contact with parts exceeding 50 K; instruction		N
7.12.4	Information with regard to built-in:	No built-in appliance	N
	- dimensions of space		N
	- dimensions and position of support		N
	- ventilation openings		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		N
7.13	Instructions and other texts in official language		N
7.14	Marking easily 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		P
	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		N



8	PROTECTION AGAINST ACCESS TO LIVE PARTS		---
8.1	Adequate protection against accidental contact with live parts		P
8.1.1	All positions; detachable parts removed		N
	Removal of lamps: protection against contact with live parts	No such lamps	N
	Use of test finger: no contact with live parts	No hazards	P
8.1.2	Use of test pin: no contact with live parts (EN 60 335-1:02)	No hazards	P
8.1.3	Use of test probe: no contact with live parts of visible glowing heating elements	No visible glowing heating elements	N
8.1.4	Accessible part not considered live if:	No hazards	---
	- 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 0,1 μ F		N
	- for peak value 450 V up to and including 15 kV capacitance not exceeding 0,1 μ F		N
	The energy of the discharge not exceed 350 mJ when voltage having a peak value over 15KV. (EN 60335-2-65:03)		N
8.1.5	Live parts protected at least by basic insulation before installation or assembly: checked by inspection and the test of 8.1.1 (EN 60 335-1:02):	No such construction	N
	- built-in appliances		N
	- 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		N
	Only possible to touch parts separated from live parts by double or reinforced insulation		N



	Appliances with batteries replaceable by the user, basic insulation between live parts and the inner surface of the battery compartment adequate (EN 60 335-1:02)		N
	If appliance can be operated without batteries: double or reinforced insulation used (EN 60 335-1:02)		N
10	POWER INPUT AND CURRENT		---
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 :	(see appended table 10)	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
11	HEATING		---
11.1	No excessive temperatures in normal use		N
11.2	Placing and mounting of appliance as described		N
11.3	Temperature rises determined by thermocouples or resistance method		N
11.4	Heating appliances operated under normal operation at 1,15 times rated power input		N
11.5	Motor operated appliances are operated under normal operation and supplied with the unfavourable voltage 0.94 times and 1.06 times the 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	Appliances are operated under steady conditions are established.		N
11.8	Protective devices do not operate		N
	Sealing compound not flowing out		N
	Temperatures not exceeding values in table 3 (EN 60 335-1:02)		N
	Operation of a current-limiting device in a high-voltage circuit is allowed. (EN 60335-2-65:03)		N
13	LEAKAGE CURRENT		---
13.1	Leakage current not excessive and electric strength adequate		P
13.2	Leakage current measured by means of circuit described in Annex G		P



	Leakage current measurements	(see appended table 13.2)	P
13.3	Electric strength test of insulation	(see appended table 13.3)	P
	No breakdown during the test		P
15	MOISTURE RESISTANCE		---
15.1	Enclosure provides the degree of moisture protection according to classification of appliance (EN 60 335-1:02)		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		N
	Built-in appliance installed according to the manufacturer's instruction		N
	Other appliances tested as specified		N
15.3	Humidity treatment for 48 h	(see appended table 15.3)	P
	Withstanding the test of Cl. 16		P
16	LEAKAGE CURRENT AND ELECTRIC STRENGTH		---
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 16.2)	P
16.3	Electric strength tests (values in table 7)	(see appended table 16.3)	P
17	OVERLOAD PROTECTION OF TRANSFORMERS AND ASSOCIATED CIRCUITS		---
	No excessive temperatures in transformer or associated circuits in event of short-circuits likely to occur in normal use		P
	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		P
	Temperature rise of insulation of the conductors of safety extra-low voltage circuits not exceeding the relevant value specified in table 3 by more than 15 K		P
	Temperature of the winding not exceeding the value specified in table 6		P
	Fail-safe transformers complying with subclause 15.5 of IE C61558-1		P



19	ABNORMAL OPERATION		---
19.1	The risk of fire or mechanical damage under abnormal or careless operation obviated		N
	Electronic circuits so designed and applied that a fault will not render the appliance unsafe		N
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 element	N
19.3	Test of 19.2 repeated; test voltage (V): power input of 1,24 times rated power input	No heating element	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 such devices	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 (EN 60 335-1:02)		N
	The test repeated with reversed polarity and the other end of the heating element connected to the sheath		N
19.6	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		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 (EN 60 335-1:02)		N
	Locked rotor, motor capacitors open circuited or short-circuited, if required		N
	The test is repeated with the capacitors short-circuited one at a time unless they are of class P2 of IEC 60252		N
	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		N



	Winding temperatures not exceeding limiting temperature; type of appliance; insulation class; measured temperature (°C) :		N
19.8	Three-phase motors operated at rated voltage with one phase disconnected		N
19.9	Running overload test of appliance incorporating motors at rated voltage; motor windings insulation class; measured temperature (°C); allowed temperature (°C) (EN 60 335-1:02) :		N
19.10	Series motor operated at 1,3 times rated voltage for 1 min		N
	Parts not ejected from the appliance during test (EN 60 335-1:02)		N
	The test is also made with detachable parts in place. (EN 60335-2-32: 03)		N
19.11	Electronic circuits, compliance checked by evaluation of the fault conditions specified in 19.11.2 for all circuits or parts of circuits, unless they comply with the conditions specified in 19.11.1		N
	During and after each test, the temperature of the windings shall not exceed the values specified in table 6.		N
	These limits do not apply to fail-safe transformers complying with subclause 15.5 of IEC 61558-1.		N
	Comply with the conditions specified in 19.13.		N
	Any current flowing through protective impedance not exceeds the limits specified in 8.1.4.		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:		---
	- the electronic circuit is a low-power circuit, that is, the maximum power at low-power points does not exceed 15 W according to the tests specified		N
	- the protection against electric shock, fire hazard, mechanical hazard or dangerous malfunction in other parts of the appliance does not rely on the correct functioning of the electronic circuit		N
19.11.2	Fault conditions applied one at a time, the appliance operated under conditions specified in Cl. 11, but supplied at rated voltage, the duration of the tests as specified:		---
	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 384-14 or 14.2 of IEC 65		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
	During and after each test the following is checked:		---
	- the temperature rise of the windings do not exceed the values specified in table 9		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 8.14		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:		---
	- 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
	- 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		P
	Temperature rises not exceeding the values shown in table 7	(see appended table 19)	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:		---
	- basic insulation: 1250 V		P
	- supplementary insulation: 1750 V		P
	- reinforced insulation: 3000 V		P
20	STABILITY AND MECHANICAL HAZARDS		---
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		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
	Not possible to touch dangerous moving parts with test finger		N
21	MECHANICAL STRENGTH		---
	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	0.5J, three blows, no hazards	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



22	CONSTRUCTION		---
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: (No stationary appliance)		---
	- 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 (EN 60 335-1:02)		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	No such construction	N
22.5	No risk of electric shock when touching the pins of the plug		P
22.6	Electrical insulation can not be affected by water or liquid.	No construction	N
	Class II appliances and class II constructions shall not be affected if hose ruptures or a seal leaks.		N
22.7	Appliances containing liquid or gases in normal use shall be against the risk of excessive pressure	No such construction	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	No such compartments	N
22.9	Insulation, internal wiring, windings, commutators and slip rings not exposed to oil, grease or similar substances		P
	Adequate insulating properties of oil or grease to which insulation is exposed	No such parts	N



22.10	Location or protection of reset buttons of non-self-resetting controls is so that accidental resetting is unlikely	No such reset button	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
	Tests		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		N
	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 such device	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 such device	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	No such construction	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		P
22.21	Wood, cotton, silk, ordinary paper and fibrous or hygroscopic material not used as insulation, unless impregnated		P
22.22	Asbestos not used in the construction of the appliance		P
22.23	Oils containing polychlorinated biphenyl (PCB) not used		P
22.24	Bare heating elements adequately supported		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		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
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, or		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		P
	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		P



22.32	Supplementary and reinforced insulation designed or protected against deposition of dirt or dust		P
	Ceramic material not tightly sintered, similar material or beads alone not used as supplementary or reinforced insulation (EN 60 335-1:02)		P
	Supplementary insulation of natural or synthetic rubber resistant to ageing, or arranged and dimensioned so that creepage distances are not reduced below values specified in 29.1	No such device	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 are not in direct contact with live parts	No such conductive liquids	N
	Electrodes not used for heating liquids		N
	Conductive liquids are not in direct contact with basic insulation or reinforced insulation in Class II constructions		N
	Conductive liquids in direct contact with live parts shall not be in contact with reinforced insulation for Class II constructions		N
22.34	Shafts of operating knobs, handles, levers etc. not live, unless the shaft is not accessible when the part is removed		N
22.35	Handles, levers and knobs, held or actuated in normal use, not becoming live in the event of an insulation fault		N
	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		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 (EN 60 335-1:02)		N
	The actuating member of this switch easily visible and accessible (EN 60 335-1:02)		N
22.41	Mercury switches mounted according to the requirement	No such switches	N
22.42	Protective impedance consisting of at least two separate components	No such protective impedance	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 device	N
22.44	Appliance enclosure not shaped and decorated so that the appliance is likely to be treated as a toy by children		P
22.45	When air is used as reinforced insulation. Due to deformation as a result of an external force applied to the enclosure, shall not be reduced below the values specified in 29.1.3.		P
22.101	Appliances shall not have openings on underside that would allow small items to penetrate and touch live parts.		N
23	INTERNAL WIRING		---
23.1	Wireways smooth and free from sharp edges		P
	Wires protected against contact with burrs, cooling fins etc.		N
	Wire holes in metal well rounded or provided with bushings		N
	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		P
	Adequate insulating lining provided inside a coiled spring, the turns of which touch one another		N
	No damage after 10 000 flexings		P
	Electric strength test, 1000 V between live parts and metal parts		P
23.4	Bare internal wiring sufficiently rigid and fixed		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		P
23.7	Only the colour combination green/yellow used for earthing conductors		N
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
24	COMPONENTS		---
24.1	Components comply with safety requirements in relevant IEC standards (EN 60 335-1:02)	See table 24.1	N
24.1.1	Capacitors likely to be subjected to the supply mains voltage and used for radio interference suppression or voltage dividing, comply with Annex ZC (EN 60 335-1:02)		N
	Small lampholders: compliance with requirements for E10 lampholders		N
	Isolating transformers and safety isolating transformers comply with IEC 742		N
	Safety isolating transformers tested with the appliance comply with Annex ZD (EN 60 335-1:02)		N
	Appliance couplers for IPx0 appliances: compliance with IEC 320		N



	Automatic controls: compliance with IEC 730, unless tested with the appliance		N
	Other appliance couplers: compliance with IEC 309		N
	Switches: compliance with IEC 1058, unless tested with the appliance (EN 60 335-1:02)		N
24.1.2	Automatic controls complying with IEC 730: additional tests according to this standard and 11.3.5 to 11.3.8 and Cl. 17 of IEC 730 as type 1 controls, the cycles of operation being:		---
	- thermostats: 10 000		N
	- temperature limiters: 1000		N
	- self-resetting thermal cut-outs: 300		N
	- non-self-resetting thermal cut-outs: 30		N
	- energy regulators: 3000 (EN 60 335-1:02)		N
	- timers: 10 000 (EN 60 335-1:02)		N
24.1.3	For switches, the test of 17.2.7 of IEC 1058-1 carried out for 10 000 cycles of operation (EN 60 335-1:02)		N
	Switches not separately tested and found to comply with IEC 1058-1 under conditions covering those occurring in the appliance, comply with Annex ZE (EN 60 335-1:02)		N
	Switches for no-load-operation and operable only with the aid of a tool, are not subjected to the tests of Cl. 17 of IEC 1058-1 (EN 60 335-1:02)		N
	This applies also to switches operated by hand, and with interlock for no-load-operation (EN 60 335-1:02)		N
	Switches without this interlock subjected to the test of 17.2.7 of IEC 1058-1 for 100 cycles of operation (EN 60 335-1:02)		N
	Interlock switches are operated 1000 times. (EN 60335-2-65:03)		N
24.1.4	Components marked with their operating characteristics are used in the appliance in accordance with these markings		N
	Components which have to comply with other standards are tested separately, according to the relevant standard		N
	Components used within the limits of its marking, tested in accordance with conditions occurring in the appliance		N
	Components not marked, or not used in accordance with its marking, or no IEC standard exists, tested under the conditions occurring in the appliance		N



	Components not mentioned in table 3 tested as part of the appliance		N
24.1.5	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
	Capacitors in appliances for which 30.2.3 is applicable and which are permanently connected in series with a motor winding being of class P1 or P2 of IEC 60252		N
	List of components		N
24.2	No switches or automatic controls in flexible cords		N
	No devices causing the protective device in the fixed wiring to operate in the event of a fault in the appliance		N
	No thermal cut-outs which can be reset by soldering		N
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 heating elements and extra-low voltage circuits, not interchangeable with plugs, and		N
	socket-outlets or with connectors and appliance inlets complying with IEC 83 or IEC 320, respectively		N
24.5	Capacitors in auxiliary of motor shall be marked with their rated voltage and rated capacitance and shall be used in according with these marking.		N
	Capacitors in appliances for which 30.2.3 is applicable , are permanently connected in serials with motor winding shall be of class p1 or p2 of IEC 60252.		N
24.6	Motors connected to the supply mains and having inadequate basic insulation for the rated voltage of the appliance, comply with the requirements of Annex F		N
	The components are listed on an appended table		N
24.101	Interlock switches that prevent access to live parts during user maintenance shall (EN 60335-2-65:03)		---
	- disconnect all poles, unless the secondary circuit is supplied through an isolating transformer		N
	- have a contact separation that provides full disconnection in accordance with IEC 61058-1		N



25	SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS		---
25.1	Appliance not intended for permanent connection to fixed wiring, means for connection to the supply:		---
	- 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 not provided with more than one means of connection to the supply		P
	Stationary appliance for multiple supply may be provided with more than one means of connection, provided electric strength test of 1250 V for 1 min between each means of connection causes no breakdown		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		N
	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		N
	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		N
	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		N
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		N
	Type X attachment: specially prepared cord		N
	Type X attachment not used for flat twin tinsel cord		N
	Type Z attachment is allowed for appliances having a mass not exceeding 3Kg. (EN 60335-2-65:03)		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	---
	- for Class I appliances: Standard Sheet C2b, C3b or C4	N
	- 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 60 335-2-29:04)	N
	- flat twin tinsel cord (227 IEC 41)	N
	- light polyvinyl chloride sheathed cord (227 IEC 52), appliance not exceeding 3 kg	P
	- ordinary polyvinyl chloride sheathed cord (227 IEC 53), appliance exceeding 3 kg	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	N
25.8	Nominal cross-sectional area of supply cords according to table 9; rated current (A); cross-sectional area (mm ²) :	N
25.9	Supply cord not in contact with sharp points or edges	N
26.10	The supply cord with green/yellow core for earthing terminal of class I appliance	N
25.11	Conductors of supply cords not consolidated by lead-tin soldering where they are subject to contact pressure, unless	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
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
	Inlet opening is insulation material	N



	Supply is unsheathed		N
25.14	Supply cords adequately protected against excessive flexing		N
	Flexing test; applied force (N); number of flexings:		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 12: pull (N); torque (Nm) (not on automatic cord reel)		N
	Max. 2 mm displacement of the cord, and conductors not moved more than 1 mm in the terminals		N
25.16	Cord anchorages for type X attachments so constructed and located that:		---
	- 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
	- 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		N
25.18	Cord anchorages only accessible with the aid of a tool, or		N
	so constructed that the cord only can be fitted with the aid of a tool		N
25.19	Type X attachment, glands not used as cord anchorage in portable appliances		N
	Tying the cord into a knot or tying the cord with string not used		N
25.20	Conductors of the supply cord for type Y and Z attachment adequately additionally insulated		N
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:		---
	- 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
	- 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 max. current during the test of cl. 11. not by the rated current of appliance;		N
	Thickness of insulation of the conductor may reduce if voltage of conductor is less than the rated voltage.		N



	If necessary, electric strength test of 16.3		N
25.24	Interconnection cords not detachable without the aid of a tool		N
25.25	The dimensions of pin compatible with the dimensions of the relevant socket-outlet.		---
	Dimensions of the pin and engagement fact are to be in accordance with IEC 60083.		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
	- 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
26	TERMINALS FOR EXTERNAL CONDUCTORS		---
26.1	The terminals shall only be accessible after the removal of a non-detachable cover.		N
26.2	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
	The conductor soldered shall be positioned or fixed, reliance is not placed upon the soldering alone to maintain it in position.		N



	Soldering alone used, barriers provided, creepage distances and clearances satisfactory if the conductor becomes free		N
26.3	Terminals for type X attachment and those for connection to fixed wiring so fixed that when tightening or loosening the clamping means:		---
	- 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		N
26.4	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
26.5	Terminals for type X attachment, when a wire of a stranded conductor escapes there is no risk .		N
	Stranded conductor test, 8 mm insulation removed		N
26.6	Terminals for type X attachment and for connection to fixed wiring suitable for connection of conductors with required cross-sectional area according to table 13; rated current (A); nominal cross-sectional area (mm ²):		N
	Terminals only suitable for a specially prepared cord		N
26.7	Terminals for type X attachment accessible after removal of a cover or part of the enclosure		N
26.8	Terminals for the connection to fixed wiring located close to each other, including the earthing terminal		N
26.9	Terminals of the pillar type constructed and located as specified		N
26.10	Terminals with screw clamping and screwless terminals not used for flat twin tinsel cords, unless conductors ends fitted with a device suitable for screw terminals		N
	Pull test of 5 N to the connection		N
26.11	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



27	PROVISION FOR EARTHING	---
27.1	Accessible metal parts of Class 0I and I appliances, permanently and reliably connected to an earthing terminal	N
	Earthing terminals not connected to neutral terminal	N
	Class 0, II and III appliance have no provision for earthing	N
	Safety extra-low voltage circuits shall not be earthed, unless they are protective safety extra-low voltage circuits.	N
27.2	Terminals used for the connection of external equipotential bonding conductors allow connection of conductors of 2,5 to 6 mm ² , and	N
	do not provide earthing continuity between different parts of the appliance	N
	Conductors cannot be loosened without the aid of a tool	N
	Clamping means adequately secured against accidental loosening	N
27.3	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	N
	Adequate resistance to corrosion of coated or uncoated parts providing earthing continuity, other than parts of a metal frame or enclosure	N
	Parts of steel providing earthing continuity provided at the essential areas with an electroplated coating, thickness at least 5 μm	N
	Adequate protection against rusting of parts of coated or uncoated steel, only intended to provide or transmit contact pressure	N
	In 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 0,1 Ω at the specified low-resistance test	N
27.6	In hand-held appliances printed conductors of printed circuit boards not used to provide earthing continuity (EN 60 335-1:02)	N



	In other appliances at least two tracks are used with independent soldering points, and		N
	the appliance complies with the requirements of 27.5 for each circuit, and		N
	the material of the printed board complies with IEC 249-2-4 or IEC 249-2-5		N
28	SCREWS AND CONNECTIONS		---
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 of insulating material not used for any electrical connection		N
	Screws transmitting electrical contact only screwing into metal		P
	Screws not of insulating material if their replacement by a metal screw can impair supplementary or reinforced insulation		P
	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 14		N
	The test is not carried out on screws and nuts transmitting contact pressure for earthing continuity provided at least two screws or nuts are used (EN 60 335-1:02)		N
28.2	Contact pressure not transmitted through insulating material liable to shrink or distort, unless shrinkage or distortion compensated		P
	This requirement does not apply to electrical connections in circuits carrying a current not exceeding 0,5 A (EN 60 335-1:02)		P
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		P
	Thread-cutting (self-tapping) screws not used for electrical connection of current-carrying parts, unless generating a full form standard machine screw thread		P



	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		P
	Thread-cutting and space-threaded screws used provide earthing continuity:		P
	- it is not necessary to disturb the connection in normal use		P
	- two screws used for each connection		P
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		P
	Rivets for current-carrying connections subject to torsion secured against loosening	No such rivets	N
29	CREEPAGE DISTANCES, CLEARANCES AND DISTANCES THROUGH INSULATION		---
29.1	Creepage distances and clearances not less than specified in table 13 (EN 60 335-1:02)	See table 29.1	P
	Resonant voltage between the point where a winding and a capacitor are connected together and metal parts separated from live parts by basic insulation only, creepage distances and clearances not less than the values specified for the value of the voltage produced by the resonance (EN 60 335-1:02)		N
	Values increased by 4 mm in case of reinforced insulation when resonance voltage		N
29.2	Distances through insulation not less than 1,0 mm for supplementary insulation, and 2,0 mm for reinforced insulation		P
29.2.1	Supplementary insulation applied in thin sheet form, other than mica or similar scaly material, consists of at least two layers, each of the layers withstands the electric strength test of 16.3 for supplementary insulation		P
	Reinforced insulation applied in thin sheet form, other than mica or similar scaly material, consists of at least three layers, and any two of the layers together withstand the electric strength test of 16.3 for reinforced insulation		P
29.2.2	Supplementary or reinforced insulation inaccessible and does not exceed the maximum permissible temperature values		P



	Supplementary or reinforced insulation, after conditioning as specified, withstands the electric strength test as specified in 16.3, both at the oven temperature and room temperature		P
30	RESISTANCE TO HEAT, FIRE AND TRACKING		---
30.1	See Annex H		P
	Relevant external parts of non-metallic material		P
	Parts supporting live parts and parts providing supplementary or reinforced insulation sufficiently resistant to heat		P
	Ball-pressure test with a force of 20 N, diameter of impression not exceeding 2 mm		P
	External parts: at 75 °C		P
	Parts supporting live parts: at 125 °C		P
	Parts providing supplementary or reinforced insulation: temperature (°C) :		N
30.2	Relevant parts of non-metallic material adequately resistant to ignition and spread of fire		P
30.2.1	Possible burning test of relevant parts according to Annex J		P
	Glow-wire test of Annex K made at temperature 550 °C		P
30.2.2	Appliances operated while attended, parts of insulating material supporting connections carrying a current exceeding 0,5 A in normal operation, subjected to the glow-wire test of Annex K at 650 °C		P
30.2.3	Appliances operated while unattended, possible bad-connection test according to Annex L		N
	Glow-wire test of Annex K made at 850 °C (EN 60 335-1:02)		N
	Possible needle-flame test according to Annex M		N
30.2.4	Parts of non-metallic material within a distance of 50 mm from parts not withstanding the tests of 30.2.2 or 30.2.3, subjected to the needle-flame test of Annex M		N
30.3	Relevant insulating material have adequate resistance to tracking		N
	Tracking test at 175 V according to Annex N		N
	Tracking test at 250 V according to Annex N		N
	No hazard other than fire, tracking test at 175 V according to Annex N, and in addition needle-flame test of surrounding parts according to Annex M		N



	Possible needle-flame test of non-metallic material		N
31	RESISTANCE TO RUSTING		---
	Relevant ferrous parts adequately protected against rusting		P
32	RADIATION, TOXICITY AND SIMILAR HAZARDS		---
	Appliance does not emit harmful radiation		P
	Appliance does not present a toxic or similar hazard		P
A	ANNEX A, NORMATIVE REFERENCES		---
	The annex contains a list of standards which are referred to, and thus become part of, this standard		P
B	ANNEX B, TESTING OF APPLIANCES POWERED BY RECHARGEABLE BATTERIES (IEC 335-1:01)		---
B.2	Definitions		N
B.2.2.9	Appliances operated under the following conditions:		---
	- the appliance supplied by its fully charged battery is operated as specified in part 2		N
	- the appliance is charged, the battery being initially discharged to such an extent that the appliance cannot operate		N
	- if possible, the appliance is supplied from the supply mains through its battery charger, the battery being initially discharged to such an extent that the appliance cannot operate. The appliance is operated as specified in part 2		N
B.2.7.2	If a part has to be removed in order to discard the battery before scrapping the appliance, this part is not considered to be detachable even if the instructions state that it is to be removed		N
B.4	General conditions for the tests		---
B.4.101	Unless otherwise specified, appliances supplied from the supply mains are tested as specified for motor-operated appliances		N
B.7	Marking and instructions		---
B.7.1	Battery compartment for batteries intended to be replaced by the user, marked with battery voltage and polarity of the terminals		N
B.7.12	The instructions for appliances incorporating batteries intended to be replaced by the user, include required information		N
	Details given about how to remove batteries containing materials hazardous to the environment		N



	Materials which are hazardous to the environment are mercury, cadmium or lead (EN 60 335-1:01)		N
B.7.15	Markings placed on the part connected to the supply mains		N
B.8	Protection against access to live parts		---
B.8.2	Basic insulation between live parts and parts accessible during and after removal of the battery		N
B.11	Heating		---
B.11.7	Charging time for the battery		N
B.19	Abnormal operation		N
B.19.101	Charging time at rated voltage		N
B.19.102	Short-circuiting of the battery, fully charged, for appliances having batteries which can be removed without the aid of a tool		N
B.19.103	Appliances having batteries replaceable by the user, supplied at rated voltage under normal operation with the battery removed or in any position allowed by the construction		N
B.21	Mechanical strength		---
B.21.101	Appliances having pins for insertion into socket-outlets, checked according to procedure 2 of IEC 68-2-32		N
	Mass of part not exceeding 250 g, 100 falls		N
	Mass of part exceeding 250 g, 50 falls		N
B.22	Construction		---
B.22.3	Appliances having pins for insertion into socket-outlets are tested as fully assembled as possible		N
B.25	Supply connection and external flexible cords		N
B.25.13.2	The requirement is not applicable to interconnection cords subjected to safety extra-low voltage		N
B.30	Resistance to heat, fire and tracking		N
B.30.2	For parts connected to the supply mains during the charging period, 30.2.3 applies		N
	For other parts, 30.2.2 applies		N
C	ANNEX C, AGEING TEST ON MOTORS		---
	Test carried out when doubt with regard to the classification of the insulating system of a motor winding		N



E	ANNEX E, MEASUREMENT OF CREEPAGE DISTANCES AND CLEARANCES		---
	Methods of measuring creepage distances and clearances, specified in 29.1, indicated in 10 different cases	Comply with requirements	N
F	ANNEX F, MOTORS NOT ISOLATED FROM THE SUPPLY MAINS AND HAVING BASIC INSULATION NOT DESIGNED FOR THE RATED VOLTAGE OF THE APPLIANCE		---
	Motors having a working voltage not exceeding 42 V, not being isolated from the supply mains, and having basic insulation not designed for the rated voltage of the appliance are tested according to this annex		N
	All clauses of this standard apply, unless otherwise specified in this annex		N
F.8	Protection against accessibility to live parts		N
F.11.8	Temperature rise of the body of the motor, where in contact with insulating material, not exceeding values in table 3 for the relevant insulating material		N
F.16	Leakage current and electric strength		N
F.19	Abnormal operation		N
F.19.101	Appliance operated at rated voltage with each of the following defects:		---
	- short-circuit of the terminals of the motor, including any capacitor incorporated in the motor circuit		N
	- open circuit of the supply to the motor		N
	- open circuit of any shunt resistor during operation of the motor		N
F.22	Construction		N
F.22.101	Class I appliance incorporating a motor supplied by a rectifier circuit, the d.c. circuit being insulated from accessible parts of the appliance by double or reinforced insulation		N
G	ANNEX G, CIRCUIT FOR MEASURING LEAKAGE CURRENTS		---
	A suitable circuit for measuring leakage currents is shown		N
H	ANNEX H, SELECTION AND SEQUENCE OF THE TESTS OF CLAUSE 30		---
J	ANNEX J, BURNING TEST		---
	The burning test is made in accordance with IEC 707, and method FH is used		N
	Category FH3 applies, the maximum burning rate being 40 mm/min		N



K	ANNEX K, GLOW-WIRE TEST		---
	The glow-wire test is made in accordance with IEC 695-2-1 (clause numbers between parentheses refer to IEC 695-2-1)		---
(4)	Description of test apparatus: the last paragraph before the note is replaced		P
(5)	Severities: the duration of application of the tip of the glow-wire to the specimen being (30 ± 1) s		P
(10)	Observations and measurements: item c) does not apply		P
L	ANNEX L, BAD-CONNECTION TEST WITH HEATERS		---
	The bad-connection test with heaters is made in accordance with IEC 695-2-3 (clause numbers between parentheses refer to IEC 695-2-3)		---
(3)	General description of the test: additions concerning crimped connections		N
(4)	Description of test apparatus: replacements of some of the test specifications and the first paragraph of the note		N
(6)	Severities: the duration of application of the test power being (30 ± 1) s		N
(8)	Test procedure: 8.6 replaced		N
(11)	Information to be given in the relevant specification: item h), the first dashed paragraph, does not apply		N
M	ANNEX M, NEEDLE-FLAME TEST		---
	The needle-flame test is made in accordance with IEC 695-2-2 (clause numbers between parentheses refer to IEC 695-2-2)		---
(4)	Description of the apparatus: the sixth paragraph is replaced		N
(5)	Severities: the duration of application of the test flame is (30 ± 1) s		N
(8)	Test procedure: some changes in the test specifications		N
(10)	Evaluation of the test results: addition in the test specification		N
N	ANNEX N, PROOF TRACKING TEST		---
	The proof tracking test is made in accordance with IEC 112 (clause numbers between parentheses refer to IEC 112)		---
(3)	Test specimen: the last sentence of the first paragraph does not apply		N
(5)	Test apparatus: some changes in the subclauses		N
(6)	Procedure: adjustments of the test specifications		N



P	ANNEX P, SEVERITY OF DUTY CONDITIONS OF INSULATING MATERIAL WITH RESPECT TO THE RISK OF TRACKING		---
	Recognition of different duty conditions with respect to the risk of tracking		N
ZA	ANNEX ZA, SPECIAL NATIONAL CONDITIONS		---
7.12	DENMARK: requirements regarding marking tag of power supply cord and connecting of earthing wire		N
19.5	NORWAY: the test is also applicable to appliances intended to be permanently connected to fixed wiring		N
19.11.2	AUSTRIA: requirements regarding appliances having circuits which under fault conditions may cause earth-leakage currents having a d.c. component exceeding 5 Ma and exceeding 20% of the total earth-leakage		N
22.2	FRANCE, NORWAY: The second paragraph of this subclause dealing with single-phase Class I appliances with heating elements is not applicable due to the supply system		N
25.6	BELGIUM, FRANCE, GREECE, UNITED KINGDOM: plugs according to Standard Sheet C2b not allowed		N
	AUSTRIA, GERMANY, FINLAND, ICELAND, IRELAND, ITALY, LUXEMBOURG, NETHERLANDS, NORWAY, PORTUGAL, SPAIN, SWEDEN, SWITZERLAND, UNITED KINGDOM: plugs according to Standard C3b not allowed		N
	DENMARK: Supply cords of single-phase portable appliances having a rated current not exceeding 10 A provided with a plug according to the following:		---
	Class I appliances: Section 107-2-DI Standard Sheet DK2-1a		N
	For appliances covered by a Part 2 of EN 60 335, also plugs in accordance with IEC 83, Standard Sheet C2b, C3b or C4 are allowed		N
	Class II appliances: IEC 83, Standard Sheet C5 or C6		N
	Stationary single-phase appliances, having a rated current not exceeding 10 A, and provided with a plug, the plug is in accordance with the requirements above		N
	Multi-phase appliances and single-phase appliances having a rated current exceeding 10 A, and provided with a plug, the plug is in accordance with the requirements below:		---
	Class I appliances: Section 107-2-D1, Standard Sheet DK6-1a/EN 60 309-2, Standard Sheet 2-II, 2-IV		N
	Class II appliances: Section 107-2-D1, Standard Sheet DK6-1a/2-II, 2-IV		N



	IRELAND: plug is in accordance with Standard Sheets B1 (15A), B2 and C2b		N
	SPAIN: Appliances having a rated current not exceeding 6 A, provided with a plug complying with UNE 20 315:		---
	for Class I appliances: Figure 7C		N
	for Class II appliances: Figure 15A		N
	Class I appliances having a rated current not exceeding 16 A, provided with a plug complying with Standard UNE 20 315 Figure 7B		N
	SWITZERLAND: supply cords of portable household and similar electrical appliances, rated current not exceeding 10 A, provided with a plug complying with SEV 1011 or IEC 884-1 and one of the following dimension sheets:		---
	SEV 6532-2:1991 plug type 15 3P+N+PE 250/400 V, 10 A		N
	SEV 6532-2:1991 plug type 11 L+N 250 V, 10 A		N
	SEV 6532-2:1991 plug type 12 L+N+PE 250 V, 10 A		N
	UNITED KINGDOM: plug according to Standard Sheet B2 or C5 used (refer to Annex ZB)		N
25.7	FINLAND: PVC insulated cords not used for battery chargers for automobile batteries (EN 60 335-2-29:96)		N
25.8	IRELAND, UNITED KINGDOM: replacement of figures (rated current/cross-sectional area) in the table		N
ZB	ANNEX ZB, A-DEVIATIONS		---
3	SWITZERLAND: information about batteries		N
7.1	ITALY: the voltage is 220 V/380 V		N
	SPAIN: the voltages are 127 V/220 V and 220 V/380 V		N
7.12	IRELAND: information about required label attached to the supply cord, concerning the colour code of the wires		N
22.22	GERMANY: the amount of asbestos in the mass containing asbestos not exceeding 0,1%	No asbestos	P
	FINLAND: certain types of asbestos not used		P
24	SWEDEN: components containing mercury not used		P
25.6	UNITED KINGDOM: regulations concerning plugs to be fitted to domestic appliances		N



ZC	ANNEX ZC, CAPACITORS (EN 60 335-1:02)		---
	The following clauses and subclauses of IEC 384-14 apply to capacitors likely to be permanently subjected to the supply mains voltage and used for radio interference suppression or for voltage dividing purposes with the following modifications		N
	SECTION ONE - GENERAL		---
1.5	Terminology		N
1.5.3	Applicable. Class X capacitors tested according to sub-Class X2		N
1.5.4	Applicable		N
1.6	Marking		N
	Items a) and b) are applicable		N
	SECTION THREE - QUALITY ASSESSMENT PROCEDURES		---
3.4.3.2	Tests		N
	Table II is applicable as follows:		---
	- group 0: subclause 4.1, 4.2 and 4.2.5		N
	- group 1A: subclause 4.1.1		N
	- group 2: subclause 4.12		N
	- group 3: subclause 4.13 and 4.14		N
	- group 6: subclause 4.17		N
	- group 7: subclause 4.18		N
	SECTION FOUR - TEST AND MEASUREMENT PROCEDURES		---
4.1	Visual examination and check of dimensions		N
	Applicable		N
4.2	Electrical tests		N
4.2.1	Applicable		N
4.2.5	Applicable		N
4.2.5.2	Only Table IX applicable. Values for test A apply, for capacitors in heating appliances the values for test B or C apply		N
4.12	Applicable, only insulation resistance and voltage proof are checked (see Table XIII)		N
4.13	Applicable, when capacitors are used for voltage dividing purposes, the impulse voltage is applied to the terminals of the appliance		N



4.14	Applicable, together with subclauses 4.14.1, 4.13.1 and 4.14.7		N
4.17	Applicable		N
4.18	Applicable		N
ZD	ANNEX ZF, informative		---
	IEC and CENELEC code designations for flexible cords		N



10	TABLE: power input and current				P
	Rated Voltage and Frequency (V/Hz)	Rated Input Power or Current (W/A)	Tested Voltage and Frequency (V/Hz)	Measured Input Power or Current (W/A)	Measured Power deviation
	220-240V/50Hz	90W	10V/50Hz	90W	+ 20%
Limited deviation: power input deviation: + 20%					

11	TABLE: temperature rise measurements				P
	1.06 times rated Voltage				
	(254.4Vac)				
	Ambient (t1) (°C)		Ambient (t2) (°C)		
	24.1		24.8		
No.	Temperature rise dT of part/at:		dT (K)		Limited dT (K)
1	Enclosure outside		9.9		60
2	Inside wire		21.4		80
3	Enclosure inside		19.8		--
4	PCB		30.3		120

13.2	TABLE: leakage current measurements at operating temperature			P
	At 1,06 times maximum rated input (V): 254.4Vac			---
Leakage current between:		I (Ma)	Limited I (Ma)	
Between live parts and plastic enclosure		< 0.012	0.25	

13.3	TABLE: electric strength measurements at operating temperature:			P
Test voltage applied between:		Test voltage (V)	Breakdown	
Between live parts and plastic enclosure		3000Vac	No	

15.3	TABLE: Moisture resistance, humidity treatment			P
Temperature (°C)		Humidity (%)	Duration (hours)	
25°C		93%	48	

Remark: After humidity test, electric strength test specified in clause 16.3 should be applied.

16.2	TABLE: leakage current measurements			P
	At 1,06 times rated voltage (V): 243.8Vac			---
Leakage current I between:		I (Ma)	Limited I (Ma)	



Between live parts and plastic enclosure	< 0.014	0.25
--	---------	------

16.3	TABLE: electric strength measurements:	P
Test voltage applied between:	Test voltage (V)	Breakdown
Between live parts and plastic enclosure	3000Vac	No

19	TABLE: abnormal operation tests		P
	ambient temperature (°C)	24.9°C	---
No.	Temperature rise dT of part/at:	dT (K)	Limited dT (K)
1	Enclosure inside	25.4	--
2	Inside wire	23.2	150

23.5	TABLE: electric strength measurements for basic insulation of internal wiring	P
Test voltage applied between:	Test voltage (V)	Breakdown
Between conductor and insulation with metal foil	3000	No

25.15	TABLE: Strain relief test					N
Appilience mass (Kg)	Pull face (N)	Duration for each time (s)	Times	Result	Limited displacement (mm)	

29.1	TABLE: CREEPAGE DISTANCE AND CLEARANCE THROUGH INSULATION MEASUREMENTS					P
clearance cl and creepage distance dcr at/of:	Up (V)	U r.m.s. (V)	required cl (mm)	cl (mm)	required dcr (mm)	dcr (mm)
Between live parts and Accessible surface	331	240	3.0	>3.0	5.0	>5.0

30.1	TABLE: ball-pressure tests for thermoplastics			P
	Limited impression diameter (mm)		≦ 2 mm	---
Part		Test temperature (°C)	Impression diameter (mm)	
PCB		125	1.0	
Plastic enclosure		75	0.8	
30.2	TABLE: glow wire test			P



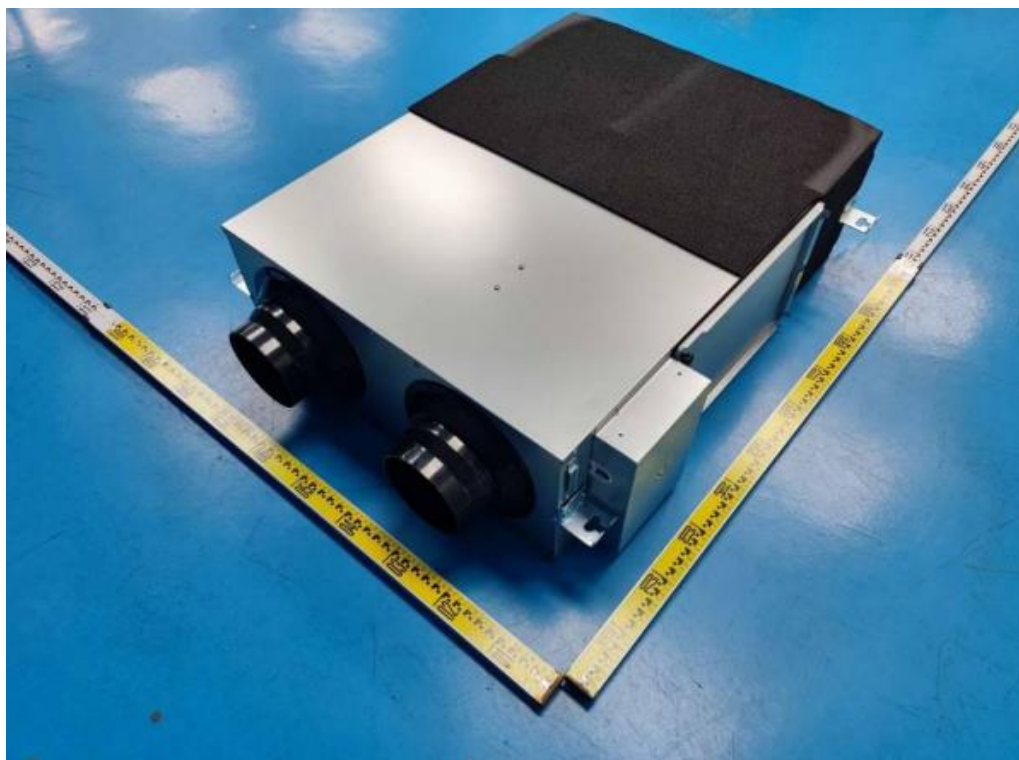
CTIC Testing Group (Guangdong) Co., Ltd.

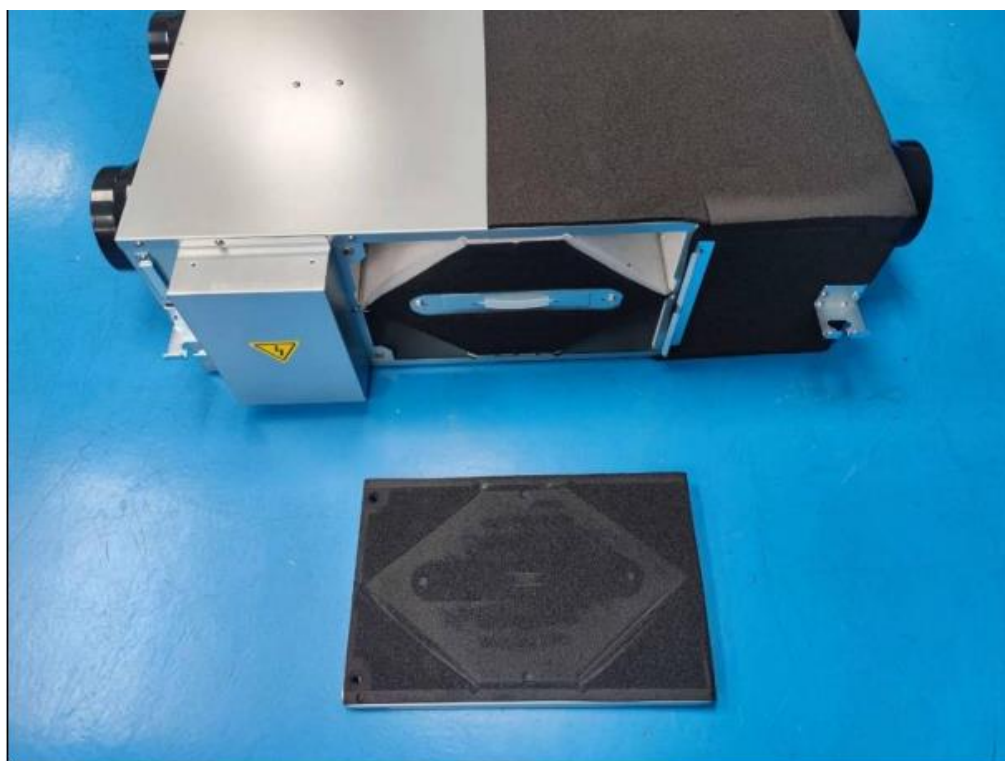
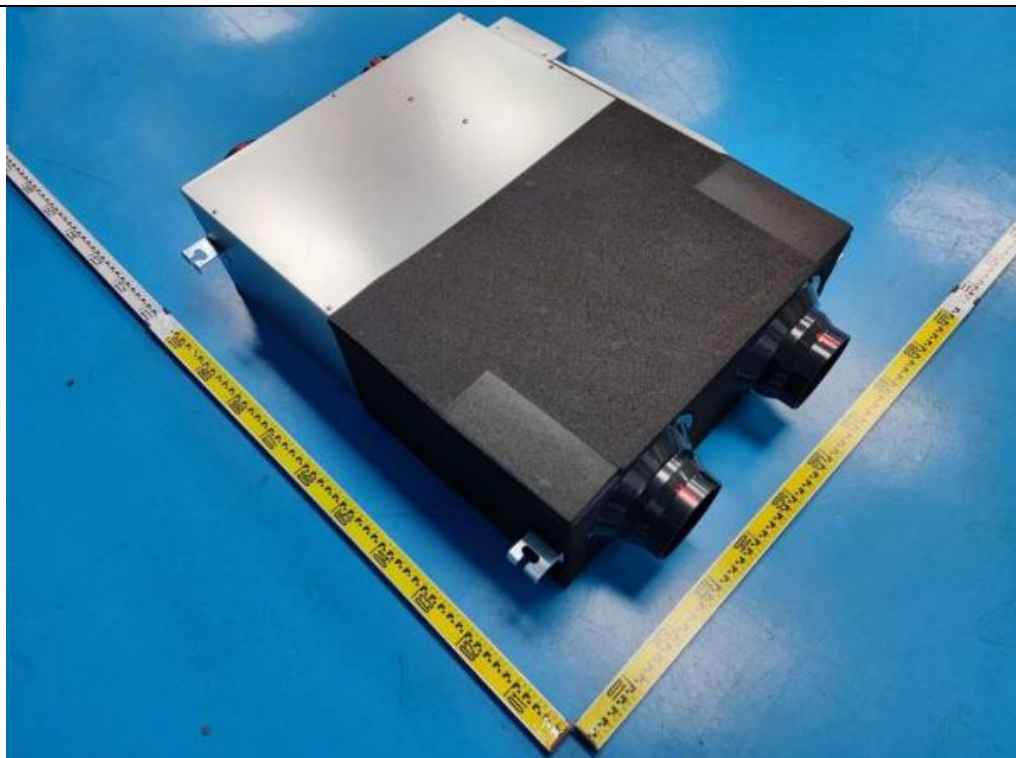
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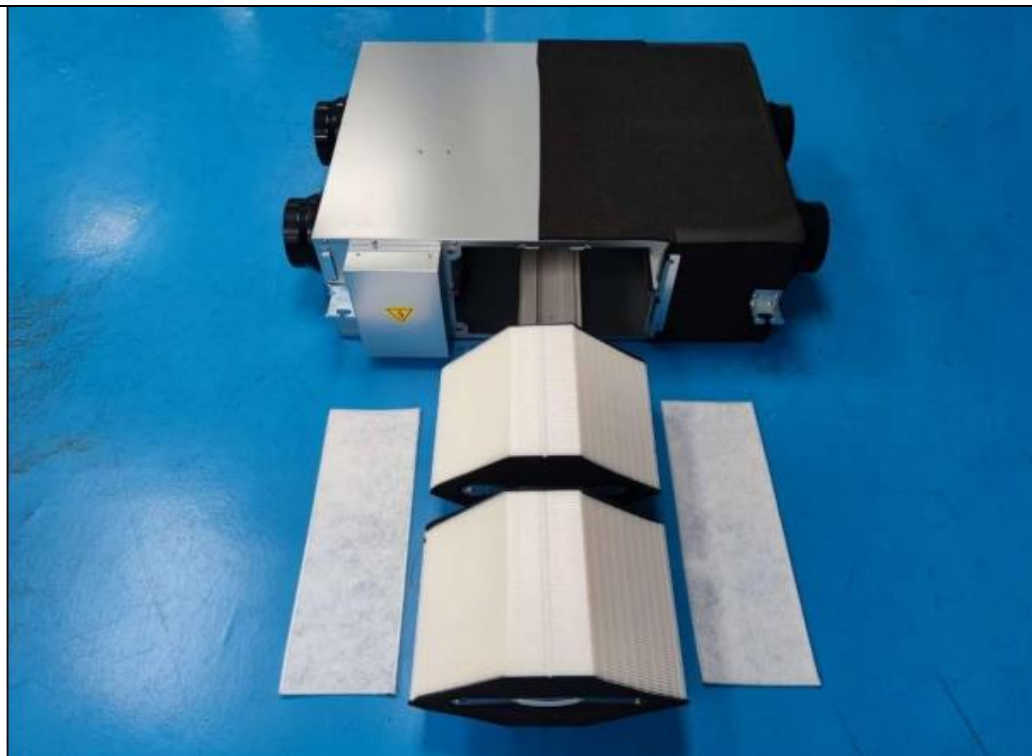
Part	Test temperature (°C)	Result
Plastic enclosure	550°C	No burning
PCB	650°C	No burning

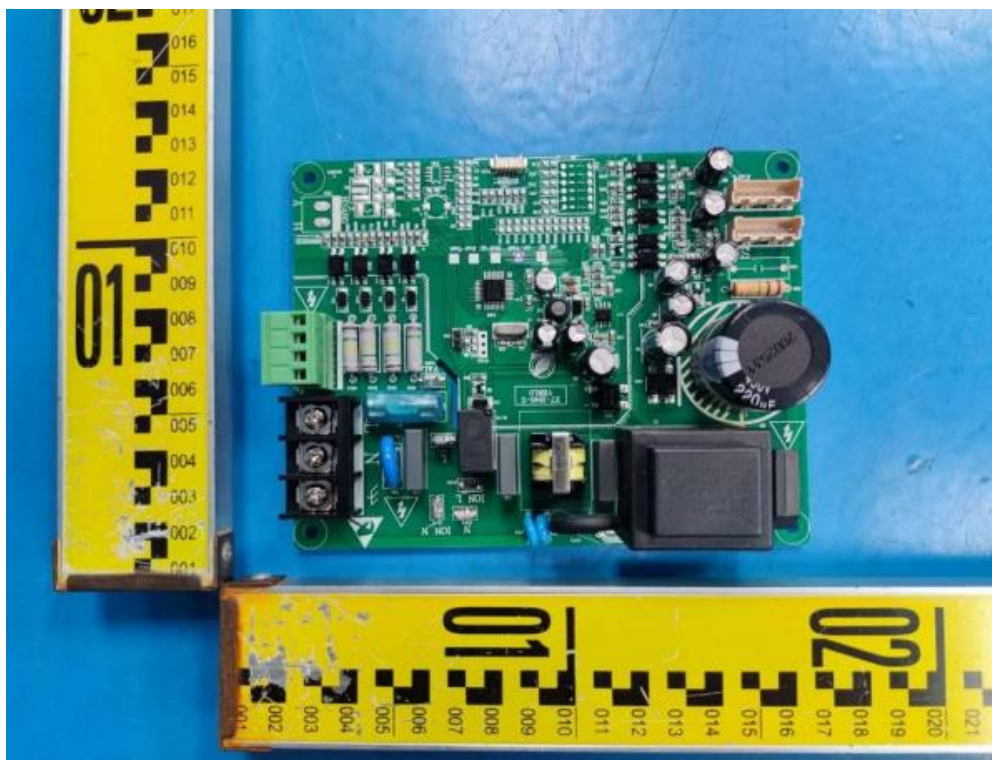
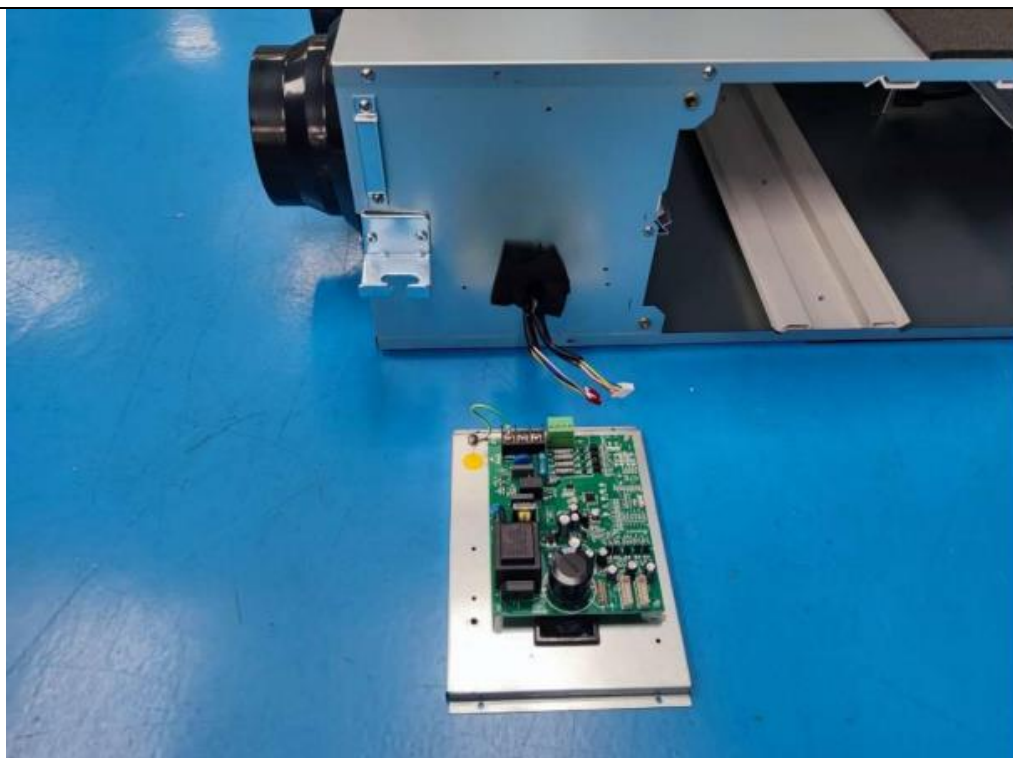


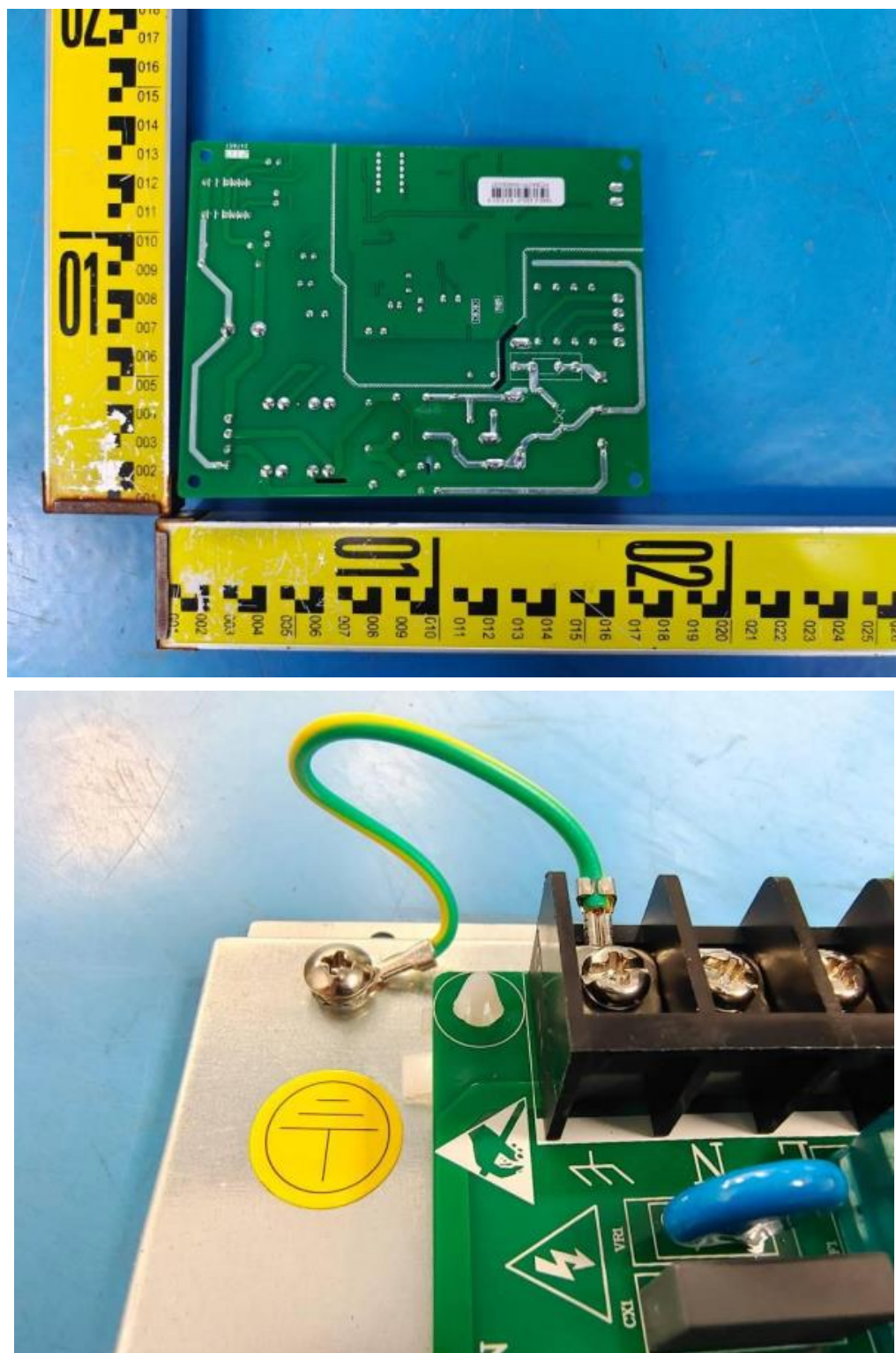
General Appearance of the EUT

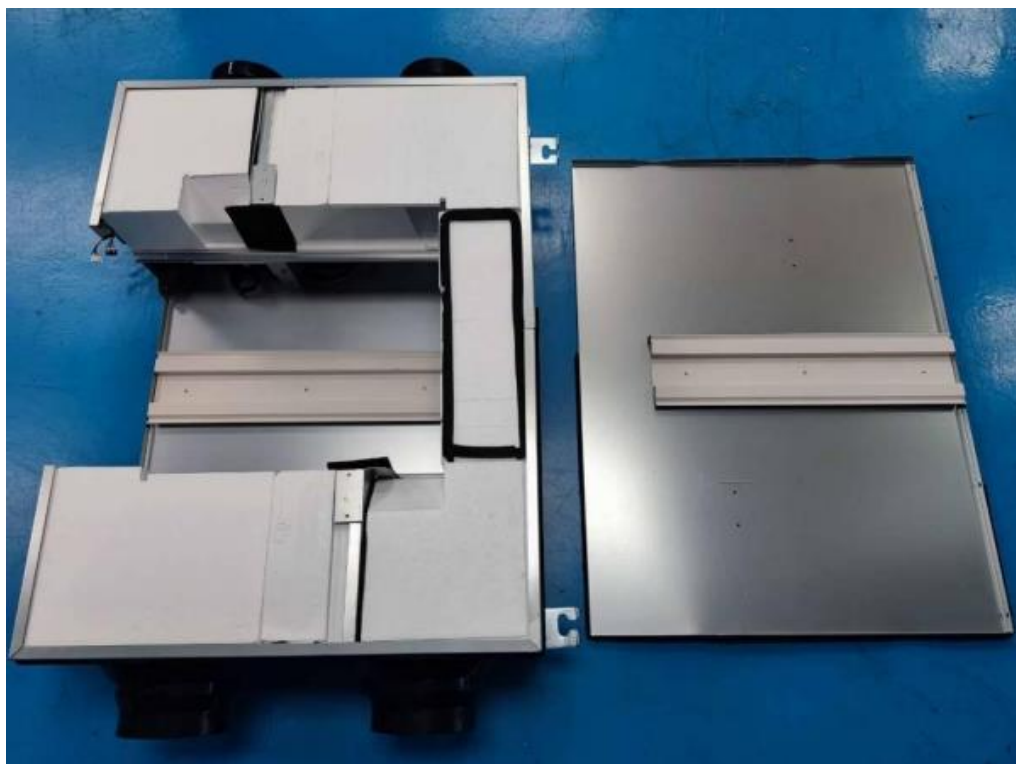


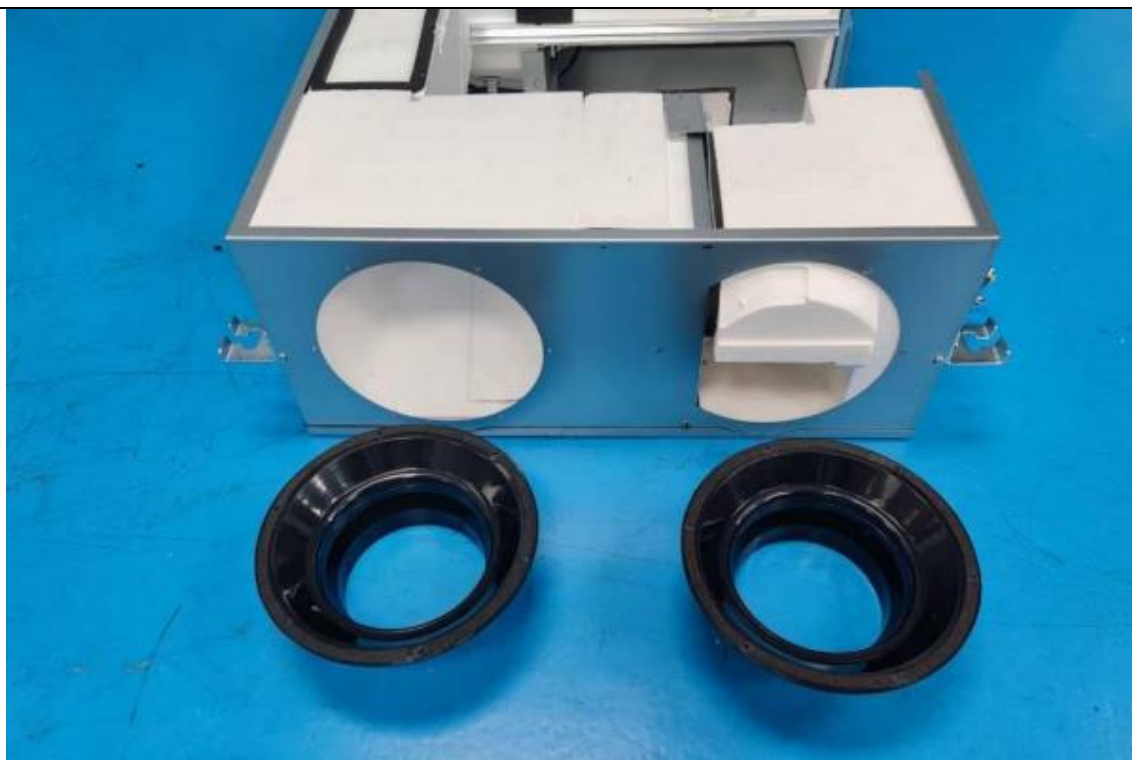




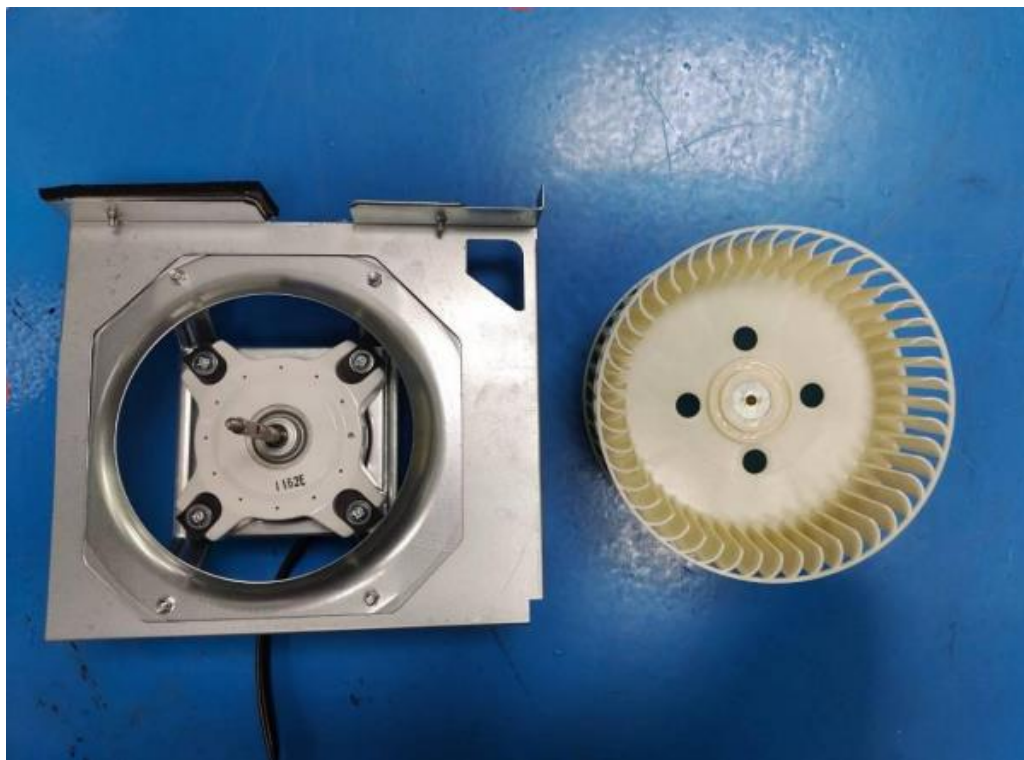


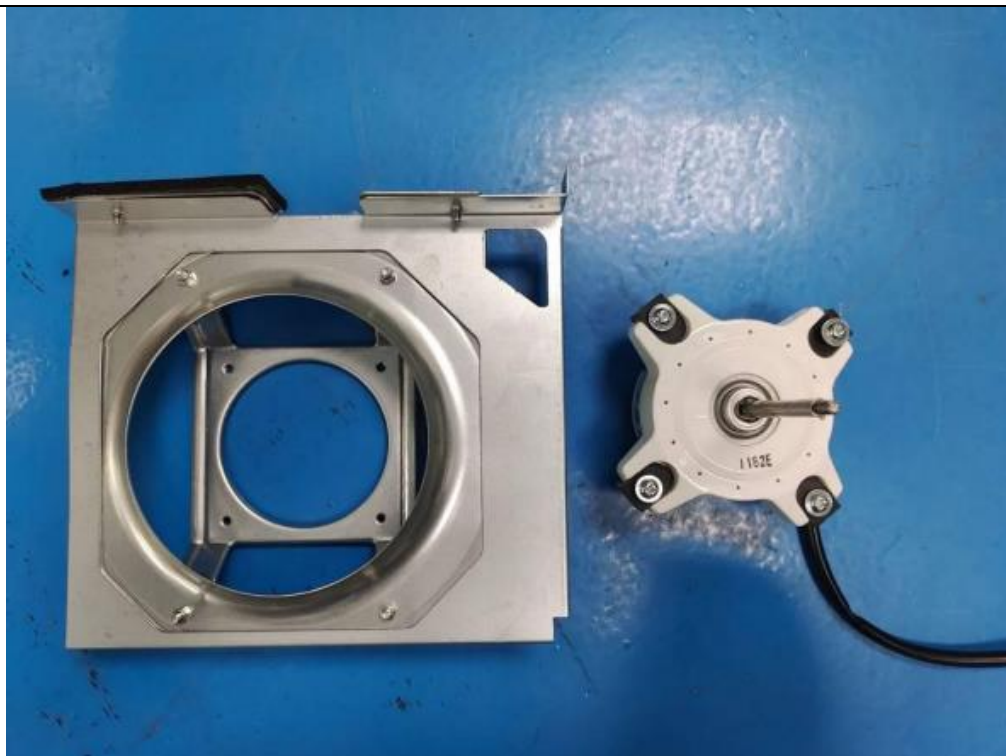














End of report