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Laboratorium Badawcze i Wzorcujące
 Laboratorium badawcze akredytowane przez
 Polskie Centrum Akredytacji, sygnatariusza porozumień EA MLA i ILAC MRA
 dotyczących wzajemnego uznawania świadectw wzorcowania.
 Nr akredytacji AB 024

TEST REPORT

Number: B/2016/305, issued on: October 13th 2016.

Subject: Heat Decor HD310 heating film tests. Film designed for the purpose of interior heating applications.

Test program executed for: Eco-Term sp. z o.o.
 ul. Mały Płaszów 10
 30-720 Kraków, POLAND

Test program executed at: Institutions for Research and Certification "ZETOM" in Katowice,
 "ZETOM" Test and Calibration Lab in Katowice

Index of the order: Order (e-mail) Date: August 23rd 2016

The order has been entered into the laboratory records under the no. B/2016/245

The Tests began on: August 30th 2016 **The Tests ended on:** October 10th 2016

The report includes: 40 pages

3 copies of the report have been issued. They are going to be received by:

1. Eco-Term sp. z o.o.
2. Eco-Term sp. z o.o.
3. LT

The test programme has been supervised by: Katarzyna Hadam, PhD

Tests and measurements were carried out by: Piotr Jureczko, MSc. Eng. At the WE laboratory

Kamil Długajczyk At the WE laboratory

The report has been written by: Piotr Jureczko, MSc. Eng.

The report has been authorized by:

Approved by:

PRACOWNIA ELEKTRYCZNA
 mgr inż. Piotr Jureczko



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Zakłady Badań i Atestacji „ZETOM”
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Institutions for Research and Certification “ZETOM” Ltd.
EU Notified body no. 1436

For directives: Building, low voltage and machinery.

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ARRANGEMENTS

A. Obligatory:

1. Test Report is a property of the Ordering Party, for whom the tests were being carried out.
2. The Test Report and the information contained therein may also be used following a consent issued by the owner of the report.
3. The Test Report may only be utilized in full.
4. All of the test results and measurement results outlined within the Report herein are applicable solely in case of the tested objects, they shall not be viewed or interpreted as a quality approval.
5. The work has been carried out in line with the arranged work execution plan, requirements of the management system according to the Book of Quality of the Lab.
6. In case when one refers to the herein report, the following (or equivalent) sentence shall be used:

Tested by the Calibrating and Testing “ZETOM” Laboratory based in Katowice, which is accredited by the Polish Centre for Accreditation (PCA) based in Warsaw, within the scope compliant with the Certificate Appendix No. AB 024.

B. Additional (contained and outlined within the report) sections

C. Anomalies(outlined within the content of the report) section

The owner of the report, making use of its content, is obliged to refer to the information contained herein, and he is obliged to state that he makes use of the results obtained by the Laboratorium Badawcze Zakładów Badań i Atestacji “ZETOM” facility in Katowice, accredited by the Polish Centre for Accreditation.

1. BASIS FOR THE RESEARCH

1.1. Name of the document of the Ordering Party: Heat Decor Tests Order, for carrying out tests at the “ZETOM” Calibration and Testing Laboratory in Katowice.

1.2. Ordering Party'd Document ID: Order (e-mail)

Date: August 23rd 2016.

1.3. Related to: Carrying out the tests concerning the conformity with the core requirements

2. Goal of the tests: verification of the properties and features, in line with the test programme.

3. Subject of the Test Programme

3.1. Name of the subject: Heat Decor HD310 heating film, for heating up the rooms

3.2. Ordering Party: Eco-Term sp. z o.o.

3.3. Producer/Supplier: Eco-Term sp. z o.o.; ul. Mały Płaszów 10; 30-720 Kraków, POLAND

3.4. Location where the product is being manufactured: Korea

3.5. Method of delivering the test object: by the Ordering Party

3.6. The objects were received from: The Ordering Party

3.7. Reception protocol: -

3.8. Date on which the test object was received: August 19th 2016.

3.9. Additional marking by the receiver:

3.10. Description of the object packaging: -

3.11. Marking of the objects at the laboratory:

Object marking before it is delivered to the laboratory	Marking of the objects at the laboratory ¹⁾	Remarks
-	2016/245	_____

¹⁾ is still treated as the sample index.

Nameplate

**HEAT
DECOR**
FOLIA GRZEWCZA
HEATING FILM

Model	HD310
Moc / Power [W/m]:	220
Napięcie / Voltage [V]:	230, 50Hz

Wymiary / Dimensions:

Szerokość / Width [mm]:	1000
Grubość / Thickness [mm]:	0,338
Waga / Weight [kg]:	48,5

Producer / Manufacturer: Eco-Term sp. z o.o.
ul. Cystersów 3, 01-500 Kraków, Poland
Współpraca z: Kivool / made in Korea
Tel: +48 12 35 70 134, info@kivool.com
www.heatdecor.com



Heat Decor HD310 heating film, for heating up the rooms

4. Test Program

The test program includes tests carried out in line with the norms as follows:

- PN-EN 60335-1:2012 „Electric household and similar appliances. Safety of use. Part 1: General requirements”.
- PN-EN 60335-2-96:2005+A2:2009 „Electric household and similar appliances. Safety of use. Part 2-96: Detailed requirements related to flexible heating mats, used for indoor heating”. (**Tests carried out with the use of non-accredited methods**)

Possible cases of assessment:

- Description of the test does not concern the tested object : **N** (A)
- The test subject meets the requirement : **P** (pass)
- The test subject does not meet the requirement : **F** (fail)
- This is not included within the scope of the test program : - (-)

General remarks:

“(see remark #)” refers to the remark which has been attached to the report herein.

“(see the table attached)” refers to the table which has been attached to the report herein.

“(see the Appendix #)” refers to the Appendix which has been attached to the report herein.

The report herein uses the point mark to separate the decimals.

The report concerns the full test programme carried out for the Heat Decor HD310 heating film, used for the purpose of heating up the rooms.

Basic technical parameters:

Power-supply voltage: 230 V

Frequency: 50 Hz

Power 220 W/m

Width: 1000 mm

Thickness: 0.338 mm

IPX7 Degree

The Heat Decor heating film which is a subject to the test programme, may be used for the following purposes:

- Floor heating under the floor panels
- Floor heating under the ceramic tiles with a concrete or anhydrite-bound screed
- Wall heating, embedded in a dry structure
- Ceiling heating, embedded in a dry structure

The herein test report takes into account two types of heating film hailing from a single family:

HD310 - Width: 1000 mm, Thickness: 0.338 mm

HD305 - Width: 500 mm, Thickness: 0.338 mm

Heating power of the HD310 film per linear meter:

1. 400 W/m
2. 220 W/m
3. 140 W/m
4. 80 W/m
5. 60 W/m
6. 40 W/m

Heating power of the HD305 film per linear meter:

1. 200 W/m
2. 110 W/m
3. 70 W/m
4. 40 W/m
5. 30 W/m
6. 20 W/m

5. Measurement equipment

– Hytherograph	ID No. 9200011
– Voltage meter	ID No. 2100021
– Voltage tests apparatus	ID No. 2100033
– Ammeter	ID No. 2200018
– Digital thermometer	ID No. 3200005
– Digital meter	ID No. 3200024
– Testing angle	ID No. 3200012
– Humidity chamber	ID No. 8920003
– Temperature regulator in the dryer	ID No. 8910001
– Calipers	ID No. 0120027
– Dynamometer	ID No. 1001065
– Meghommeter	ID No. 2700005
– Control-measuring device	ID No. 2500015
– Measuring tape	ID No. 0110063

6. Test Results and Description

6.1. The tests were carried out in line with the PN-EN 60335-1:2012 norm.

Item, according	Requirements	Measurements Observations	Result
5.	General Conditions for Test Execution		
5.1	Tests carried out in line with the herein norm belong to the test type		P
5.2.	Tests are being carried out on a single example of the equipment which ...		P
5.3	The tests are being carried out in order, compliant with the herein ...		P
5.7	The tests are being carried out in the room without a draught...	20 ± 5 ⁰ C	P
5.8	Test conditions depending on frequency and voltage		P
5.8.1.	The equipment may only be powered by alternating current. The test is being carried out with AC power supply, with the frequency..		P
	The equipment is powered via an AC power supply without named frequency, or with a frequency range ...		N
5.9	If the manufacturer offers other replaceable heating elements ...		N
5.10	Tests are being carried out on the equipment as delivered ...		P
5.11	The equipment is tested with the delivered power supply cord		P
5.12	Combined and heating equipment operated at power consumption..		N
5.13	Equipment with PTC heating elements, heating equipment and combined equipment, powered by a switched-mode power supply		N
5.14	0I and I class equipment with metal elements		N
5.15	Equipment with elements operated at SELV voltage		N
5.16	Equipment with electronic circuitry		N
5.17	Equipment powered by rechargeable batteries		N
5.18	Linear and angular dimensions provided without any deviations		N
5.19	Element or part of the equipment with automatic or non-automatic features		N
6.	Classification		
6.1.	In order to protect the user from electrical shock the equipment shall conform with Class I, II, or Class III requirements.	Class II (After the film is embedded and installed, in line with the manufacturer's manual)	P
6.2.	Water-resistance	IPX7	P
7.	Instruction Manuals and Marking		
7.1.	Rated voltage or rated voltage range	230 V	P

1	2	3	4
	Current type or frequency	50 Hz	P
	Rated power consumption	220 W/m	P
	Rated current		N
	Name of the manufacturing facility or trade label	Heat Decor	P
	Type or model designation	HD310	P
	Class II Symbol		P
	IP Number	IPX7	P
	Class III Symbol		N
	Protective cover of the electric water valve - marked ...		N
7.2.	Stationary equipment, with multiple power supply sources, features a warning sign		N
	The warning sign is located close to the clamps		N
7.3.	The equipment which has a similar rating range, and which may be operated without the change of settings within the whole range, shall be labelled with the top and bottom values of the range, separated by ...		N
	The equipment, in case of which the rating is varied, and in case of which the settings shall be changed to achieve the defined power rating, by the user, or by the person who is setting up the given device, shall be labelled with the aforesaid values separated by a slash symbol		N
7.4.	The voltage setting of the equipment - clearly visible		N
7.5.	The equipment is rated for more than a single voltage range, or more than a single rated voltage, it should feature the following information visible:		
	Lowest and highest values of rated power consumption Marked on the equipment ...		N
7.6.	Correctness of the applied symbols		P
7.7.	The equipment has been designed for being connected to more than two power supply cables and the equipment which should be powered from several sources should be fitted with a connection layout, attached to		N
7.8.	With the exclusion of the Z-type connector, the power-supply clamps shall be labelled as follows:		
	- Clamps that are destined solely to be used with the neutral wire ...		N
	- Grounding clamps shall be labelled with the ... symbol		N
	It is not permissible to place those symbols on the screws, removable washers or other parts which may ...		N
7.9.	Switches labels and layout		N

1	2	3	4
	Switches labelling is understandable and legible, regardless of the form and foreign languages proficiency		N
7.10.	Varied positions of the switches for the stationary equipment, and varied locations for the regulators, in case of the whole equipment package, shall be marked with digits ...		N
	If the digits are used to mark the various positions ...		N
	The elements used for 0/1 function, if such elements exist, shall be different from the remaining elements ...		N
7.11.	Regulators which are to be used during the installation process or during the normal operation, shall have their directional character ..		N
7.12.	The equipment is delivered with an instruction manual		P
	Special user-maintenance precautions shall be taken when the unit is maintained by the user, as per instruction manual ...		P
	The equipment may be utilized by children at age of at least 8 and by persons who are physically disabled, under a relevant supervision ...		P
	The instructions of the class III equipment shall include information referring to the sole power supply voltage ...		N
7.12.Z1	Special instruction manuals regarding the safe operation of the equipment shall be brought together at the beginning of the instruction manual. Signs should be at least 3 mm high.		P
7.12.1.	If special precautions need to be taken in the process of setting the equipment up, the said precautions are in detail ...		P
	If the equipment is designed for being connected to the system ...		N
7.12.2.	If the equipment installed has not been fitted with a power supply cord and plug, or other device ...		N
7.12.3.	If the power supply cords insulation for the equipment which is expected to be continuously plugged in into the electrical system ..		N
7.12.4.	The instruction manual for the equipment to be embedded shall include clear information related to:		
	- Dimensions of the space that is required to properly install the equipment		N
	- Dimension and layout of the supporting elements		N
	- Minimum spacing between the individual components		N
	- Minimum air-vent dimensions		N
	- Power supply connection ..		N
	- Need to provide plug access ...		N
7.12.5.	Instruction Manual contains the following information:		
	- X type connector		N

1	2	3	4
	- Y type connector		N
	- Z type connector		P
7.12.6	If a non-automatic thermal switch is required, conforming with the norm, the instruction manual related to the equipment including the switch should include the following content: WARNING Should a danger emerge, caused by unintentional ...		N
7.12.7	The installed equipment's instruction includes ...		N
7.12.8	Within the instruction manuals of the equipment connected to the water pipeline network, the following data shall be included: - Maximum water supply pressure - Minimum water supply pressure, if this is ...		N
	Within the instruction manuals of the equipment connected to the water pipeline network, with the use of detachable complete hoses, the following data shall be included:		N
7.13.	Operating and maintenance manual in Polish;		P
7.14.	The labelling shall be clear, legible and permanent		P
7.15.	The labelling shall be placed on the main portion of the equipment		P
	The labelling on the equipment shall be easily noticeable from the outside ...		P
	In case of the stationary equipment, once the equipment is set up as if it was to be normally operated, at least the following data shall be visible: name of the generator		N
	The indications related to the connectors and regulators shall be placed close to the aforesaid appliances. They shall not be located on the parts.		N
7.16.	Marking of the thermal coupling or a fuse insert ...		N
8.	Protection from accessing the active components		
8.1.	The equipment shall be designed and protected in a way which would secure the active components from being touched ...		P
8.1.1.	The lamps under the removable cover are not to be removed ...		N
	It should not be possible to touch the active components with the use of the sampler		P
8.1.2.	The sampler shall be inserted without using any force into the holes of Class 0 or II devices, with the exception of the holes which make it possible to access ...		N
8.1.3.	In case of the equipment of class different from class II, to the parts of the heating or visibly glowing elements, all polarities of which may be disconnected with a single action ...		N

1	2	3	4
8.1.4.	The accessible part shall not be considered to be active, if:		
	- It is powered with a very low and safe voltage		N
	- It is separated from the active parts with a protective level of ...		N
	In case when protective impedance is applied, the current between the given part and the power source ...		N
8.1.5.	The active parts for being embedded, of the equipment installed and delivered in separate assemblies shall ...		P
8.2.	Class II equipment, created and enclosed in a way which provides protection from accidental touching ...		P
	It should only be possible to touch the parts separated from the active parts with a double or reinforced insulation		P
10.	Power and Current Consumption		
10.1.	Power consumption value:		
	- Power rating		P
	- Measured power		P
	Acceptable deviation ... +5%/-10%		P
10.2.	Current consumption value:		
	- Current rating		N
	- Measured current		N
	Permissible deviation ...		N
11.	HEATING UP		
11.1.	The equipment and its surroundings should not excessively heat up during the normal use.		P
11.2.	The manual equipment is kept in the ... position during the test		N
	The embeddable equipment shall be embedded ...		N
	Heating equipment and combined equipment shall be placed in a corner		N
	The equipment which is powered by a motor, destined to, during normal ...		N
11.3.	Temperature growth is being measured with the use of thermo-components made out of a thin wire, so that they present the highest ...		P
	Increase of the wiring temperature, with the use of resistance ...		N
11.4.	The heating equipment is operable at 1.15x of the rated power consumption		P

1	2	3	4
11.5.	The equipment with motor-drive, is operated at voltages ranging from 0.94 to 1.06 ...		N
11.6.	Combined equipment has been operated at voltages ranging from 0.94 to 1.06 of the rated voltage.		N
11.7.	The equipment was operated throughout the period corresponding with the least favorable conditions ...		P
11.8.	Measured temperature growth		P
	Protection devices should not be triggered		N
	Casting compound did not leak		N
13.	Leakage current and electric strength at working temperatures		
13.1.	At the working temperature, the leakage current level shall not be excessive, the electrical strength shall also be proper		P
	The equipment is being operated under normal conditions ...		P
13.2.	Leaking current is measured with the use of the IEC 60990 defined system.		P
13.3.	The insulation is exposed to 60 seconds long voltage impact with sinusoidal profile, at 50 or 60 Hz.	(Table attached)	P
15.	Humidity Resistance		
15.1.	The housing of the equipment provides a proper level of humidity protection, in line with the equipment class ...		P
15.1.1.	The equipment, in case of which protection level was different that IPXO underwent relevant testing in line with the IEC 529 norm.		P
15.1.2.	The manual equipment is being continuously rotated during the test, being placed ...		N
	The embeddable equipment is being installed in line with the instruction manuals...		N
	The equipment with an automatic cable retraction spool is tested		N
	The equipment used on the floor or on a table is placed on a horizontal ...		N
	The equipment which is installed on the wall and equipment with wheels ...		N
	The removable parts are removed and subjected to tests, depending on the needs ...		N
15.2.	The equipment in case of which liquid may be transferred inside during normal use, shall be designed in a way, in which the above feature has no detrimental impact on its electrical insulation		N

1	2	3	4
	The equipment should, with a positive result, pass the electrical strength test...		N
15.3.	The equipment shall not be sensitive to the humidity present in conditions of normal operation.		P
	Humid permanent hotness ...		P
16.	Leaking current and the electrical strength		
16.1.	The leakage current level shall not be excessive, the electrical strength shall also be proper		P
16.2.	The drawn AC voltage is being transferred between the active components and the accessible metall components that remain unconnected...	0,25 mA	P
	The leakage current of the combined equipment cannot exceed the values defined for heating or motorized appliances		N
16.3.	Directly after the test carried out in line with 16.2, the insulation of the equipment is being tested through exposure to voltage of sinusoidal type ...	1750V	P
17.	Transformer and Transformer-Powered Circuitry Overload Protection		
	The equipment featuring transformer-powered circuitry shall be designed in a way, should any short-circuit events that may emerge during normal operation, which would prevent exceeding ...		N
	The insulation temperature growth, when it comes to the very low safe voltage wiring, shall not exceed proper values listed in the table 3 by more than 15 K.		N
	The transformer winding temperature shall not exceed the values listed in table 8		N
18.	Wear Resistance (requirement, if it is required in line with the Part 2 of the Norm)		P
19.	Operation in Abnormal Conditions		
19.1.	The equipment shall be designed in a way, in which, as a result of abnormal or negligent operation, the fire hazard ...		P
	The electrical circuitry shall be designed and applied in a way, in which the possible interference does not render the equipment dangerous ...		N

1	2	3	4
	The testing procedures are continued until the moment when the non-automatic thermal circuit breaker is activated, or until the moment when a stable state is attained...		N
	The combined equipment is tested with motors and heating elements operating at the same time, in normal conditions.		N
19.2.	The equipment with heating elements is tested in the conditions described in chapter 11, with limited heat dissipation. The power supply voltage set before the test shall have the value which ...		P
19.3.	The 19.2 test is being repeated at a voltage set before the test in a way, which would make the power consumption equal to 1.24 of the rated power consumption in normal operating conditions, after stabilization ...		P
19.4.	The equipment is tested in the conditions described in chapter 11. Each of the temperature-limiting regulators, during the test carried out in line with Chapter element remains active		N
19.5.	The 19.4 test is repeated with the use of 0I class equipment and I class equipment, with pipe or moulded-in heating elements. However ...		N
	The test is repeated with changed power supply polarity with the other end of the element coupled with the cover		N
19.6.	The equipment featuring PTC heating elements is powered in line with its voltage rating, until it reaches a stable condition within the scope of temperature and power consumption.		N
19.7.	The equipment shall be tested with its motor stopped through:		
	- Locking the rotor, should the torque of the locked motor ...		N
	- Locking the moving parts, in case of any other type of the equipment		N
	The equipment with motors fitted with capacitors within the auxiliary winding is started with the rotor locked, and with sequentially ...		N
19.8	In case of the three-phase motor-powered equipment, one phase is disconnected ...		N
19.9.	The dynamic overload test is carried out with the use equipment with motorized power, which is to be remotely controlled or automatically controlled, or designed for continuous operation.		N
	The equipment which is powered by a motor and combined equipment and equipment in case of which the motor winding is protected by protective winding...		N

1	2	3	4
	The equipment is being operated under normal conditions and with power supply at the rated voltage, until a stable status is achieved Then, gradually ...		N
19.10.	The equipment with series-motors has been activated with power supply at voltage equivalent to 1.3 of the voltage rating.		N
19.11.	The electronic circuitry has been verified by purposeful introduction of interference, in line with 19.11.2, unless they meet the conditions met in the 19.11.1 procedure.		N
	If the conductive path of the circuit board has been broken, it is assumed that the equipment passed the test and that conditions are met...		N
19.11.1.	The interference statuses from a) to f), listed in 19.11.2, have no relevance in case of circuitry, should the following conditions be met:		
	- Electronic circuit is of low power rating		N
	- Protection from electrical shock, fire and mechanical hazard shall not be dependent on the proper operation of the electronic circuitry		N
19.11.2.	The interference states listed below are taken into the account:		
	a) short-circuit of the insulation spacing in the surface insulation and air insulation.		N
	b) Open circuit with clamps on any element		N
	c) Capacitor short-circuit		N
	d) Short-circuit of any two ends of the electronic element		N
	e) Damage of the triacs in a diode system		N
	f) Damage of the microprocessors and integrated circuits, with the exception of components such as thyristors and triacs		N
	g) Damage of the electronic power connector in stand-by mode		N
	Moreover, each of the low power circuits is also subjected to a short circuit condition.		N
	In case when interference is introduced, the equipment shall be operated in conditions defined by Chapter 11, with rated voltage		N
19.11.3	If the equipment features an operable electronic protective circuit, then...		N
19.11.4	The equipment which features a device, in case of which the switched off setting is attained through electronic circuit breaker, or featuring a device which may be ... The tests are carried out with the safeguards disconnected, unless the said safeguards feature spark gaps		N

1	2	3	4
19.12.	If in any state of interference, among the states as such listed in section 19.11.2, the safety of use of the equipment is dependent on a miniature fuse, the test is repeated, however, the fuse is replaced with an ammeter.		N
19.13.	During the tests, flames should not emerge within the equipment, nor should the metal melt or toxic fumes emerge, in a quantity dangerous for ...		P
	After the said tests, the housing of the device shall not be deformed.		N
	After the tests the insulating material different from the class III insulation, shall positively pass the electric resistance verification ...		N
	The equipment with electronic connector in the switched off position ...		N
	Once the control system is activated or deactivated, the air insulation gaps and surface insulation clearances...		N
	The equipment should enter a malfunction or error mode, no damage to the electronic components shall occur...		N
	In case of the equipment fitted with covers or doors controlled with a single on more than one locking mechanisms ...		N
19.14.	The equipment is operated in conditions according to chapter 11. Each of the contactors or activating relays...		N
19.15.	In case of the equipment featuring a power-supply voltage selecting adapter, the said adapter is set to the lowest rated voltage...		N
20.	Stability and Mechanical Hazards		
20.1.	Equipment different from the installed equipment and manual equipment, designed for being used on a surface such as floor, shall retain a proper level of stability.		N
	The equipment should be placed on a plane which has an inclination of 10 degrees in relation to the horizon.		N
	The equipment shall not tip over.		N
	The equipment which features heating elements shall be subjected to tests at inclination of 15 degrees.		N
	During the test, the temperature growth shall not exceed the values listed in table 9		N
20.2.	The moving parts of the equipment, within the scope guaranteeing ability to use and operate the equipment, shall be scattered or protected...		N
	In case of the equipment which features dangerous moving parts related to the hardware's basic function...		N

1	2	3	4
	The cases, protective covers and similar parts shall be impossible to detach and they shall have sufficient strength ...		N
	Unexpected repeated activation of the thermal circuit breakers and excessive current protection...		N
	It shall not be possible to touch the dangerous moving components with the use of the test probe		N
21.	Mechanical Strength		
21.1	The equipment shall have a proper level of mechanical strength and it should be designed in a way resistant to negligent use.		P
	The equipment shall not exhibit any damage after being exposed to three hits in any point of the housing that seems to be weak.		N
21.2	The available parts of the insulation shall be resistant enough to being punctured with sharp tools.		N
22.	Design		
22.1.	The equipment has a sufficient IP protection level...	IPX7	P
22.2.	The stationary equipment shall be fitted with measures that make it possible to disconnect the power supplies at all poles. Such measures shall include:		
	- Power supply cable, impossible to disconnect, with a plug		N
	- Connector		N
	- Statement included in the operating manual		N
	- Equipment plug		N
	OI class equipment and I class equipment, permanently connected to the power source, single pole connectors and single pole safeguards...		N
22.3.	The equipment fitted with connection “pegs”, with plug sockets shall not impose load on the sockets		N
22.4.	The liquid heating equipment and equipment creating excessive vibrations ...		N
22.5.	No electric shock emerges when it comes to the charged capacitors ... The voltage value shall not be higher than 34 V.		N
22.6.	The equipment should be designed in a way which would not weaken the electrical insulating material due to possible contact with water ...		N
22.7.	The equipment containing gases or liquid shall be properly secured from excessive growth of pressure ...		N

1	2	3	4
22.8.	In case of the equipment which includes chambers that are accessible without the use of tools, and it is assumed ...		N
22.9.	The equipment should be designed in a way which would not expose the parts such as insulating material, internal wiring, winding, to oil...		N
22.10.	Unexpected repeated activation of the non-automatic thermal circuit breakers with support ... Switches for restarting the device are arranged or secured..		N
22.11.	The parts that are impossible to detach shall be installed in a secure manner ... The clamps used for the purpose of installing such parts should be closed in a clear manner ...		N
22.12.	Handles, knobs, grips are installed in a reliable manner ... The parts applied to indicate the position of connectors shall be impossible to install in an incorrect position ...		N
22.13.	The handles are designed in a way, which makes it possible, when gripping with a hand ...		N
22.14.	The equipment shall not feature sharp or rough edges... Sharp edges of the self-tapping screws or other screws ...		N
22.15.	Hangers or similar elements for storing the flexible hoses shall be smooth and well-rounded		N
22.16.	Spools for winding the hoses are smooth and round ...		N
	- Cable winding test ...		N
	- Electrical strength test		N
22.17.	The spacers which are to set the position of the equipment in relation to the wall shall be placed in a way, thanks to which ...		N
22.18.	Current conducting elements shall be resistant to corrosion in normal operating conditions ...		P
22.19.	Driving belts do not act as an insulating element		N
22.20.	Active parts have no contact with the thermal insulation, unless ...		N
22.21.	Wood, cotton, silk, paper and similar materials shall not be used for the purpose of insulation.		P
22.22.	The equipment shall be asbestos-free		P
22.23.	Within the equipment, no oils containing ... shall be used		N
22.24.	Bare heating elements shall be supported in a way, in which, should they be broken, it has to be impossible for the heating wire to be exposed to short circuit		N

1	2	3	4
22.25.	Equipment different from the Class III hardware shall be designed in a way which would prevent the hanging heating elements from touching one another ...		N
22.26.	Class II equipment including Class III equipment components shall be designed in a way which would make the insulation between the parts ...		N
22.27.	Parts connected with protective impedance shall be ...		N
22.28.	In case of the Class II equipment connected during normal use to the gas or water pipeline network, the metal elements not expected to conduct the electricity ...		N
22.29.	Class II equipment, expected to be constantly connected to the electrical system, shall be designed in a way so that it would be...		N
22.30.	The components of the Class II design, taking on a function of extra or enhanced insulation, and which could be disregarded in case of repeated assembly, shall be:		
	- Installed in a way, which would prevent them from being removed without a serious damage.		N
	- Designed in a way which would prevent them from being installed in an incorrect position.		N
22.31.	The insulation spacing on the surface, in case of the extra or reinforced insulation, shall not become smaller as a result of...		N
22.32.	The additional and extra-reinforced insulating material shall be designed or secured in a way which would prevent the dirt from being accumulated on those elements.		N
	Parts made out of natural or synthetic rubber, resistant to aging...		N
	Ceramic materials that are not tightly sintered and similar materials or ceramic beads not used as insulating material...		N
22.33.	Conductive liquids that are or may be available...		N
	In case of the Class II designs, conductive liquids shall not remain in direct contact with the insulating material...		N
	In case of the Class II designs, conductive liquids that remain in contact with the active components, shall not be in contact with...		N
22.34.	Knob axles, handle axles, levers and similar elements shall not be a subject to voltage, unless the axle is unavailable ...		N
22.35.	In case of the designs other than the ones belonging to class III, handles, levers and knobs that are held or activated manually, during...		N
	In case of the stationary equipment, this requirement is not applicable in case of the handles, levers and knobs other than the ones belonging to...		N

1	2	3	4
22.36.	In case of the equipment different from the class III equipment, the handles designed in this way should make it possible, when the operator grips them by his hand...		N
22.37.	In case of the Class II equipment, the capacitors shall not have a direct connection with the metal elements ...		N
22.38.	The capacitors shall not be placed in between the connecting points of the thermal circuit breaker		N
22.39.	The lamp holders shall be used solely for the purpose of...		N
22.40.	The equipment with motorized drive and combined equipment which is designed to be mobile during the operation ...		N
	The equipment cannot be operated in a continuous, automated manner, it also cannot be controlled remotely, without a growing level of danger...		N
22.41.	The equipment shall not include components other than tubes, containing mercury		N
22.42.	The protective impedance shall be composed out of at least two separate components, the impedance of which ...		N
22.43.	The equipment which may be designed to be used within a varied voltage range shall be designed in a way which would make it impossible to accidentally change the voltage setting		N
22.44.	The equipment shall not have a housing which is shaped and decorated in a way, which is similar to a toy...		N
22.45.	If the air is used as reinforced insulation, then the insulating clearances shall be provided in the equipment's design.		N
22.46.	Software used within the electronic safety circuits shall be compliant ...		N
22.47.	The equipment designed with a purpose of being attached to the water pipeline shall be sufficiently resistant to the water pressure. No leaks from any part of the equipment shall be present.		N
22.48.	The equipment designed with a purpose of being attached to the water pipeline shall be designed in a way which would make it impossible for the water to flow in the reverse direction.		N
22.49.	In case of remote control, the operation time shall be set before starting the equipment up...		N
22.50.	If the equipment has been fitted with regulators of any kind, then the operation of those regulation shall have a priority over the control ...		N
22.51.	The regulator of the equipment shall be manually set, in compliance to the setting of the remote control ... A visual marking shall be placed on the equipment		N

1	2	3	4
22.52.	The electrical sockets on the equipment, accessible to the user, shall be compliant with the system		N
23.	Internal Wiring		
23.1.	The conduits for the wiring within the equipment shall be smooth, without any sharp edges.		N
	The wiring shall be secured in a way which would secure it from touching the rough edges of the cooling fins, or ...		N
	The holes in the metal elements, through which the insulated wiring passes, shall have smooth surfaces ...		N
	The wiring shall be effectively protected from touching ...		N
23.2.	Beads and similar ceramic insulation on the live wires, should be installed in a manner which:		
	- Would prevent them from changing their position		N
	- Would prevent them from touching the sharp edges		N
23.3.	Different components of the equipment that may move in relation to one another during the normal use, or during...		N
23.4.	Bare internal wiring shall be stiff ...		N
23.5.	The insulating material of the internal wiring shall have voltage rating sufficient to withstand the voltage that may emerge during use of the device.		P
23.6.	If sleeves are used as additional insulating material, then they shall be kept in place, through installation ...		N
23.7.	The conductors of the cables in green-yellow insulation shall be solely ...		N
23.8.	The aluminum cables shall be used for the purpose of ...		P
23.9.	It is not permissible to reinforce the multi-cable wires through soldering ...		P
23.10.	Insulation and coatings of the internal wires placed in the external tubing used to attach the equipment ...		N
24.	COMPONENTS		
24.1.	Components utilized within the equipment shall conform with the safety requirements of the corresponding norms		P
	Active parts of the components and available parts of the equipment shall be compliant with the requirements of Chapter 29.		N
	Requirements, in line with section 30.2, are applicable in case of the elements made out of material other than metal utilized in order to create the components...		N

1	2	3	4
	The components that had been tested before, or that are not compatible with the norm, shall be tested for conformity ...		N
	The components had been tested and conform with the requirements ...		P
	The lamp and starter holders that had not been tested before and are deemed to be in compliance with a corresponding norm ...		N
	Electrical plugs and sockets and other connecting elements existing within the connection wiring, shall not be interchangeable ...		N
24.1.1.	Capacitors meet the requirements of the relevant, corresponding norm		N
24.1.2.	Safety transformers meet the requirements of the relevant, corresponding norm		N
24.1.3.	Connectors meet the requirements of the relevant, corresponding norm		N
24.1.4.	Automatic regulators meet the requirements of the relevant, corresponding norm		N
	Water valves with active components and embedded within the external hoses, for the purpose of connecting the appliance to the water supply network ...		N
24.1.5.	Connectors of the cap with a plug meet the requirements of the relevant, corresponding norm		N
24.1.6.	Lamp holders meet the requirements of the relevant, corresponding norm		N
24.1.7	If remote control of the equipment is carried out via an ICT network, norm relevant for the interface circuitry ...		N
24.1.8	Thermal connectors conform with the norm ...		N
24.1.9	Contactors and relays other than the engine start relays ...		N
24.2.	The equipment shall not feature the following:		
	- Connectors or automatic regulators connected to the wiring		N
	- Assemblies which, should a damage of the equipment occur, would trigger the safeguard within the power supply grid		N
	- Thermal circuit breakers that may be restarted		N
24.3.	The connectors, the purpose of which is to disconnect all polarities of the stationary equipment, shall be connected to ...		N
24.4.	Plugs and plug-in sockets for the very low voltage circuitry, and utilized for the purpose of connecting the heating elements, and plugs and sockets for the circuits ...		N
24.5.	Capacitors in the auxiliary winding of the motors shall ...		N
24.6.	Operating voltage of the motors connected directly to the power-supply, having their basic insulation not properly tailored to...		N

1	2	3	4
24.7	Detachable hoses, complete, used for connecting the equipment to the grid ... The hoses shall be delivered together with the equipment.		N
24.8	Engine starting capacitors within the equipment, in case of which 30.2.3 is applicable, and which are connected ...		N
25.	Connection of the Power-Supply and Flexible External Wires		
25.1.	Equipment other than the one designed for constant connection to the electrical system shall be fitted with one of the following measures for connecting it to the power-supply:		
	- Power supply cable, impossible to disconnect, with a plug		N
	- Plug offering at least identical degree of protection ...		N
	- Connection poles for connection with the plug socket		N
25.2.	The equipment features one technical measure for connecting the power supply		N
	The stationary equipment features more than one technical measure for connecting the power supply		N
25.3.	Equipment designed for constant connection to the electrical system shall be fitted with one of the following measures ...		P
	The equipment which is fixed to something is designed in a way, which would allow for dismantling of some of the parts, making the installation process easier...		N
25.4.	The current of the equipment does not exceed 16 A, while the input allows for introduction of a cable ...		N
	Quantity of the cable conductors cable diameter		N
	Input holes in the equipment displaced and designed in a way ...		N
25.5.	Power-supply wires which are impossible to be disconnected shall be attached to the equipment with the use of one of the technical measures	Z type	P
25.6.	The plugs shall not be fitted with more than one flexible cable		N
	The power supply cables that are not being disconnected from the portable single phase equipment with current rating below 16 A shall be...		N
25.7.	The connection cable is of type not lighter than	LgY 2.5 mm ²	P
	PVC-covered wiring shall not be used in case of the equipment, in which, on the metal components		N
	Nondetachable power supply cables for the Class III equipment shall be properly insulated		N

1	2	3	4
25.8.	Power supply cable wires shall have nominal cross sections that are not smaller than the values contained in table 11.	2.5 mm ²	P
25.9.	The nondetachable power supply cables shall not remain in contact with sharp edges or points of the equipment		P
25.10.	The power supply cable, impossible to be detached from the class I equipment, shall have a wire with insulation of yellow-green color, which is only connected to the ground clamp of the equipment and ground connector of the plug		N
25.11.	The wires of the power-supply cables are not reinforced by being soldered around with lead-tin alloy, should they be exposed to compression in a clamp		P
25.12.	The insulating material of the nondetachable power supply cable should not be damaged as a result of bending the cable, in order to match the curvature of the housing		N
25.13.	Input holes created in a way which protects the cover of the cable when the nondetachable power supply cable through those holes.		N
25.14.	The equipment fitted with a power supply cable which is impossible too be disconnected and movable during operation features a safeguard, preventing the connection cable from excessive bending		N
	The wire has been subjected to the force of N		N
	Resistance test, concerning bending		
	- 20 000 times in case of the Z-type connections		N
	- 10 000 times in case of other connections		N
25.15.	The equipment fitted with a nondetachable power supply cable and equipment designed to be connected to the electrical system in a fixed manner, with a flexible cable, shall have a tension relief system attached.		N
	It is impossible to push the cable into the equipment		N
	Test of pulling the cable with the force of N		N
	Exposing the cable to the torque of Nm		N
	The cable did not move by more than 2 mm		N
	No excessive tension of the cable wires within the clamps took place		N
25.16.	For the X-type connections, the tensile relief is designed and placed in a way, thanks to which:		
	- Replacement of the cable is not difficult		N
	- Tensile relief method is obvious		N
	- It may be used for a variety of cable types		N

1	2	3	4
	- The cable does not remain in contact with the mounting screws that remain in the touching range		N
	- The cable is not pushed with metal screws		N
	- One of the parts of the tensile relief is fixed in a secure manner		N
	- The screws are not used to fix any other elements of the equipment		N
	The aforesaid requirements are not applicable, if:		
	- When the aforesaid screws are excluded, the equipment is rendered inoperable,		N
	- The parts that were to be mounted with the use of the said screws could not have been removed without using a tool, when replacing the wire		N
	- Option of passing besides the labyrinths ...		N
	In case of the class 0, 0I and I equipment, these elements have been made out of insulating material or were ...		N
	In case of the class II equipment, these elements have been made out of insulating material and in case ...		N
25.17.	Y and Z connectors feature proper tensile relief system		N
25.18.	Tension relief system is placed in a way which allows access to it solely with the use of proper tools ...		N
25.19.	In case of the X-type connectors of the portable equipment, glands are not applied in a role of the tension reliefs ...		N
	No knots or rope tightening exist on the cable ...		N
25.20.	In case of the Y or Z type connections, the wires of the non-detachable power supply cable shall be isolated from the parts accessible		N
25.21.	For the purpose of connecting the nondetachable power supply cable via an X-class connection, or for the purpose of connecting it to the electrical power supply system, there should be ...		N
25.22.	The equipment plugs shall:		
	- Parts with live voltage are inaccessible ...		N
	- Be placed in a way which would not make it more difficult to ...		N
	- The equipment is not supported on a cap ...		N
	- Not be a plug for cold operation, if...		N
25.23.	Connection cables meet the requirements defined for the non-detachable power supply cables, with the exception of ...		N
25.24.	Connection cables have not been fitted with connectors such as...		N

1	2	3	4
25.25.	The dimensions of the poles inserted into the plug socket shall be compatible with the dimension of the corresponding ...		N
26.	Clamps for the external cables		
26.1.	The equipment should be fitted with clamps or a similar system, designed to attach the external wiring		N
	The clamps shall be accessible solely after a non-detachable cover is detached		N
26.2.	The equipment with X-type connection, with the exception of the equipment with specially designed cable and equipment designed for ...		N
	Screws, washers, fastening screws, should not be used for mounting...		N
	In case of the soldered connections, the cable wires should be located or installed in a way which ...		N
26.3.	Clamps for the X-type connections and for connecting the equipment to the fixed installation shall be installed in a way, thanks to which:		
	- The clamp cannot be loosened		N
	- The internal cabling is not exposed to tension		N
	- clearances and insulation distance is not diminished		N
26.4.	In case of the clamps used for the purpose of creating the X-type connections, with the exclusion of the X-type connection using a specially prepared wire ...		N
26.5.	Clamps that may be used for the X-type connection should be placed or covered in a way, which, should the wire be introduced ...		N
26.6.	Clamps for the X-type connections and for connecting the equipment to the electrical system, shall make it possible to add wired with nominal cross section as per table 13		N
26.7.	Clamps that may be used for the X-type connection should be available once the cover and part of the housing is removed		N
26.8.	Clamps used for connecting the equipment to the electrical system, including the grounding clamp, shall be arranged close to each other		N
26.9.	Bushing-type clamps shall be designed and displaced in a way, that would make it possible to place the end of the wire ...		N
26.10.	Threaded and thread-less clamps shall not be used for the purpose of connecting the wires of the flat spiral cable, unless...		N

1	2	3	4
26.11.	In case of the equipment featuring Y or Z connection used to attach external cables, soldering, welding, clamping and similar connections may be applied		P
	Solder-connected wires are not considered to be situated or mounted ...		N
27.	Earthing Connections		
27.1.	Accessible metal parts of the class 0I and class I equipment should be, in a fixed and reliable manner, connected to the earthing clamp		N
	Grounding clamps and contactors shall be connected electrically with the neutral clamp		N
	Class 0, II and III equipment shall not feature the grounding clamps		N
27.2.	Elements used to attach the grounding clamps shall be properly secured from getting loose		N
	The clamps used to attach the external earthing wires make it possible to connect wires with cross section ranging from 2.5 to 6 square millimeters		N
	The aforesaid clamps shall not be used for the purpose of providing continuity of the earthing connections between different components of the equipment		N
27.3.	In the detachable part which constitutes a fragment of the earthing connection, the earthing connection shall be created before the electrical connection		N
	In case of the equipment with a non-detachable power supply cable, clamp layout or wire length ...		N
27.4.	Any part of the grounding clamp, the purpose of which is to connect the cable wires of the external cables shall be made out of material ...		N
	Parts that ensure coherence of the grounding circuit different from the parts of the metal frame or housing shall be made ...		N
	Coated or uncoated steel components which are expected solely to provide or transfer ...		N
	If the body of the grounding clamp acts as a component of the frame or housing created out of aluminum or aluminum alloys ...		N
27.5.	Connection between the grounding clamp or grounding contact, and the components which shall be attached to those elements, shall have a low resistance		N
27.6.	The conductive tracks of the printed circuit boards shall not be used for the purpose of ensuring grounding continuity in the manually operated equipment.		N

1	2	3	4
28.	Screws and Connections		
28.1.	Mounting points, electrical connections and connections that ensure the continuity of the grounding circuit shall withstand ...		P
	Screws used for that purpose shall not be made out of a soft material.		N
	Screws used to create electrical connections or connections providing the continuity of the grounding shall be screwed into metal parts.		N
	The screws shall not be created out of insulating materials, if, should they be replaced with metal counterparts, the additional or reinforced insulation could be weakened.		N
28.2.	The electrical connections and connections ensuring the continuity of the grounding shall be created in a way, in which we would be sure that the contact pressure is not transferred via the insulating material ...		N
28.3.	Screws with high thread pitch (self-tapping screws for thin sheet metal) shall not be used to create electrical connections ...		N
	Self-tapping screws for thin sheet metal shall be used for electrical connections if they cut the thread which is fully corresponding with normal metric threading		N
	Self-tapping screws for thin sheet metal may only be used in case of the connections which ensure continuity...		N
	In case of any connection which is required to attain continuity of the grounding circuitry, at least two screws shall be applied...		N
28.4.	Screws, bolts and washers, used to create mechanical connection between different parts of the equipment, shall be protected from getting loose ...		N
	Rivets used to create electrical connections shall be protected from rotation, should those connections be exposed to rotation during normal use		N
29.	Surface, air and cross insulation clearance		
	The equipment shall be designed in a way which would make the air and surface insulation clearance, and the thickness of the fixed insulation, sufficient to withstand the possible stress ...		P
29.1.	Clearance and insulation distances shall not be shorter/smaller than the ones defined within table 16		P
29.1.1.	Air insulation clearance of the basic insulation should be sufficient to withstand ...		P
	Air insulation clearance within the clamps of the heating elements in pipe cover may be diminished down to 1 mm, if		N

1	2	3	4
29.1.2.	Air insulation clearance of the additional insulation ...		N
29.1.3.	Air insulation clearance of the reinforced insulation ...		N
29.1.4.	In case of the functional insulation, values are used as follows...		N
	Air insulation clearance within the surfaces of the PTC heating elements in pipe cover may be diminished down to 1 mm, if		N
29.1.5.	In case of the equipment operated with voltages higher than the rated voltage, e.g. within the secondary section		N
29.2.	The equipment should be designed in a way, thanks to which the surface insulation clearances are not smaller than the ones corresponding with the operating voltage, taking into account		P
29.2.1.	Surface insulation clearance of the basic insulation ...		N
29.2.2.	Surface insulation clearance of the additional insulation ...		N
29.2.3.	Surface insulation clearance of the reinforced insulation ...		N
29.3	Additional and reinforced insulating material shall have thickness proper, or feature enough layers to...		P
29.3.Z1	If an option exists to damage the insulation during the installation process, then the equipment shall be designed, so that		P
30.	Resistance to high temperatures, heat I Stray (leak) currents		
30.1.	The external portions of the insulating material resistant to high temperatures		P
30.2.	Parts other than the metal parts shall be resistant to being ignited, and shall make it difficult for the flames to spread		P
30.2.1.	Heated wire test, in line with IEC 60695-2-11 norm, at a temperature of 550 ° C		N
30.2.2.	In case of the equipment operated under supervision, the components made out of the insulating material, supporting the connections conducting the current, and parts made out of insulating material at a distance of 3 mm		N
	- Heated wire test at a temperature of 750°C (in case of the connections that pass through current above 0.5 A)		N
	- Heated wire test at a temperature of 650°C (remaining connections)		N
30.2.3.	The equipment which is remaining active without supervision shall be tested in line with the following guidelines:		
30.2.3.1	- Heated wire test at a temperature of 850°C (in case of the connections that pass through current above 0.2 A)		N
30.2.3.2	- Heated wire test at a temperature of 775°C / 750°C		N

1	2	3	4
	- Heated wire test at a temperature of 675°C / 650°C		N
30.2.4.	The surface material of the PCBs is exposed to the needle flame test		N
31.	Corrosion Resistance		
31.1.	Parts made out of an iron-containing material, the rusting of which may have a detrimental impact on the operation of the equipment shall be properly secured from corrosion		N
32.	Radiation, toxic effects and similar dangers		
32.1.	The equipment shall not be a source of dangerous radiation, it also shall not create toxic effect, it also should not create effects of nature which would be similar		N

13.2	Table: Leakage current at working temperatures		P
	The heating equipment is operable at 1.15x of the rated power consumption		P
	Equipment with drive and combined, at 1.06x of the rated voltage	-	-
Leaking current in between each of the poles of the power supply grid and the insulating surface of the film		(mA)	Permissible (mA)
		0.009	0.35
13.3	Table: Electrical strength at working temperature		P
Voltage test between each of the poles of the power supply network and the insulation		Test voltage (V)	Result
basic		1000	without avalanche breakdown
additional		1750	without avalanche breakdown
16.2	Table: Leaking current		P
	Drawn voltage - 1.06 of the rated voltage	244 V	-
Leaking current in between each of the poles of the power supply grid and the insulating surface of the film		(mA)	Permissible (mA)
		0.010	0.35
16.3	Table: Electrical strength		P
			-
Voltage test between each of the poles of the power supply network and the insulation		Test voltage (V)	Result
basic		1000	without avalanche breakdown
additional		1750	without avalanche breakdown

24.1.		Table: Components			
Assembly	Manufacturer	Type - Model	Technical specification	Conforming with the norms	Label in line with
Heating film	HEAT DECOR	HD310	220W±10% / m 230 V 50 Hz	-	CE; RoHS
Power supply cable	-	LgY	2.5 mm ² 450/750V	-	-

Connection between the film and the power supply wires is created with the use of a clamp, while self-amalgamating tape made out of a butyl seal tape.

6.2. The tests have been executed in line with the PN-EN 60335-2-96:2005 norm (Tests carried out with the use of non-accredited methods)

1	2	3	4
7	Labelling and Instruction Manuals		
7.1	Instead of using a label featuring the data of the rated current or power consumption, heating units shall be labelled with the rated power consumption.		P
	Flexible heating mats shall be labelled with rated power consumption label, with a reference to 1 meter of their length		N
	Flexible heating mats shall be labelled with maximum current rating, if:		
	- Current is variable, depending on the length of the element		N
	- Other flexible heating mats may be powered through the aforesaid mats		N
	Flexible heating mats shall be labelled as follows:		
	- they should feature the directional marking, unless the heating units are symmetrical		N
	- expected place of installation (ceilings, walls, floors)		P
	- Type of the heating (direct or storage heating), unless both types are expected		P
	If the heating unit is expected to be used solely in case of the floors created out of concrete or a similar material, it shall be properly labelled		N
	Labelling shall be repeated in 0.5 meter gaps of the heating elements within each and every section that may be cut, in order to create the heating units.		P
	Flexible heating mats that may be cut on location where they are installed and which should be cut only in the places indicated, shall be properly labelled		N
7.6	Correct use of symbols		P
7.12.1	Set-up manuals shall be delivered. The manual shall include the following information:		
	a) Clarification of labelling and symbols, should a need arise		P
	b) Information pertaining to installation of the heating units within the buildings		N
	c) Statement claiming that the installation procedure shall be carried out in line with the domestic legal regulation concerning the installation procedures		N
	d) Maximum permissible current rating, regarding the current that may flow through the heating unit, when other units are powered ...		N

1	2	3	4
	e) List of regulators (adjusting units), unless they are embedded within the heating unit		N
	f) Maximum thermal resistance between the heating unit and the room		N
	g) Type of the covering material, permitted to be used with the heating unit, with determined ...		N
	h) Profile of the thermal insulation which shall separate the separate units ...		N
	i) Outline of properties of the glueing materials		N
	j) Statement, suggesting that the label should be placed in a way that would attach it to the switchboard ...		N
	k) In case of the suspended ceiling heating units or heating units embedded within the available roof space ...		N
	l) statement that in case of the wooden floor applications, solely the heating units with insulation ...		N
7.12.101	The instruction for the devices embedded within the concrete floors, floors made out of a similar material, or under the ceramic tiles, shall include the information that:		
	a) The net should be installed above the heating unit		N
	b) When the heating units are installed, they need to be covered with additional layer of material that would protect them mechanically. If the heating units were installed ...		N
	c) If the heating units featuring solely the basic insulation, different from the units powered with very low, safe voltage		N
	d) Class II heating units shall be installed at least 30 mm from the conductive elements		N
7.12.102	In case of the heating units using solely the basic insulation, different from the ones powered with very low, safe voltage, designed for being used in the ceilings and metal floors, the instruction shall feature information that:		
	a) Flexible heating mats shall be completely covered with the ceiling or the floor.		N
	b) Metal components of the floor or of the ceiling shall be properly grounded. The instruction shall state that the metal components should include elements proper for connection..		N
7.12.103	The instruction manuals of the devices designed for floor use, with the heating units covered with tiles ...		P
7.12.104	Within the instruction manuals of the flexible heating mats that may be cut on installation site, it shall be indicated that such work could only be carried out by persons authorized by ...		N

1	2	3	4
7.12.105	Within the instruction manuals of the heating units that utilize the storage heating method, rated heating time should be indicated		N
7.14	Test involving the white spirit is not carried out		N
	If the symbols applied refer to the installation or heating method, they should be at least 15 mm high 15 mm		N
7.101.	The label that has enough space to calculate the heating units shall be placed within each and every electrical system, and it should contain the following data:		
	- Name, logo or trademark which would identify the manufacturer, authorized representative or the importer		N
	- Type or model designation		N
	The label shall include the following content:		
	- Flexible heating mats for floor/ceiling applications		N
	- Do not limit the heat emission from the heated floor/ceiling		N
	- Do not add materials other than recommended		N
	- Do not use nails or screws		N
10.	Power and Current Consumption		
10.1	This requirement is applicable also in case of the rated power consumption per one meter of length of the heating mats.		P
11.	Heating up procedure		
11.2.101	Heating units destined to be installed within the wooden ceiling are placed in an assay frame, such as ...		N
	Heating units designed for being installed within the metal ceilings shall be installed in line with the instruction manual		N
11.2.102	Nine modular heating units are being installed in line with the instruction manual They are arranged in a layout ...		N
11.2.103	Heating units destined to be installed within the wooden floor are placed in an assay frame, such as ...		N
	Heating units destined to be installed within the floor made out of concrete or similar materials ...		N
	Heating units designed for being installed within the metal floors shall be installed in line with the instruction manual		N
11.2.104	Separate heating units, destined to heat up wooden floor and ceiling, placed beneath the ceiling ...		N

1	2	3	4
13	Leaking current and the electrical strength at working temperature range		
13.1	The heating units shall be installed in line with the guidelines of section 11.2, with the use of coverage material which provides the least beneficial test conditions, due to the profile ..		N
16	Leaking current and electrical strength		
16.1	The test is carried directly with the use of the heating unit and additional electric insulation		P
16.2	The value provided for the 0 class equipment is applicable solely in case of the heating units featuring only the primary insulation		N
	The value provided for the II class equipment is applicable in case of the heating units destined to be installed on a conductive surface covered with the concrete, or...		N
16.3	The values provided for the 0 class equipment is applicable solely in case of the heating units featuring only the primary insulation		N
	The values provided for the II class equipment are applicable in case of the heating units destined to be installed on a conductive surface covered with the concrete, or...		N
	In case of the heating units using solely the basic insulation, different from the ones powered with very low, safe voltage, which are fitted with additional electric insulation, for		N
	In case of the heating units using solely the basic insulation, different from the ones powered through a separating transformer, fitted with additional electric insulation, for use in		N
18	Wear Resistance		
18.101	The connection between the heating element and the power-supply wiring loom and the connection cables shall be reliable		P
	The heating unit shall be placed in the heating chamber and powered with voltage which would make it possible to equalize the current with the value indicated on the heating element i.e. the rated current. Voltage loss at every connection is being measured.		P
	Voltage drop shall not exceed 22.5 mV or 150% of the value originally measured, depending on...		P
	Inspection after the test shall not expose any damage that could breach the conformity with ...		P

1	2	3	4
18.102	Electrical connections between the resistance material and the electrodes of the flexible heating films shall be reliable.		P
18.102.1	The heating unit is being coiled on a cylinder, the diameter of which is equal to the length of double minimum bending radius of the flexible heating mats, as defined by the instruction manual, and then ...		P
18.102.2	Certain part of the heating unit is installed between two plates with thickness of 100 mm, and dimensions large enough to completely cover the width of the heating element. One...		N
18.102.3	The heating unit is placed within a hygrostat, in conditions of relative humidity of $(80 \pm 5) \%$, and at the temperature of $(40 \pm 5) ^\circ\text{C}$. Then, the unit is powered with the rated voltage and heated up for 1 h, then the power is cut for 1 h. 1000 cycles are performed.		P
18.102.4	The heating unit is tested in line with the guidelines of 18.101, with 2000 cycles performed. However, no inspection of damage takes place, voltage drops also remain undetermined		P
18.102.5	The heating unit is placed on a horizontal surface and powered with the rated voltage. The needle is introduced into the resistive material of the heating element at an angle of 45° ..		N
18.103	Resistance of the heating unit shall not be significantly decreased during use		P
21	Mechanical Strength		
21.101	A part of the heating element is installed between two 100 mm thick plates of identical dimensions, completely covering the width of the heating element		P
	The heating unit then should, with a positive result, pass the electrical strength test pertaining to the insulation material in line with section 16.3, no damage should occur to a degree ...		P
21.102	Two heating units are subjected to the said test. The heating unit is placed on a horizontal steel plate of smooth surface and the surface of the element ...		N
21.103	Part of the heating unit with insulated heating wires is placed on a rigid steel plate. If the cables ...		P
21.104	A sample of the additional material layer is placed on the horizontal steel plate of smooth surface and is scratched with a hardened steel rod, the end of which has ...		N

1	2	3	4
22	Design		
22.101	The power connecting measures shall be connected to the heating element in a reliable way		P
	The heating unit is then placed on a flat horizontal manner and held in a way, which would ensure that around 100 mm of the heating element's length, along with the power supply wires loom...		P
22.102	The insulating material protecting the connections and edges of the heating element shall have no impact on the material the heating element is made of ...		P
	The heating unit is placed in a heating chamber, with temperature of 80 or 45 °C, plus the temperature growth		P
	After cooling down the heating unit to a level corresponding to a room temperature, the unit should pass, with a result which is		P
22.103	Layers of the electric insulation of the laminated flexible heating mats shall be reliably interconnected. However, if the heating units are destined to be used ...		N
22.104	The connecting elements that are attached to the power supply and connection wiring shall be of Class II design. It should not be possible to ...		P
22.105	The heating units of class II design, the purpose of which is to be installed under the floors in humid rooms, shall not expose the user to excessive current ...		N
24	Components		
24.101	Thermal switches required to meet the requirements in line with chapter 19 shall be non automatic and feature a proper mechanism.		N
24.102	Regulators and other elements required for provision of conformity of the heating units with the requirements, in line with the present ...		N
25	Connection to power supply and flexible external cables		
25.3	Heating units other than the ones that may be cut at the installation site, shall feature one of the following means	package of power-supply cable looms	P
	Heating units other than the ones that may be cut at the installation site, shall be delivered with proper...		N
26	Clamps for the internal cables		

1	2	3	4
26.1	The heating unit shall not feature screw-based clamps		P
27.	Earthing Connections		
27.1	The earthed connections diminishing the capacitive currents are not considered to provide ...		N

Complementary photographs:

