

Company Info SEGGI CENTURY CO., LTD.

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ALL PROPERTY.

HEARAU

Company Name: Seggi Century Co., Ltd. CEO: Hun-Kyu Park Category: Heating film manufacture Address: 94 Yeonam-gil, Chongpyeong-myeon, Jincheon-gun, Chungbuk-do, S. Korea Tel: +82-43-838-1911 Email: kdbae@heatplus.co.kr

해목가족입

Company History

2022

• Europe CE certification renewal

2020

- 2020 Russian TRCU certificate acquired
- MSS export voucher program join
- ISO certification renewal
- Renewal of the designation as s chungbuk Promising Exporter

2019

- Launched the new ACN plane film
- 3-million-dollar Export tower awarded

2018

- The 124th Chinese Export/Import goods Fair(1st batch) (Canton Fair 1st Batch)
- Selected as the registered products for Venture Nara
- Applied for the patent for waterproof, moisture-proof plane film type heating element and the plane heat radiation device using such a Mechanism

Company History

2017

- Started to export to Vietnam
- Japan PSE certification
- HEAT PLUS PTC Heating Film launched
- Patents Registration: "Plane heater with power supplier"
- Purchased second factory site

2016

- Additional development and supply of heating film for industrial use of Samsung Heavy Industries
- 'Shielding Heat Insulator' released
- Patents Registration:
 - "Multichannel plane heater controller"
 - "Window-type blinds with plane heater"
 - "Harmful current removal insulating material and manufacturing method of plane heater with it"

2015

- Participated in -Kyunghyang Housing Fair
 - -Russia MosBuild
- -Belgium, Germany, Lithuania Exhibition
- Re-selected as Promising Export Medium and Small Size Business
- Started to export heating film to Netherlands. Turkey, Bulgaria, United Kingdom, Mexico, Brazil
- Patents Registration:
 - "Length adjustable connection terminal for connecting electrode of plane heater"
 - "Plane heater comprising carbon fabric"
 - "Plane heater comprising heat cushion material and manufacturing method
- Started to export heating film to U.S.A

Company History

2014

- Selected as national policy subject in Aug. 2014 (developing the conductive ink manufacture technology for all coated heating element use.)
- Patent registration for all coated heating element and the manufacture method using hardening type carbon ink and adhesive
- The branch in Japan joined international house industry fair that have been held in Beijing, China
- Released Heat Plus DIY kit
- Released Half thermostat(HP-HALF): Exclusive for only Seggi Century Co., Ltd.
- Renewed UL for SPN-305 model
- Selected as excellent company at Seoul international Building Fair
- Started to export heating film to Poland
- Ranked as the top for the market share of heating film in Greece

2013

- All Coated Film APN-410, APN-405, APH-410, Stripe Coated Film SPH-305 launched
- Selected as a CLEAN business place, Company annexed Laboratory acknowledged
- Export to France, Lithuania, Estonia, Latvia
- Selected as a subcontractor of "Samsung Heavy Industry"
- A store is entered in the biggest European Building Materials Mart of Germany origin "Praktiker"
- Participated in Exhibition -Japan Tokyo Housing Fair -China Domotex -China CANTO FAIR -China ISH CHINA Air conditioning and Heating Fair -Russia SibBuild, MosBuild, BalticBuild Fairs -Latvia Bustas 1, Ryga Fair
- -Estonia EstBuild, Tallinn Fair
- -Lithuania RESTA 2013, Vilnius Fair
- -Czech Construction / Building Fair, Bmo Fair
- -MBC Construction Expo

Company History

2011~2012

- Designated as a Venture company in 2011
- Participated in: -the 109th, 110th, 111th China Import and Export Fair (CANTON), in Korean Pavilion, Guangzhou, China -Build Décor, Shanghai, China -Home & Building Show in Japan -Architectural Expo in Moscow, Russia -Architectural Expo in Prague, Czech Republic -International Energy Saving Expo
 - -Kyunghyang Housing Fair -MBC Architectural Expo
- Started to export heating film to Italy, Greece, Azerbaijan

2010

- Selected as Promising Export Medium and Small Sized Business in Chungcheongbukdo
- PSE(JET) Certification, Japan
- Participated in:

 MBC Architectural Expo
 Japan Home & Building Show
 Architectural Expo in Khabarovsk, Russia
 the 108th China Import and Export
 Fair(CANTON), IN Korean Pavilion,
 Guangzhou, China
- -Started to export heating film to Germany, Ukraine, Belarus, Kyrgyzstan

2005~2009

- 2005 -Established
 - 2007 -Started to export to Mongolia
- 2008

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- -Incorporation, Seggi Century Co., Ltd. -Establishment of Beijing Branch Office in
- China
- -KICM certification
- -ISO9001 certification
- -CE certification
- 2009
- -GOST(Russia) certification -Establishment of WeiHai Branch Office in
- China
- -RoHS Certification
- -Started to export to Japan (first in Korea), Russia, Turkey, UK, etc

Manufacturing Factory





We have the drying chamber that is possible to increase the temperature maximum 200 Celisius degree in Korea only.

This is very important for keeping good adhesion of the heating Film layers.

The good adhesion is very important for the heating film quality.

Technical difference with other heating film Manufacturers in Korea

HEAT PLUS

	HEAT PLUS	Competitors
Product	We have the production line that can produce both stripe coated and Full coated film.	They have the production line that can produce stripe coated Film only.
type	 Full coated type(Thermoset adhesion) -> Thermoset that is strong for heat is used for production. Therefore, the heat resistance is stronger than the stripe coated type. No worries for being peeled off Thermoset is used for hot food packaging like retort food because the thermoset is stronger metasial for heat 	Stripe coated type(Thermoplastic adhesion) -> Thermoplastic that is weak for heat is used for production. Therefore, it can be peeled off at high temperature over 100 Celsius degree.
	because the thermoset is strong material for heat.	They started to imitate our full coated film for overcoming the weak point of the stripe coated film like the above. But they have to outsource design printing of top layer because They have production equipment that can produce only stripe coated film. It is just imitation of our full coated film and Thickness is 0.338mm like the stripe coated film.
	Stripe coated type (SPN model)Full coated type (APN model)	It is just stripe coated film with the appearance of the full coated film.
1 5]	As the competitors started to sell the imitation of our full coated film, we had no choice but to develop low priced full coated film. So we developed the below model. The thickness is 0.45mm that Is different from the imitation.	
		Imitation(0.338mm width)

Technical difference with other heating film Manufacturers in Korea

HEAT PLUS

	HEAT PLUS	Competitors
Production		
Equipment	1) The most advanced electronic 2 dry coating equipment that is possible to print various colors besides black color and proceed with	1) Normal mechanical Production equipment that is possible to produce only stripe coated film.
	both printing and lamination at the same time.	Separate printing and lamination equipment.
	(There is no concern for humidity penetration into	(It is not possible to proceed with the printing
	the layers of the film because the printing and	and lamination process as one equipment unlike
	lamination process are carried out at the same time.)	the films have to be kept inside the factory until next lamination process and the humidity can be
	2) Production available width range: 76mm~1450mm	penetrated into the layers of the films during the keeping.)
	3) It is possible to keep the temperature over 150	
	Celsius degree inside the drying chamber by double	
	wall structure. (Setting temperature 190 Celsius degree)	2) Production available width range: 200mm~1000mm
	-> Drying is very important for minimizing the power consumption change during the heating film use.	 Drying chamber that is only possible for 100~130 Celsius degree.

Inspection process

HEAT PLUS



The appearance inspection process of the heating film with naked eyes for removing the contamination of the heating film This is the unique process we only have in Korea.

Product Introduction

All Coated Type
 Stripe Type
 PTC







Classic Full coated Heating Film **HEAT PLUS**



electrodes after carbon printing.

New Full Coated Heating Film

HEAT PLUS





HP-ACN-405,408,410

Structure diagram

It has a safe structure to prevent sparks and defects in products by forming silver electrodes after carbon printing.

New carbon pattern of ACN model



* Improved the adhesion of the film layers through the carbon pattern modification

All Coated Heating Film for sauna (High wattage)





It has excellent moisture resistance and durability as specially insulated with curing type adhesive and does not contact with air and moisture.

All Coated Heating Film

Samsung Heavy Industries

-> Industrial Use

Export to Japan

HEAT PLUS

Stripe Heating Film

HEAT PLUS





SPN-305, 308, 310

An off-white insulative PET film, it pursues hard and stable carbon print surface compared with other transparent PET film.

Structure diagram

Special design of silver electrode prevents sparking at electrode.

Stripe Heating Film





PTC Heating Film





HEAT PLUS PTC Heating Film controls power consumption by itself when temperature changes. It prevents overheating and safer. Resistance of HEAT PLUS PTC Heating Film increases as temperature goes up. While resistance increases, power consumption decreases, as a result, Heating Film generate less fever. So, it prevents overheating.



Changes of power consumption as temperature of heating film increases

Advantage of PTC Heating Film



Safer Heating

Heat Plus PTC Heating Film prevents overheating with its special characteristic of controlling power consumption as temperature changes.



Saving Money

Heat Plus PTC Heating Film saves more than 20% of electric costs, because it consumes less power as temperature goes up.



Same Installation

Heat Plus PTC Heating Film can be installed same as ordinary heating film. Therefore, everyone can install easily.

Standards & Specifications

	Model	Width	Thickness	Packing unit	Weight	Power consumption	Heat resistance	Voltage
	HP-ACN-410	1000mm	0.45mm	75m	50.3kg	220W/m ²	80~90° C	AC 200V~230V
	HP-ACN-408	800mm	0.45mm	75m	40.8kg	220W/m ²	80~90° C	AC 200V~230V
Full	HP-ACN-405	500mm	0.45mm	100m	33.5kg	220W/m ²	80~90° C	AC 200V~230V
Coated	HP-APN-410	1000mm	0.4mm	75m	51.7kg	220W/m ²	100° C	AC 200V~230V
	HP-APN-405	500mm	0.4mm	100m	34.7kg	220W/m ²	100° C	AC 200V~230V
	HP-APH-410	1000mm	0.4mm	75m	43.5kg	400W/m ²	100° C	AC 200V~230V
	HP-SPN-305	500mm	0.338mm	100m	25.5kg	220W/m ²	80° C	AC 200V~230V
Stripe	HP-SPN-308	800mm	0.338mm	100m	39.5kg 22	220W/m ²	80° C	AC 200V~230V
Coated	HP-SPN-310	1000mm	0.338mm	100m	48.7kg	220W/m ²	80° C	AC 200V~230V
	HP-SPN-303	300mm	0.338mm	100m	13.5kg	50W/m	80° C	DC 12V
DTC	HP-SPP-305	500mm	0.338mm	100m	25.5kg	220W/m ²	80° C	AC 200V~230V
Stripe	HP-SPP-308	800mm	0.338mm	100m	39.5kg	220W/m ²	80° C	AC 200V~230V
Coated	HP-SPP-310	1000mm	0.338mm	100m	48.7kg	220W/m ²	80° C	AC 200V~230V

% OEM & Customized production is available

Features of HEAT PLUS

Economical heating

Heat Plus requires less power consumption to create an excellent heating effect than general convectional methods

Efficient heating

There is much less temperature difference compare to hot water pipes, hot wire method

Healthy heating

Heat Plus generates far infrared rays which is good for human body



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Simple installation

Consumer simply needs to insert it between the floor finishing material and the insulation material.

Safe heating

Heat Plus doesn't need a flame for ignition, therefore, there is no danger of CO2 or conduction accidents

Semi permanent heating system

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Simple structure and high durability make possible to use semi permanantly

Shielding Heat Insulator

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Simply 2 IN 1! Combine shielding functionality to existing heat insulator

> Inductive Current Remove Mitigates discomfort feeling by removing inductive current

Prevention of Electric Shock Shielding material prevents electric shock caused by leakage current





Specification:

Width: 100cm Thickness: 5mm Length: 50m(1 roll) Packing: 60cmX60cmX100cm

Thermostat - HP-HALF



Do you have trouble with lack of Capacity?

HEAT PLUS will solve your problem

HP-HALF One and Only Made by HEAT PLUS

Specification

HEAT PLUS HP-HALF is the revolutionary heating system which has two-circuits that operate turn by turn. So that makes possible to heat up with half the capacity.

Maximum Capacity: 7Kw Working Voltage: 100~250V Temp. Range °C: -20~180 Maximum Current : 32A(16A/each channel) Size(mm): 120X120X34

Construction Example



Kindergarten



Veterans Education Center



Student Hall



English Village

Construction Example



Rich Hotel



Sin-Ahn Beach Hotel



Grand Valley Pension



World Youth Hostel

Construction Example



Oriental Hospital



GVN



Women's Hospital



Geriatric Hospital

Construction Example



Vitna Church



Myung-hwa Temple



Milal Church



The Church of God

Global Exhibitions

HEAT PLUS



HEAT PLUS Certification





Business Registration



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대		-	H		X	. :	: 박훈규	
개	QL	4	년	뭞	08	1 :	: 2008년 04월 17일 법인등록번호 : 121111-0171115	
사	업	장		소자	HX	:	: 충청북도 진천군 초평면 연암길 94	
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🙀 국세청

Factory Registration Certificate

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입	자 2012-01	-06		공 장 1	5 독 대 상	(省)					
55	회 사 망	(주)세기센격	(주)세기센주리)								
。 导	대표자성명	박훈규	·훈규 생년월일 (법인등록번호)					121111-0171115			
인	대표자주소 (법인소재지)	충청북도 진	천군 초평면 (
	공장소재지	충청북도 진	천군 초평면 -	지목	지 복 답						
	설립승인번호				설립승인일자	2011-	2011-07-28				
공 장 개 요	용도지역	관리지역/계 역/	지역/개획관리지역/개획관리지 배출규모별 사 입 장			대 기 수 질	기 해당없음 질 해당없음				
	입 종 (분류번호)	플라스틱 필· (22212)	름, 시트 및 ૨	난 제조업	주 요 생산철	^ 요 양산품 난방필름					
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주)세기생추리		박운규	520.00	181.14	플라스틱 필륨, 시트 관 체조업	및 2012-01-09		[완료신고]			
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210mm×297mm(보존용지 1종 70g/m²)

성민중 / 01월13일 11:01

8목번호 공장등록대장(을) 인 사 2012-01-06 31 (전화: (011) 9756-7800 (주)세기 세추리 회사 명 3 주민등록변호 (법인등록변호) 대표자성명 世界市 121111--0171115 7 대표자주소 (법인소재지) 충청북도 진천군 초평면 연암길 94 2 공장설립동 중 인 일 완료신고 (동목) 인 2012-01-06 2011-07-28 가 등 2012-01-09 부대시설면 작(m) 제조시설 공장부지 면적(m) 종업원수 공 181.14 남자 : 13명 28 2.257.00 520.00 28 보유구문 플라스틱 필름, 시트 및 관 재조업 (22212) 2 얶 5 ■ 자가 (분류번호) □ 입 대 주요생산품 난방필름 주요원자재 PET碧唇 생 신 용수사용 광 (t/일) 인료사용 랑 전력사용량 (kW/일) 7 석유 가 스 (㎡/원) 기 타 (t/인) 생활용수 공업용수 0 0 0 0 4 21 1.1 10 서 제조시설명 수 량 배출여부 그라비아 코팅부 2 건조기 -5 동선민즐기 1 합지부 자동카팅 1 집진기 1 압축기 관출부 2 배기홴

210m×297m(보존용지 1종 70g/m')

성민중 /01월13일 11:01



No. of Certificate : 2020 - 56

Prospective Small Business Designation Certificate

CERTIFICATE

This is to certify that the following company is designated as a 'Promising Small and Medium Enterprise in Export' by Ministry of SMEs and Startups(MSS), Republic of Korea.

Company : SEGGI CENTURY Co., Ltd.

□ Representative : PARK HOON KYU

Designated Period : 2021. 01. 01. ~ 2022. 12. 31.(2years)

Date of issue : 2021. 01. 01.

Issued by Chungbuk Export Center, M



HEAT PLUS Trade & Inno-Biz Association Membership



Environmental & Quality Management Certificate





This is to certify that :

Seggi Century Co., Ltd. 94, Vennam-gil, Chopyeong-mycon, Jincheon-gun, Chungcheongbuk-do, Korea

Has been assessed by International Certification Registrar Ltd., in respect of their Quality Management Systems and found to comply with

ISO 9001:2015

Approval is hereby granted for registration providing the rules and conditions relating to certification are observed at all times.

Certification Scope

Design, Development, Manufacture, Sale of Heating Film

Expiration Date : 12th October 2023 3: This contificate is valid by completion of surveillance audit which is conducted within 12 months from the contification date.

Certificate Issue Date :26th November 2020 Initial Issued Date : 23rd August 2013 Certificate No. : O298313

The Seal of ICR Limited was hereto affixed in the presence of :

President

III.C.II.Co., LUI, 117, Hwanapsan Dira Theoregii, Yangahoreup, Ginporsii, Daeonggindo, Kowa Intel J. Veri, Jongs. con



Certificate of Registration

This is to certify that :

Seggi Century Co., Ltd. 94, Yennam-gil, Chopyeang-myean, Jincheon-gun, Chungcheongbuk-do, Korea

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ISO 9001:2015

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The Seal of ICR Limited was hereto affixed in the presence of :

President



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Patents



전력공급장치가 구비된 면상 발열체

특허권자 Patentee 주식회사 세기센추리(121111-*******) 충북 진천군 초평면 연암길 94,

발명자 Inventor 박훈규(590110-******) 충청북도 청주시 청원구 오창읍 오창중앙로 94 (한라비발디아파트) 808동 902호

위의 발명은 「특허법」에 따라 특허등록원부에 등록되었음을 증명합니다.

This is to certify that, in accordance with the Patent Act, a patent for the invention has been registered at the Korean Intellectual Property Office.



Property Office

2017년 07월 03일 특허청장 COMMISSIONER,

KOREAN INTELLECTUAL PROPERTY OFF



2016년 01월 18일

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특허청장 COMMISSIONER. KOREAN INTELLECTUAL PROPERTY OFFICE

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발명의 명칭 Title of the Invention

제 10-1002363 호

제 10-2010-0048967 호

2010년 05월 26일

2010년 12월 13일

접착시트 및 이를 포함하는 바닥마감 시공구조

특허권자 Patentee 주식회사 세기센추리(121111-0******) 충청북도 진천군 초평면 은암리 278

특허증

특허

출원번호

Application

출원일

Filing Date

등록일

Patent Number

CERTIFICATE OF PATENT

발명자 Inventor 박훈규(590110-1*****) 경기도 부천시 원미구 길주로 276, 무광오피스 908호 (중동)

위의 발명은 「특허법」에 따라 특허등록원부에 등록되었음을 증명합니다.

This is to certify that, in accordance with the Patent Act, a patent for the invention has been registered at the Korean Intellectual Property Office.
Patents



발명의 명칭 Title of the Invention 길이 조절이 가능한 면상 발열체의 전극 접속용 연결단자

특허권자 Patentee 주식회사 세기센추리(121111-0******) 충북 진천군 초평면 연암길 94,

발명자 inventor 등록사항란에 기재

위의 발명은 「특허법」에 따라 특허등록원부에 등록되었음을 증명합니다.

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2015년 04월 21일

특허청장 COMMISSIONER, KOREAN INTELLECTUAL PROPERTY OF



2015년 07월 23일

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특허청장 COMMISSIONER KOREAN INTELLECTUAL PROPERTY OFFICE

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위의 발명은 「특허법」에 따라 특허등록원부에 등록되었음을 증명합니다.

This is to certify that, in accordance with the Patent Act, a patent for the invention has been registered at the Korean Intellectual Property Office.



발명의 명칭 Title of the Invention 카본 발열 직물로 이루어지는 면상 발열체

특허권자 Patentee 주식회사 세기센추리(121111-0******) 충북 진천군 초평면 연암길 94,

발명자 Inventor 등록사항란에 기재

Patents



발명자 Inventor 등록사항란에 기재

특허증 CERTIFICATE OF PATENT 특허 제 10-1604379 호 Patent Numb 출원번호 제 10-2014-0089214 호 Application Num 출원일 Filing Date 2014년 07월 15일 동록일 2016년 03월 11일 발명의 명칭 Title of the Invention

면상 발열체가 구비된 창문형 블라인드

특허권자 Patentee 주식회사 세기센추리(121111-******) 충북 진천군 초평면 연암길 94,

발명자 Inventor 등록사항란에 기재

위의 발명은 「특허법」에 따라 특허등록원부에 등록되었음을 증명합니다.

This is to certify that, in accordance with the Patent Act, a patent for the invention has been registered at the Korean Intellectual Property Office.

위의 발명은 「특허법」에 따라 특허등록원부에 등록되었음을 증명합니다.

This is to certify that, in accordance with the Patent Act, a patent for the invention has been registered at the Korean Intellectual Property Office.



2015년 10월 13일

3

특허청장 COMMISSIONER, KOREAN INTELLECTUAL PROPERTY OFFICE 升 ろ



2016년 03월 11일

특허청장 COMMISSIONER. KOREAN INTELLECTUAL PROPERTY OFFICE ち 升 3

Patents



다채널 면상 발열체 제어 장치

특허권자 Patentee

주식회사 세기센추리(121111-******) 충복 진천군 초평면 연암길 94,

발명자 Inventor 박훈규(590110-******) 충청북도 청원군 오창읍 오창중앙로 94(한라비발디아파트) 808동 902호

특허증 CERTIFICATE OF PATENT 특허 제 10-1604383 호 Patent Number 전 10-1604383 호 전 10-1604383 10 전 10-1604383 10

발명의 명칭 Title of the Invention 유해전류 제거 기능이 구비된 면상발열체용 단열부재 및 이를 이용한 면상발열체의 제조방법

특허권자 Patentee 주식회사 세기센추리(121111-*******) 충북 진천군 초평면 연암길 94,

발명자 Inventor 등록사항란에 기재

위의 발명은 「특허법」에 따라 특허등록원부에 등록되었음을 증명합니다.

This is to certify that, in accordance with the Patent Act, a patent for the invention has been registered at the Korean Intellectual Property Office.

LECTUAL PROGRAM OFFICE

2016년 03월 11일 특허청장

COMMISSIONER, KOREAN INTELLECTUAL PROPERTY OFFICE

2016년 03월 11일 E 11 11 7년

2016년 03월 11일 특허청장 COMMISSIONER,

위의 발명은 「특허법」에 따라 특허등록원부에 등록되었음을 증명합니다.

This is to certify that, in accordance with the Patent Act, a patent for the invention

has been registered at the Korean Intellectual Property Office.

Patents

특 허 제 10-1377747 호 호원번호 계 2013-0119092 호 (PATENT NUMBER) 출원번호 제 2013-0119092 호 (PATENT NUMBER) 출원 한 원 2013년 10월 07일 응용 왕 የደለመ በልቸር ሃሃ/MM/DO) 2014년 03월 18일	특 허 제 10-0965745 호 홍북벐읍 NAMERT 제 2010-0036905 호 (PATENT NUMBER)
발명의명칭 (TITLE OF THE INVENTION) 경화형 카본 잉크 및 접착제를 이용한 면상 발열체 및 그 제조 방법	발명의명칭(TITLE OF THE INVENTION) 면상발열체
특허권자 (PATENTEE) 주식회사 세기센추리(121111-0******) 충정북도 진친군 초평면 온안리 278	특허권자 (PATENTEE) 등록사항란에 기재
발명자 (INVENTOR) 등록사항란에 기재	발명자 (INVENTOR) 등록사항란에 기재
위의 발명은 「특허법」에 따라 특허등록원부에 등록 되었음을 증명합니다.	위의 발명은「특허법」에 의하여 특허등록원부에 등록 되었음을 증명합니다.
(THIS IS TO CENTIFY THAT THE PATENT IS REGISTERED ON THE REGISTER OF THE KOREAN INTELLECTUAL PROPERTY OFFICE.) 2014년 03월 18일	(THIS IS TO CERTIFY THAT THE PATENT IS REGISTERED ON THE REGISTER OF THE KOREAN INTELLECTUAL PROPERTY OFFICE.)
na sen can ann ann ann ann ann ann	2010년 06월 15일
F 허 청 장 김 영 COMMISSIONER, THE KOREAN INTELLECTUAL PROPERTY	

Trademark Registration



상표등 CERTIFICATE OF	루증 TRADEMARK REGISTRATION
등록 Registration Number	제 40-1148111 호
출원번호 Application Number	제 40-2014-0080423 호
출원일 Filino Date	2014년 11월 27일
등록일 Registration Date	2015년 12월 10일

상표권자 Owner of the Trademark Right 주식회사 세기센추리(121111-0*****) 충북 진천군 초평면 연암길 94,

상표를 사용할 상품 및 구분 List Qf Goods 제 11 류 난방용 온열 필름지둠 17건

Ddat

위의 표장은 「상표법」에 따라 상표등록원부에 등록되었음을 증명합니다.

This is to certify that, in accordance with the Trademark Act, a trademark has been registered at the Korean Intellectual Property Office.



2015년 12월 10일

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Design & Service Mark Registration

등 록 egistration Number	제 30-0868754 호
원번호	제 30-2015-0053320 호
원일	2015년 10월 22일
ing Date 독일	2016년 08월 12일
rgistration Date 록의 구분 pe of Registration	심사 등 록 (DAMMINED REGISTRATION)
남풍류 Gass [13류 자인의 대상이 되 [상발열체용 전	는 물품 Product [기접속단자
자인권자 Owner 식회사 세기센	추리(121111-******)
북 진천군 초평	면 연암길 94,
작자 Creator	
훈규(590110-*	******)
IOI LITIOI	또 영합 조영중영도 왜, 000중 902일(안라미월니아파트) 9. [디그니이너 추버, 에, 따라, 디그니이드 큰 이너 에, 드 큰 디 이 이 이
명합니다.	는 `디사인모오힙」에 따다 디사인등복원부에 등복되었음을
nis is to cert as been regi	ify that, in accordance with the Design Protection Act, a design stered at the Korean Intellectual Property Office.
CTUAL PO	2016년 08월 12일

서비스표등록증 CERTIFICATE OF SERVICE MARK REGISTRATION

등록 Registration Number	제 41-0352044 호
출원번호 Application Number	제 41-2014-0049359 :
출원일 Elling Data	2014년 11월 27일
등록일 Registration Date	2016년 03월 11일

서비스표권자 Owner of the Service Mark Right 주식회사 세기센추리(121111-*******) 충북 진천군 초평면 연암길 94,

서비스표를 사용할 서비스입명 및 구분 List of Services 제 35 류 난방용 온열 필름지 도매업등 20건

주식회사 따뜨애

위의 표장은「상표법」에 따라 서비스표등록원부에 등록되었음을 증명합니다.

This is to certify that, in accordance with the Trademark Act, a service mark has been registered at the Korean Intellectual Property Office.



International Certification: CE

	Segai Century Co. 1td
	Seggi Century CO., Llu.
e 94, Yeonam-gil, Cho eclare under our sole res	pyeong-myeon, Jincheon-gun, Chungcheongbuk- do, Republic of Koro ponsibility that the products:
Product :	HEATING FILM
Model No.	APN-410-RS
Derived Mo	HP-SPN-305, HP-SPN-308, HP-SPN-310, HP-ACN-405, HP-ACN-408, HP-ACN-410, HP-APN-405, HP-APN-410, HP-APH-410
EN 55014-1: 2017	Electromagnetic Compatibility (EMC)- Radio disturbance characteristics - Limits and methods of measurement
EN 55014-2: 2015	Electromagnetic compatibility (EMC) - Immunity characteristics- Limits and methods of measurement
and a second contraction of a second s	Electromagnetic compatibility (EMC)- Limits. Limits for harmonic current emissions
EN 61000-3:2:2019	
EN 61000-3:2:2019 EN 61000-3-3:2013 +A1: 2019	Electromagnetic compatibility (EMC)- Limits. Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems
EN 61000-3:2:2019 EN 61000-3-3:2013 +A1: 2019	Electromagnetic compatibility (EMC)- Limits. Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems are fully complying with the essential requirements of the EU directives. B ce with EMC directive and others are additionally required, If need.
EN 61000-3:2:2019 EN 61000-3-3:2013 +A1: 2019 Dove described products e test report in accordan	Electromagnetic compatibility (EMC)- Limits. Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems are fully complying with the essential requirements of the EU directives. B ce with EMC directive and others are additionally required, if need. Issued date: March 23, 2022



HEAT PLUS International Certification: S-JET / RoHS





JET認証業務規程に基づく検査の結果、認証の要件に適合しているものと認められます ので認証します

認証の種類: S-JET 認証

認証書番号: 1453-81084-001

認証年月日: 2010-11-25

認証取得者(名称及び住所):

株式会社 GROOVE 神奈川県横浜市西区楠町11番地2

製品名: 電熱シート

製品の型番及び定格: 付属書の通り

製造工場(名称及び住所): 付属書の通り

試験基準: 電気用品の技術上の基準を定める省令第1項 別表第八 1及び2(33)

認証書番号: 1453-81084-001

付属書番号: S09Y0788- 2 / 2

付属書発行日:2010-11-25

製造工場(名称及び住所):

1453-81a

理事長 末廣 惠雄長

財団法人 雷気安全環境研究所

東京都渋谷区代々木5-14-12

SEGGI CENTURY CO., LTD, #68 SINYANG-RI, SAENGGEUK-MYUN, EUMSEONG-GUN, CHUNGCHEONGBUK-DO, KOREA



European Union Directive 2002/95/EC (RoHS)

Supplier Name: SEGGI CENTURY CO., LTD.

Product Marketing Model Name : Heat-Plus Heating film

We declare that the product specified above has been designed in compliance with the essential requirements and other relevant provisions of European Union Directive 2002/95/EC (RoHS).

We declare that the above product manufacturing process is in compliance with the essential requirements and other relevant provisions of European Union Directive 2002/95/EC (RoHS).

Conforms to the EU Directive 2002/95/EC (RoHS) and to the generally accepted maximum concentration values (MCVs) of 0.1% for hexavalent chromium (Cr VI), mercury (Hg), lead (Pb), polybrominated biphenyls (PBBs), polybrominated diphenyl ethers (PBDEs), and 0.01% for cadmium (Cd) at the homogeneous level.

 Signature
 : M. N. Park

 Printed Name : Hoon Kyu, Park

 Title
 : President

 Date
 : May 14, 2009

Contact Phone Number and Email : + 82-32-328-6699 (FAX) + 82-32-328-6464

HEAT PLUS International Certification: Russian TRCU / UL

ЕВРАЗИЙСКИЙ ЭКОНОМИЧЕСКИЙ СОЮЗ ДЕКЛАРАЦИЯ О СООТВЕТСТВИИ



Заявитель Общество с ограниченной ответственностью "ТС-СЕРВИС"

Место нахождения и адрес места осуществления деятельности: Российская Федерация, Москва, 117246, проезд Научный, дом 10, этак 1 офис 692, основной государственный регистрационный номер: 1187746867109, номер телефона: +79652397636, адрес электронной почты: ts-servis@rambler.ru в лице Генерального директора Курдюковой Светланы Николаевны

заявляет, что Приборы электронагревательные промышленного назначения: нагревательная пленка. моделя: HP-SPN-305, HP-SPN-308, HP-SPN-310, HP-SDN-305, HP-SDN-308, HP-SDN-310, HP-SPP-305, HP-SPP-308, HP-SPP-310, HP-APN-410, HP-APN-405, HP-APH-410, HP-ACN-405, HP-ACN-408, HP-ACN-410

изготовитель Seggi Century Co., Ltd. Место нахождения и адрее места осуществления деятельности по изготовлению продукции: 94, Yeonam-gil, Chopyeong-myeon, Jincheon-gun, Chungcheon, Республика Корея.

Продукция изготовлена в соответствии с директивой 2014/35/EU (О низковольтном оборудовании -Low Voltage Directive LVD); директивой 2014/30/EU (О электромагнитной совместимости -Electromagnetic compatibility EMC).

Код ТН ВЭД ЕАЭС 8516797000. Серийный выпуск

соответствует требованиям

ТР ТС 004/2011 "О безопасности низковольтного оборудования", утвержден Решением Комиссии Таможенного союза от 16 августа 2011 года № 768, ТР ТС 020/2011 "Электромагнитная совместимость технических средств", утвержден Решением Комиссии Таможенного союза от 09 декабря 2011 года № 879

Декларация о соответствии принята на основании

Протокола испытаний № МРД/042020/0280 от 25.05.2020 года, выданного Испытательная лаборатория Общество с ограниченной ответственностью "МЕРИДИАН", атгестат аккредитации РОСС RU.32001.04ИБФ1.ИЛ16, сроком действия до 25.03.2021 года.

Схема декларирования 1д Дополнительная информация

дополнительных информы

ГОСТ 12.2.007.0-75 "Система стандартов безопасности труда (ССБТ). Изделия электротехнические. Общие требования безопасности", ГОСТ 30804.6.2-2013 (IEC 61000-6-2:2005) "Совместимость технических средств электромагнитная. Устойчивость к электромагнитным по мехам технических средств, применяемых в промышленных зонах. Требования и методы испытаний", ГОСТ 30804.6.4-2013 (IEC 61000-6-4:2006) "Совместимость технических средств электромагнитныя. Электромагнитные помехи от технических средств, применяемых в промышленных зонах. Нормы и методы испытаний". Срок службы – 5 лет. Хранить в крытых отапливаемых и вентилируемых помещениях, исключающих воздействие прямых солнечных лучей, атмосферных осадков, при температуре окружающего воздуха от -25 до +35 °С, относительной влажности воздуха до 70%. В помещениях, тде хранятся продукция и элементы изделий, не должно быть паров кислот, щелочей. Срок хранения – 5 лет.

Декларации о соответствии действительна с даты регистрации по 24.05.2025 включительно



Курдюкова Светлана Николаевна

Регистрационный номер декларации о соответствии: ЕАЭС N RU Д-KR.HX37.B.03277/20

Дата регистрации декларации о соответствии: 25.05.2020

M II.



Far Infrared Test Report





Far Infrared Test Report

TEST REPORT 김수 및 차: 2010년 02년 18일				TEST REPORT 접수번호: FWR218001 접수일자: 2010년 02월 18일					
 * 연호· FWRZ18001 청 인: 주식회사 세기센추리 박훈규 소: 충북 음성군 생극면 신양리 68 료 냉: HEAT PLUS (필름난방) 		ы т. i	4		시 료 명: HEAT PLUS (평융난방)				
	시 험	결 과				00	0.4 -	08-	10
시험항목	단위	구분	전과	시험방법					
사율 (측정온도: 40℃, 측정파장: 5 ~ 20pm)	-	1	0.901	KICM-FIR-1005: 2006		œ -		-	2
사에너지 (측정온도: 40℃, 측정파장: 5 ~ 20pm)	W/m²	1	3.63×10^3	KICM-FIR-1005:2006					1
# 시험성적서 이용독적 :공절관리 본 시험질과는 FT-IR Spectrometer을 이용한 Ea	ck Bodyc[[9]	측정 결과임.	₩.			8 1 1			
						12 14 Wavelength(Jm)			
						16			
고: 1.이 성격서는 의뢰자가 제시한 시료 및 / 2.이 성격서는 한국건자재시험연구원의 / 의 사용을 금합니다.	니료명으로 시 나전 서면동의	험한 결과로 없이 홍보, 신	서, 전체 제품에 대한 권 1전, 광고 및 소송용으:	중질을 보증하지는 않습니다. 로 사용될 수 없으며 용도 이외		- -			
3. 이 성적서의 무본 발급 기한은 원본 발급	7일로부터 67	1월 이내이미	1, 사본은 부효입니다.			5			1
		C	담 당 자: 이형	욱(02-3415-8878) 2010년 03월 04일		11	망ㅅ	H#	
한 국 건 : (웹방소재센터, 주소: 서울 서초구서	자 재 / ±3\\$1465-	시 험 4. 전화번3	연구원 8: 02-3415-8581	高代前 高割代 影啓園 影啓岡 www.kicm.re.kr)	(4	曹빙소재센터, 주소: 서실	e 서초구 서초3둏1465	1, 전화번호: 02-3415-	-8881,www.kicm.re.kr)
	페이지)	1/参 3					페이저2/	*3	

Far Infrared Test Report



Insurance

(365852) 278, Eunam-ri, Chopyeong-mye The Insured (주)세기센추리 (365852) 278, Eunam-ri, Chopyeong-mye			on, Jincheon-gun, son, Jincheon-gun,	Chungcheor D/Coposite Registrate Chungcheor	Igbuk-do, Korea 130-86-33844 Igbuk-do, Korea		
Policy Period	2017-0	5-16 00:00 ~ 2018-05-16 00:00	A	pplication Da	ate 2017년05월1	1일	
Initial Premium	KRW 4,	000,000	Total Premiu	KRW 4	000,000		
갱신계약여부		갱신	전계약번호		31630437500000		
통화종류		KRW	공동인수구분		단독		
납입방법		일시납	금종구분		현금		
연간/구간 구분		연긴계약	담보지역		전세계(북미지역제외)		
통신수단 이용 해지 동의여부		ମା -	최근5년간사고	l여부	아니오		
동일위험중복가입여	부	무					
Indemnity Insured Objective		Coverage		Currency	Limit of Liability	Premium	
	Pro	ducts/Completed Operations Liab	pility(II) CSL a.o.c.	KRW	300.000.000	Thermont	
Droduct Liability	Pro	ducts/Completed Operations Liab	pility(II) CSL agg.	KRW	300,000,000		
roduct bability	Pro a.o	oducts/Completed Operations Liability(II) CSL [KRW	1,000,000		
O Insured Detail							
nsured Objective		Product Liability					
생산되는제품		기타	담보제품명		HEAT PLUS(FILM HEATER, THERMOSTAT)		
		1000000000	보험료기초종	F	매출액		
··출기초수							



HEAT PLUS Installation Manual



How to Install: Preparations



How to Install



1. Site management before construction

Clean the floor. Be careful that there are no screws or bolts on the floor, and remove moisture.

2. Insulator laying

Place the insulator on the floor and fix it with a regular OPP tape. (* Make sure that the slippery plastic side of the insulator is on top.)





How to Install

3. Film (HEAT PLUS) laying

Place the insulator on the floor and fix it with a regular OPP tape. (* Make sure that the slippery plastic side of the insulator is on top.)



How to Install

รักาะ เพราะ รักา

4. Insulating the film

Insulate the cut surface of the film (HEAT PLUS) with insulative tape or butyl tape. (※ Butyl tape is also a kind of insulative tape.)



How to Install



5. Connecting Terminals

After inserting the terminal into the space of the copper foil, press it with a presser (pliers). (X When inserting, be sure to pass it to the copper area, not the silver area.)



How to Install



6-1. Connecting wires (cables)

Double the first (starting) terminal of each wire. (* Be careful not to twist the two wires when connecting.)



6-2. Connecting wires (cables)

Connect all the + terminal wires first, then the - terminal side wires. (* When removing the surface of wire, use stripper.)



How to Install

7. Insulating wires

Insulate the area where the wires, terminals, and film are connected with butyl tape. During insulation, press the tape firmly to prevent moisture. After insulation, clean up the wires using regular tape.



How to Install

DI IC TAD

8. Destroying the insulator (clipping the insulator)

Areas with wires and butyl tape are different in thickness, making it difficult to finish. Therefore, cut the insulator of the corresponding part and attach the tape to prevent the moisture from rising upward.



How to Install



9. Installation of regulator

Refer to "How to connect the regulator" to connect the regulator to the film. \times It is safe to use separate circuit breaker for each controller.

10. Checking and construction completion

Make sure the capacity of the connected film and the actual power usage is correct. Construction is completed.

HEATING FILM In the World



all over the World

THANK YOU !

http://www.heatplus.co.kr/eng

IEAT PLUS

HEAT PLUS

Experience our environmentally-friendly heating products that use the cleanest energy of all

HEATING FILM

Seggi Century sees beyond a short-term business success

In the ever-changing world, we understand the importance of the environment and lead the way to the new heating industry that is based on electricity, which is the cleanest energy of all, so that our products can contribute to a world where humanity and the earth can coexist in happines:

Company Introduction	The world's first All Coated Film with silver busbars With the latest production line, we can produce both All Coated Films and Stripe Films at the same time, as well as the products which have the advantages of both. Heat Plus All Coated Film is made by applying carbon, which is the heating element on a layer of PET film, with silver and copper-coated electrodes on both sides and the PET insulating layer. Our superb and latest heating film provides a high heat preservation performance.
CEO's greetings	Greetings! In this ever-changing world, the importance of the environment is becoming more and more paramount. The efforts of the governments of the world to reduce greenhouse gases is resulting in the educed use of fossil fuel and increasing the use of the cleanest energy, electricity. These efforts, we believe, will continue for some time to come, and people are now paying more and more attention to heating by electricity. Heating by electricity can be done in many different ways. And, in my opinion, heating films are one of the easiest to install and good for your health. And, our belief is supported by the popularity of heating films in the cultures where people usually don't sit or lie down on the floor. We, Seggi Century, are producing and selling the best-ever heating film products, Heat Plus All Coated Films and Heat Plus Stripe Films, based on years of know-how and trust. A company's brand values and reputation are not built overnight. Only a company that is equipped with proper production machineries, technical engineers, and trustworthiness can keep the promise with the customers. And, as we keep our promises with the customers, we gain more trust from them.

We will always be with our customers.



Hoongyu Park, CEO, Seggi Century Co., Ltd.

History

O 2020

- Russian TRCU certification, 2020
- Participated in the exportation voucher program of the Ministry of Ventures and Startups
- Renewal of the ISO certificate
- Re-designated as a promising exporter in Choongbuk

O 2019

- Launched the new, color plane ACN models
- Awarded with the 3-million-dollar Export Tower

O 2018

- Applied for a patent for the plane-shaped heating element and the heating device based on such a heating element equipped with water-proof and moisture-proof properties
- Designated as a Venture–Nara–registered product
- Participated in the first Canton Fair (the 124th Chinese Trade Goods Fair)

O 2017

- Designation of corporate
- Venture company designation

O 2016

- Additional development and supply of the industrial heating films for Samsung Heavy Industry
- Launched the insulation material with grounding function
- Registered the patent for the window blinds with plane-shaped heating elements
- Registered the patent for the multi-channel plane-shaped heating element controller
- Registered the patent for the heat insulator and plane heating element capable of removing induced currents
- Started exporting to Chile, Colombia, Bolivia, Italy, and Iraq

O 2015

- Participated in Kyunghyang Housing Fair and Mosbuild 2015
- Registered the patent for the connector for the electric poles of planeshaped heating elements that is capable of adjusting its length
- Started exporting to the Netherlands, Turkey, Bulgaria, UK, Mexico, and Brazil
- Re-designated as a promising exporter (June 2015 to May 2017)
- Registered the patent for the plane-shaped heating element composed of carbon heat-emitting fabrics
- Registered the patent for the plane-shaped heating element equipped with the heat-preserving cushions and its production method

O 2014

- Registered the patent for the plane-shaped heating element based on hardening carbon ink and adhesives and its production method
- The Japanese branch participated in the 13th International Housing and Industrial Product Fair (Beijing, China) – launched the DIY-type product of Heat Plus
- Launched the half controller HP-HALF (developed exclusively by us)
- Participated in Seoul International Construction Fair (August 16 to 19, SETEC, Seoul) and designated as an excellent SMB
- Started exporting to Poland
- No. 1 market share in the Greek market for heating films

O 2013

- Launched the All Coated Film products APN-410, APN-405, APH-410, Stripe Film SPH-305
- Designated as a Clean Business; certificate for the corporate R&D center
- Selected as a vendor for Samsung Heavy Industry
- Participated in Seoul International Construction Fair and G-Fair

2012

- Participated in Kazakhstan International Construction Fair
- Participated in MBC Construction Fair and Kyunghyang Housing Fair

O 2011

- Certified as a venture company
- Participated in Canton Fair, Guangzhou, China (Spring, Fall)
- Participated in Mosbuild

O 2010

- Named as a Choongbuk Exporter
- Exported to Germany, Ukraine, Belarus, and Kirgizstan
- Participated in Japan Construction Materials Fair and Russia Khabarovsk Construction Fair
- Named as a promising exporter
- Patent registered for the heating film (No. 10-0965745)
- PSE and JET certificates, Japan

2009

- GOST (Russia) certificate
- ISO 14001 certificate
- RoHS certificate
- Exported to Japan (for the first time as a South Korean company), Russia, Turkey, UK, Australia, USA, Canada, and Kazakhstan, etc.

O 2008

- Incorporated as Seggi Century Co., Ltd.
- KICM certificate
- ISO 9001 certificate
- CE certificate
- Participated in MBC Construction Fair

2007

 Participated in MBC Construction Fair/Hotel Fair/Exported to Mongolia

2006

• Participated in MBC Construction Fair

2005

• Founded in October

Introduction to Heat Plus

Heat Plus All Coated Films, which are the start-of-the-art 6-layer plane-shaped heating element. The product is manufactured by coating a layer of PET, which is electrically insulating, flame retardant, and water-proof. The base film is then coated with the adhesive fabric material, which has superb heat insulation and constriction/expansion properties. Then, this base layer is coated with carbon and covered with a layer of active carbon, which is used to absorb and attach contaminants. On top of this, cooper coating is used to create an electrode, followed by the final lamination.

The highest technical prowess

The silver electrode of the carbon heating element and silver electrodes are produced using the technologies which allow the high precision printing of 10 micron or smaller dimensions and the heat treatment at 150 $^{\circ}$ C or higher. Also, by applying the laminating method that enhances the resistance of the product against humidity, this product can be used almost indefinitely.

The highest brand values

It takes many years to build the values and reputation of a brand. Seggi Century always does its best based on craftmanship that our customers can trust, along with the advanced technology and quality control based on our know-how and experience.

Seggi Century in the World Market

Heat Plus has been exported to more than 20 countries, including China, due to its superb quality and performances. Most notably, our products have been recognized in Japan, where the expectations on quality and performance is very high. As a result, we became the first All Coated Film company that exported to Japan, and we are still the only South Korean company exporting to the country today.

Heat Plus All Coated Films



- The All Coated Films of Heat Plus come with special insulation by hardened adhesives, which protect the product from the air and humidity, reinforcing the resistance against humidity and endurance.
- Our All Coated Films have the silver electrodes that are formed after carbon printing, so that it has a safe structure that prevents sparks and defects.

Heat Plus Stripe Films



- Heat Plus Stripe Films use beige insulation PET film, so that it is more robust and stable compared to the clear PET films in competing products.
- Heat Plus Stripe Films prevent sparks from the electrodes with the special design of silver electrodes.



The advantages of Heat Plus PTC films



Safer Heating

The PTC films of Heat Plus increases its resistance as the temperature goes up, reducing wattage. As a result, it is possible to improve heat accumulation and overheating issues.



Saving the power cost

The PTC films of Heat Plus controls the power and electric current automatically depending on the changes in temperature, saving the power cost by more than 20%.



The same installation processes

The PTC film of Heat Plus can be installed in the same way as with the existing heating films, so that anyone can install the product easily.

Specification

ltem	Model name	Width (mm)	Thickness (mm)	Packaging Unit	Weight	Wattage	Max. Temperature
All coated	HP-ACN-405	500	0.45	100m	33.5kg	110W/m²	100°C
	HP-ACN-408	800	0.45	75m	40.8kg	180W/m²	100°C
	HP-ACN-410	1000	0.45	75m	50.3kg	220W/m²	100°C
	HP-APH-410	1000	0.4	75m	52.6kg	400W/m²	100°C
	SPN-305	500	0.338	100m	25.3kg	110VV/m²	70°C
Stripe	SPN-308	800	0.338	100m	39.8kg	180W/m²	70°C
	SPN-310	1000	0.338	100m	48.8kg	220W/m²	70°C
PTC	HP-SPP-305	500	0.338	100m	25.5kg	110W/m²	70°C

The comparison between Heat Plus and other heating methods

Item	Oil and gas boilers Film heating		Night-time electricity boiler	Electric panel	
Туре	Fossil fuel	Electricity	Electricity	Electricity	
Heating Conduction/ Method convection		Radiation heat	Conduction/ convection	Conduction	
Far infrared	None	90% or more	None	None	
Heating rate	30-60 minutes	4–10 minutes	30-60 minutes	10~15 minutes	
Service life	About 10 years	Almost indefinite	About 5 years	2–3 years	
Weakness	Freezing and high fuel cost	-	High failure rate within two years	Continuous management required	



Heat Plus insulation material with grounding function and HP-HALF thermostat



Specification Width 100cm Thickness 5mm Length 50m(1roll) Packaging 60cmX60cmX100cm



Specification

Max capacity 7kw Operating voltage 100~250Vac Operating temperature -20~180°C Max current 32A (16A per channel) Dimension 120mmX120mmX34mm

This product adds earthing function to the traditional insulator. It can remove the induced current that is generated when the heating film is in use and prevents electric shocks due to leaked current that can happen when the insulator is degraded or damaged. When the voltage needs to be increased due to the insufficiency of electric capacity, this device will help you reduce the cost for the voltage increase work and stream line the complicated process.

The device will cover a half of the area on which the film is installed at a time and switch alternatingly, so that you do not have to worry about the electric capacity.

Potential use cases



Hotels, condos, learning centers, models, and dormitories



Office-tel, buildings, offices



Restaurants



Cottages, detached houses, bungalows, and recreational forests



Kindergarten, daycare



Hospitals and clinics



Churches, temples, training centers, and religious facilities



Apartment terrace, remodeling



Containers and steel houses



Mobile homes

The exportation of Heat Plus



We will become the **best company** in the world!

We use the highly advanced technology to ensure that the nano-sized high-purity carbon particles are printed evenly on the surface so that there will be almost no temperature difference through our state-of-the-art process. When we produce hour heating film, we form silver electrodes on the carbon heating element and copper coats to prevent electric sparks through our optimized laminating method. Ours are the best films with enhanced stability by employing the insulation and flame-retardant film of world-class qualities.

* Our products are exported to : Japan, China, USA, Canada, Australia, Russia, Germany, Ukraine, Uzbekistan, Belarus, Hong Kong, Mongolia, and many other countries



NAME AND ADDRESS OF THE OWNER OWNER

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Head Office: #58-10, Sagiso-gil, Docheok-myeon, Gwangju-si, Gyeonggi-do 12816, Korea Tel: (82)-31-763-6709 Fax: (82)-31-764-6709 Web site: www.emc.re.kr e-mail: emc@emc.re.kr

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Electromagnetic Compatibility Test Report

Test of:	HEATING FILM
Model Number:	APN-410-RS
Applicant:	Seggi Century Co., Ltd.
Test Type:	Compliance
Test Specification(s):	EN 55014-1:2017, EN 55014-2:2015, EN 61000-3:2:2019, EN 61000-3-3:2013+A1:2019
Report Number:	KTI22EC03002
Date of Receipt:	March 04, 2022
Date of Test(s):	March 18 to March 22, 2022
Date of Issue:	March 23, 2022



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1. Client Information

Company Name:	Seggi Century Co., Ltd.
Address:	94, Yeonam-gil, Chopyeong-myeon, Jincheon-gun, Chungcheon

2. Equipment Under Test (EUT)

2.1 Identification Of EUT

Model Number:	APN-410-RS
Applied Models:	HP-SPN-305, HP-SPN-308, HP-SPN-310, HP-ACN-405, HP-ACN-408, HP-ACN-410, HP-APN-405, HP-APN-410, HP-APH-410
Unique Identifier:	Sample as supplied by client
Description of EUT:	HEATING FILM
Supply Voltage:	230 VAC


2.2 Rating and physical characteristics (Specifications)

List	Spec
Electrical Rating	220 - 240 V AC Power Consumption : 220 W/m2(±10 %)
Main features	Plastic
Size	Width : 100(±50 cm) cm Thickness : 0.4 mm Packing Dimension : 240 x 240 x 1020(mm)
Weight	30 Kg
etc.	Heat Resistance : 100 °C Purpose: Normal heating
Temperature controller	model : UTH-170 AC 85 V~ AC 265 V, 4 kW Dimension: 70(W) x 27(D) x 120 (H)

2.3 Product Description for Equipment Under Test (EUT)

The product that is produced by Seggi Century Co., Ltd.

The Application Model are APN-410-RS



3. Test Specification, Methods and Procedures

3.1 Test Specification(s)

Standard	Title				
EN 55014-1:2017	Electromagnetic Compatibility (EMC)- Radio disturbance characteristics- Limits and methods of measurement				
EN 55014-2:2015	Electromagnetic compatibility (EMC) - Immunity characteristics- Limits and methods of measurement				
EN 61000-3:2:2019	Electromagnetic compatibility (EMC)- Limits. Limits for harmonic current emissions				
EN 61000-3-3:2013 +A1: 2019	Electromagnetic compatibility (EMC)- Limits. Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems				

3.2 Purpose Of Test

- To perform the relevant tests and assess the product for compliance with the above Specification

4. Deviations or Exclusions from the Test Specifications

There were no deviations from the test specifications.



5. Operation of the EUT During Testing

5.1. EUT test configuration diagram

The configuration used for each individual test is described in the test results section of this report.



_____ SIGNAL



5.2. Peripheral Equipment list for test

Equipment Name	Model	Serial Number	Manufacturer	etc.
HEATING FILM	APN-410-RS	N/A	Seggi Century Co., Ltd.	EUT
Temperature controller	UTH-170	N/A	Seggi Century Co., Ltd.	-

5.3. Cable connections

Star	t	Ei	nd	Cable		
Name	I/O Port	Name	I/O Port	Length (m)	Shielded/ Unshielded	
EUT	POWER	Temperature controller	POWER	0.1	Unshielded	



5.4 Performance Criteria for Immunity Tests

Criterion A

The apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer then either of these may be derived from the product description and documentation and what the user may expert from the apparatus if used as intended.

Criterion B

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

Criterion C

Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by operation of the controls.



5.5 Classification of apparatus

Category I

apparatus containing no electronic control circuitry.

All appliances having no electronic control circuitry are considered to be category I. Electric circuits consisting of passive components (such as radio interference suppression capacitors or inductors, mains transformers, mains frequency rectifiers and heating elements) are not considered to be electronic control circuitry.

EXAMPLES Appliances operated with a motor and mechanical switch only; lighting toys with a battery and a LED or incandescent lamp without additional electronic control circuitry; track sets without electronic control circuitry;

heating or cooling appliances without electronic control circuitry; tools without electronic controls and all other apparatus containing only electromechanical components (e. g. switches or thermostats).

Category II

transformer toys, dual supply toys, mains powered motor operated appliances, tools, heating appliances and similar electric apparatus (for example – UV radiators, IR radiators and microwave ovens) containing electronic control circuitry with no clock frequency higher than 15 MHz.

NOTE For toys, examples include educational computers, organs, track sets with electronic control units.

Category III

equipment which in normal use, is not connected to a power network and has no cables attached.

Category IV

all other apparatus covered by the scope of this standard.



6. Summary of Test Results

6.1 General Comments

The Equipment does not contain devices susceptible to magnetic fields, so the test was not performed.

6.2 Modifications Made to the EUT

No modifications were made to the EUT



6.3 Summary of Test Results

Basic Standard	Test	Result
EN 55014-1	Limits and methods of measurement of radio disturbance characteristics of Industrial, scientific and medical (ISM) radio-frequency equipment	Complied
	Conducted Emission Radiated Emission	
EN 61000-4-2 +A1	Testing and measurement techniques.	Complied
	Electrostatic discharge immunity test.	
EN 61000-4-3 +A1	Testing and measurement techniques	
	Radiated, radio-frequency, electromagnetic field immunity test.	Complied
EN 61000-4-4	Testing and measurement techniques.	Complied
	Electrical fast transient/burst immunity test.	Complied
EN 61000-4-5	Testing and measurement techniques.	Complied
	Surge immunity test.	Complied
EN 61000-4-6	Testing and measurement techniques.	
	Immunity to conducted disturbances induced by radio frequency fields.	Complied
EN 61000-4-11	Testing and measurement techniques	
	Voltage dips, short interruptions and voltage variations immunity test	Complied
FN	Electromagnetic compatibility (EMC)	
61000-3:2:2019	Limits. Limits for harmonic current emissions	Complied
EN	Electromagnetic compatibility (EMC)	
61000-3-3:2013 +A1:2019	Limits. Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems	Complied

Result:

In the configuration tested, the EUT complies with the test standards listed above. Full details of all tests can be found in the Test Results section of this report.



6.4 Uncertainty

1) Radiated Emissions from 30 MHz to 6000 MHz

Expanded Uncertainty $U = k \times Uc(xi) = 2 \times 2.61 = \pm 5.22 \text{ dB}$ (for 30 MHz to 1000 MHz) $U = k \times Uc(xi) = 2 \times 2.53 = \pm 5.06 \text{ dB}$ (for 1000 MHz to 6000 MHz) The coverage factor k =2 yields approximately a 95 % level of confidence.

2) Conducted missions from 150 kHz to 30 MHz

Expanded uncertainty $U = k \times Uc(xi) = 2 \times 1.40 = \pm 2.8 \text{ dB}$ The coverage factor k =2 yields approximately a 95 % level of confidence.

3) EMS Uncertainty

All parameters are within the tolerances required by the standard, reduced by the tolerances required on the calibration certificate, so this laboratory has confidence that the EMS Test equipment is in compliance with the standard with X % confidence level.

- ESD (IEC/EN 61000-4-2): 95 % (k = 2, confidence level is 95 %)
- Radiated immunity (IEC/EN 61000-4-3): 2.14 dB (k = 2, confidence level is 95 %)
- EFT (IEC/EN 61000-4-4): 95 % (k = 2, confidence level is 95 %)
- SURGE (IEC/EN 61000-4-5): 95 % (k = 2, confidence level is 95 %)
- Conducted immunity (IEC/EN 61000-4-6): 1.17 dB (k = 2, confidence level is 95 %)
- Voltage dip (IEC/EN 61000-4-11): 95 % (k = 2, confidence level is 95 %)
- Harmonics : 1.28 % (K = 2)
- Flicker : 8.26 % (K = 2)



7.0 Test Result

7.1 Terminal Disturbance Voltages Test Results

Port:	AC Main
Basic Standard:	EN 55014-1 : 2017
Limit Table:	At mains terminals
Test result	PASS
Test Date	03.18.2022

7.1.1 Limit

HOUSEHOLD APPLIANCES AND EQUIPMENT CAUSING SIMILAR DISTURBANCES AND REGULATING CONTROLS INCORPORATING SEMICONDUCTOR DEVICES

Frequency range	At mains	terminals	At load ter additional	minals and terminals
1	2 3		4	5
(MHz)	dB (µV) Quasi-peak	dΒ (μV) Average*	dB (µV) Quasi-peak	dΒ (μV) Average*
.15 ~ 0.5	Decreasing linearly of the frequ	/ with the logarithm uency from:	80	70
.10 0.0	66 to 56	59 to 46		
0.5 ~ 5	56	46	74	64
5 ~ 30	60	50	74	64

MAINS TERMINALS OF TOOLS

1	6	7	8	9	10	11	
Frequency range	Frequency Rated motor power not range exceeding 700 W			oower above ot exceeding 0 W	Rated motor power above 1 000 W		
(MHz)	dB (µV) Quasi-pea k	dB (µV) Average*	dB (µV) Quasi-pea k	dB (µV) Average*	dB (µV) Quasi-pea k	dB (µV) Average*	
45 0.05	De	ecreasing linea	arly with the log	garithm of the	frequency fron	ו:	
.15 ~ 0.35	66 to 59	59 to 49	70 to 63	63 to 53	76 to 69	69 to 59	
.35 ~ 5	59	49	63	53	69	59	
5 ~ 30	64	54	68	58	74	64	

* If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver with an average detector need not be carried out.



7.1.2. Test Set-up and Procedure.

The mains terminal disturbance voltage was measured with the equipment under test (EUT) in a shield room.

The EUT was connected to an artificial main network (LISN) placed on the floor.

The EUT was placed on non-metallic table 0.8 m above the metallic, grounded floor.

Amplitude measurements were performed with a quasi-peak detector and an average detector.

7.1.3 Operation Mode

Supplied Voltage(V)	Level(Q.P [dBµV])
208	42.6
220	42.3
235	41.9
249	41.7



7.1.4. Test Results

<Line>

QP

Frequency	MaxPeak	QuasiPeak	CAverage	Meas.	Bandwidth	Line	Corr.	Margin	Limit -	Comment
(MHz)	(dB¥iV)	(dB¥iV)	(dB¥iV)	Time	(kHz)		(dB)	- QPK	QPK	
				(ms)				(dB)	(dB¥iV)	
0.170000		39.8	32.5	1000.0	9.000	L1	10.3	25.2	65.0	
0.194000		40.6	32.7	1000.0	9.000	L1	10.2	23.3	63.9	
0.234000		43.5	35.1	1000.0	9.000	L1	10.3	18.9	62.3	
0.270000		42.8	33.9	1000.0	9.000	L1	10.3	18.3	61.1	
0.334000		44.5	36.1	1000.0	9.000	L1	10.3	14.9	59.4	
0.386000		42.2	31.6	1000.0	9.000	L1	10.3	15.9	58.1	
0.614000		38.7	29.9	1000.0	9.000	L1	10.3	17.3	56.0	
1.190000		38.8	30.6	1000.0	9.000	L1	10.1	17.2	56.0	
1.910000		41.0	34.3	1000.0	9.000	L1	10.3	15.0	56.0	
2.698000		39.3	33.4	1000.0	9.000	L1	10.3	16.7	56.0	
3.478000		37.0	32.0	1000.0	9.000	L1	10.4	19.0	56.0	
4.246000		39.3	33.9	1000.0	9.000	L1	10.4	16.7	56.0	
5.798000		39.8	34.3	1000.0	9.000	L1	10.3	20.2	60.0	
7.202000		37.9	31.4	1000.0	9.000	L1	10.2	22.1	60.0	
9.554000		39.6	33.2	1000.0	9.000	L1	10.3	20.4	60.0	
12.538000		41.0	34.9	1000.0	9.000	L1	10.6	19.0	60.0	
19.998000		21.7	12.7	1000.0	9.000	L1	11.1	38.3	60.0	
22.506000		23.9	15.9	1000.0	9.000	L1	11.1	36.1	60.0	

CAV

Frequency	MaxPeak	QuasiPeak	CAverage	Meas.	Bandwidth	Line	Corr.	Margin	Limit -	Comment
(MHz)	(dB¥iV)	(dB¥iV)	(dB¥iV)	Time	(kHz)		(dB)	- CÂV	CAV	
				(ms)				(dB)	(dB¥iV)	
0.170000		39.8	32.5	1000.0	9.000	L1	10.3	22.5	55.0	
0.194000		40.6	32.7	1000.0	9.000	L1	10.2	21.2	53.9	
0.234000		43.5	35.1	1000.0	9.000	L1	10.3	17.2	52.3	
0.270000		42.8	33.9	1000.0	9.000	L1	10.3	17.2	51.1	
0.334000		44.5	36.1	1000.0	9.000	L1	10.3	13.3	49.4	
0.386000		42.2	31.6	1000.0	9.000	L1	10.3	16.5	48.1	
0.614000		38.7	29.9	1000.0	9.000	L1	10.3	16.1	46.0	
1.190000		38.8	30.6	1000.0	9.000	L1	10.1	15.4	46.0	
1.910000		41.0	34.3	1000.0	9.000	L1	10.3	11.7	46.0	
2.698000		39.3	33.4	1000.0	9.000	L1	10.3	12.6	46.0	
3.478000		37.0	32.0	1000.0	9.000	L1	10.4	14.0	46.0	
4.246000		39.3	33.9	1000.0	9.000	L1	10.4	12.1	46.0	
5.798000		39.8	34.3	1000.0	9.000	L1	10.3	15.7	50.0	
7.202000		37.9	31.4	1000.0	9.000	L1	10.2	18.6	50.0	
9.554000		39.6	33.2	1000.0	9.000	L1	10.3	16.8	50.0	
12.538000		41.0	34.9	1000.0	9.000	L1	10.6	15.1	50.0	
19.998000		21.7	12.7	1000.0	9.000	L1	11.1	37.3	50.0	
22.506000		23.9	15.9	1000.0	9.000	L1	11.1	34.1	50.0	







<Neutral>

QP

Frequency	MaxPeak	QuasiPeak	CAverage	Meas.	Bandwidth	Line	Corr.	Margin	Limit -	Comment
(11112)	(uD# V)	(uD+iV)	(uD+iv)	(ms)	(K112)		(ub)	(dB)	(dB¥iV)	
0.170000		38.7	27.4	1000.0	9.000	N	10.2	26.3	65.0	
0.198000		40.3	29.6	1000.0	9.000	N	10.3	23.4	63.7	
0.234000		43.2	28.7	1000.0	9.000	Ν	10.3	19.1	62.3	
0.298000		42.6	27.7	1000.0	9.000	Ν	10.3	17.7	60.3	
0.370000		44.9	29.4	1000.0	9.000	Ν	10.3	13.6	58.5	
0.454000		43.8	27.9	1000.0	9.000	Ν	10.4	13.0	56.8	
0.614000		40.3	27.7	1000.0	9.000	Ν	10.2	15.7	56.0	
1.202000		44.6	36.0	1000.0	9.000	Ν	10.3	11.4	56.0	
1.934000		43.7	35.3	1000.0	9.000	Ν	10.1	12.3	56.0	
2.718000		43.0	35.6	1000.0	9.000	Ν	10.2	13.0	56.0	
3.470000		42.6	35.8	1000.0	9.000	Ν	10.3	13.4	56.0	
4.338000		43.6	35.2	1000.0	9.000	Ν	10.2	12.4	56.0	
5.826000		42.0	34.0	1000.0	9.000	Ν	10.2	18.0	60.0	
7.478000		42.7	33.2	1000.0	9.000	Ν	10.3	17.3	60.0	
9.702000		40.8	31.8	1000.0	9.000	Ν	10.3	19.2	60.0	
13.074000		36.8	30.4	1000.0	9.000	N	10.3	23.2	60.0	
19.998000		24.8	9.7	1000.0	9.000	N	10.2	35.2	60.0	
26.246000		18.8	12.4	1000.0	9.000	N	10.5	41.2	60.0	

CAV

Frequency	MaxPeak	QuasiPeak	CAverage	Meas.	Bandwidth	Line	Corr.	Margin	Limit -	Comment
(MHz)	(dB¥iV)	(dB¥îV)	(dB¥iV)	Time	(kHz)		(dB)	- CĂV	CAV	
				(ms)				(dB)	(dB¥iV)	
0.170000		38.7	27.4	1000.0	9.000	Ν	10.2	27.5	55.0	
0.198000		40.3	29.6	1000.0	9.000	N	10.3	24.1	53.7	
0.234000		43.2	28.7	1000.0	9.000	N	10.3	23.6	52.3	
0.298000		42.6	27.7	1000.0	9.000	N	10.3	22.6	50.3	
0.370000		44.9	29.4	1000.0	9.000	N	10.3	19.1	48.5	
0.454000		43.8	27.9	1000.0	9.000	N	10.4	18.9	46.8	
0.614000		40.3	27.7	1000.0	9.000	N	10.2	18.3	46.0	
1.202000		44.6	36.0	1000.0	9.000	N	10.3	10.0	46.0	
1.934000		43.7	35.3	1000.0	9.000	N	10.1	10.7	46.0	
2.718000		43.0	35.6	1000.0	9.000	N	10.2	10.4	46.0	
3.470000		42.6	35.8	1000.0	9.000	N	10.3	10.2	46.0	
4.338000		43.6	35.2	1000.0	9.000	N	10.2	10.8	46.0	
5.826000		42.0	34.0	1000.0	9.000	N	10.2	16.0	50.0	
7.478000		42.7	33.2	1000.0	9.000	N	10.3	16.8	50.0	
9.702000		40.8	31.8	1000.0	9.000	N	10.3	18.2	50.0	
13.074000		36.8	30.4	1000.0	9.000	Ν	10.3	19.6	50.0	
19.998000		24.8	9.7	1000.0	9.000	N	10.2	40.3	50.0	
26.246000		18.8	12.4	1000.0	9.000	Ν	10.5	37.6	50.0	







7.1.5. Terminal Disturbance Voltages Test Configuration







7.1.6. Terminal Disturbance Voltages Environmental Conditions

Power Supply	230 VAC
Temperature	15 ℃
Relative Humidity	36 R.H.
Barometric Pressure	101.4 kPa

7.1.7. Test Equipment Used

Equipment	Manufacturer	Model	Serial no.	Cal date.	Cal due.
EMI RECEIVER	Rohde & Schwarz	ESCI	100025	11.08.2021	11.08.2022
LISN	AFJ INSTRUMENTS	AFJ LS16C	1601132 8326	12.03.2021	12.03.2022
LISN	Rohde & Schwarz	ESH2-Z5	100017	11.05.2021	11.05.2022

7.2 Radiated Emission Environmental Conditions

Port:	Enclosure
Basic Standard:	EN 55014-1: 2017
Limit Table:	Distance 10 m
Test result	Pass
Test Date	03.18.2022

7.2.1. Limit

Testing method	Standard	Frequency range (MHz)	Limit dBµV/m Quasi-peak	Remark
OATS ^a or SAC ^{b d} CISPR 16-2-3		30 ~ 230 230 ~ 300	30 37	Measurement distance 10 m
		300 ~ 1000	37	
FAR ^e	CISPR 16-2-3 30 ~ 230 42 to 35 ^f		42 to 35 ^f	Measurement distance 3 m
TEM- Waveguide ^c IEC 61000-4-20		30 ~ 230 230 ~ 1000	30 37	-

NOTE The lower limit is applicable at the transition frequency.

a OATS = open area test site

b SAC = semi-anechoic chamber

c The TEM-waveguide is limited to devices without cables attached and with a maximum size according to sub clause 6.1 of IEC 61000-4-20 (The largest dimension of the enclosure at 1 GHz measuring frequency is one wavelength, 300 mm at 1 GHz)

d Measurements may be made at closer distance, down to 3 m. An inverse proportionality factor

of 20 dB perdecade shall be used to normalize the measured data to the specified distance for determining compliance.

e FAR = fully anechoic room. All equipment, including floor-standing equipment, shall be measured within the test volume as described in Figure 6 of CISPR 16-2-3.

f Decreasing linearly with the logarithm of the frequency.

7.2.2. Test Set-up and Procedure.

A pretest was performed at 3 m distance in a semi-anechoic chamber for searching correct frequency.

The final test was done at a 10 m open area test site with a quasi-peak detector.

EUT was placed on a non-metallic table height of 0.8 m above the reference ground plane. Cables were folded back and forth forming a bundle 0.3 m to 0.4 m long and were hanged at a 0.4 m height to the ground plane.

Cables connected to EUT were fixed to cause maximum emission. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization.

The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength

7.2.3. Test Results



Frequency	Field Strength	Polarization	Polarization	Polarization	ation Antenna Hight		Corr		Limit	Margin	Result
[MHZ]	[[ΔΒμν]	[H/V]	[m]	Cable[dB]	Ant[dB/m]	AMP	[αβμν]	[[08]	[αβμν]		
46,60	22,83	Н	3,86	1,24	14,20	27,56	30,00	19,29	10,71		
49,04	31,46	V	1,10	1,27	14, 10	27,55	30,00	10,72	19,28		
54,24	29,36	V	1,11	1,32	13,10	27,55	30,00	13,77	16,23		
66, 16	28,80	V	1,13	1,43	11,20	27,53	30,00	16, 10	13,90		
123,88	32,54	V	1,25	2,16	9,00	27,53	30,00	13,83	16,17		
134,96	42,56	V	1,27	2,33	8,60	27,55	30,00	4,06	25, 94		
261,08	24,54	Н	3,22	3,24	12,50	27,71	37,00	24,43	12,57		
307, 36	23,44	V	2,19	3,73	13,44	27,74	37,00	24,13	12,87		
435,20	13,64	V	3,48	4, 41	16,90	27,78	37,00	29,83	7,17		
601,76	9,44	V	3,18	5,22	19,44	27,93	37,00	30, 83	6,17		
752, 48	6,22	Н	1,74	6,23	21,10	27,84	37,00	31,29	5,71		
889, 28	9,50	Н	1,33	6,29	22,26	27,75	37,00	26, 70	10, 30		
+ H : Horizo	ntal, V : Vertic	al									

* Result = Field Strength + Corr.(Cable + Antenna – Amp.)

NOTE: Other frequencies up to 1 GHz were not observed during the test.



7.2.4. Radiated Emission Test Configuration





7.2.5. Radiated Emission Environmental Conditions

Power Supply	230 VAC
Temperature	7 ℃
Relative Humidity	71 R.H.
Barometric Pressure	101.4 kPa

7.2.6. Test Equipment Used

Equipment	Manufacturer	Model	Serial no.	Cal date.	Cal due.
EMI RECEIVER	Rohde & Schwarz	ESIB40	100189	11.05.2021	11.05.2022
Biconic Logarithmic Periodic Antenna	Schwarzbeck	VULB9163	9163-281	11.25.2020	11.25.2022
Amplifier	HP	8447F	2805A02 702	05.21.2021	05.21.2022
TURNTABLE	KTI	K401	K100	-	-
ANTENNA MAST	KTI	K402	K200	-	-
CONTORLLER	KTI	K401OS	K300	-	-



7.3. Discontinuous disturbance Emission Tests

Port:	AC Main
Basic Standard:	EN 55014-1 : 2017
Limit Table:	Table 7.4.1
Test result	PASS
Test Date	03.18.2022

7.3.1 Limit

Electro-mechanical office machines

In the frequency range 148,5 kHz to 30 MHz, the limits as given in EN 55014-1:Table 1, column 2 – for the measurement with the quasi-peak detector on household and similar equipment – apply enlarged with.

20
$$\lg \frac{30}{N} dB (\mu \vee)$$
 for $0, 2 \le N < 30$
 $N = n_2 \times f / T$

The click rate N is obtained in the following way:

In general N is the number of clicks per minute determined from the formula N = n1/T, n1 is the number of clicks during the observation time T minutes. For certain appliances (see Annex A) the click rate N is determined from the formula $N = n2 \times f/T$ where n2 is the number of switching operations during the observation time T and f is a factor given in EN 55014-1: Annex A, Table A.2

7.3.2. Test Set-up and Procedure.

The mains terminal disturbance voltage was measured with the equipment under test (EUT) in a shield room.

The EUT was connected to an artificial main network (LISN) & Click meter placed on the floor. The EUT was placed on non-metallic table 0.8 m above the metallic, grounded floor.

Amplitude measurements were performed with a quasi-peak detector and an average detector.



7.3.3. Test Results

Mode Click Rate

Type of Eut Heating mattresses

Rx 150 KHz Att. [dB]	25	Rx 500 kHz Att. [dB]	15
Rx 1.4 MHz Att. [dB]	15	Rx 30 MHz Att. [dB]	20
Rx 150 kHz Input Offset [dB]	0	Rx 500 kHz Input Offset [dB]	0
Rx 1.4 MHz Input Offset [dB]	0	Rx 30 MHz Input Offset [dB]	0

External Att. [dB] NONE

Remote

LISN LS16 - LINE 1

	150 kHz	500 kHz	1.4 MHz	30 MHz
First Run				
Short	4	4	2	0
Long	0	0	0	0
Fast Long	0	0	0	0
Total Clicks	4	4	2	0
Events	0	0	0	0
Time(s)	0.00	0.00	0.00	0.00
Sw.Op.	0	0	0	0
4.2.3.4 events	0	0	0	0
Limit dBu∨	66	56	56	60
N	0.90	0.90	0.90	0.90



7.3.4. Discontinuous disturbance Emission Test Configuration





7.3.5. Discontinuous disturbance Emission Environmental Conditions

Power Supply	230 VAC
Temperature	15 ℃
Relative Humidity	35 R.H.
Barometric Pressure	101.4 kPa

7.3.6. Test Equipment Used

Equipment	Manufacturer	Model	Serial no.	Cal date.	Cal due.
LISN	AFJ INSTRUMENTS	AFJ LS16C	1601132 8326	12.03.2021	12.03.2022
Click Meter	AFJ CL55C	AFJ INSTRUM ENTS	5504134 8240	12.10.2021	12.10.2022

Port:	Enclosure
Basic Standard:	EN 61000-4-2:2009
Performance Criteria:	В
Number of Discharges:	Contact: \geq 25 per polarity / test point Air: \geq 10 per polarity / test point
Test level:	± 4 kV Contact discharge ± 8 kV Air discharge
Discharge Impedance	330 Ω / 150 pF
Test result	Met criterion A / Pass
Test Date	03.21.2022

7.4 Electrostatic discharge Test Results

7.4.1. Test Set-up and Procedure.

A ground reference plane was located on the floor, and connected to earth via a low Impedance connection. The return cable of the ESD generator was connected to the reference plane.

In case of floor standing equipment, EUT was placed on the reference plane on 0.1 m of insulating Support. In case of table top equipment, EUT was placed on a wooden table 0.8 m above the reference grounded floor.

A horizontal coupling plane (HCP) was placed on the table, and Connected to the reference plane via a 470 ohm resistor located in each end (0.5 mm insulating support between EUT and HCP).

In both cases a vertical coupling plane (VCP) of 0.5 m x 0.5 m was located 0.1 m from the EUT's sides.

The VCP was connected to the reference plane in the same matter as the HCP.



7.4.2. Test Results

Test Point		Voltage (± kV)	Air/ Contact	Criteria	Results
	Case (Plastic)	±2&4&8	Air	В	А
Direct	Thermostat	±2&4&8	Air	В	А
	Bolt	±2&4	Contact	В	A
Indirect	HCP/VCP	±2&4	Contact	В	А

) KTI)

7.4.3. ESD points











7.4.4. Electrostatic discharge Test Configuration



7.4.5. Electrostatic discharge Environmental Conditions

Power Supply	230 VAC
Temperature	16 ℃
Relative Humidity	34 % R.H.
Barometric Pressure	102.6 kPa

7.4.6. Test Equipment Used

Equipment	Manufacturer	Model	Serial no.	Cal date.	Cal due.
ESD Simulator	NoiseKen	ESS-2000	9000C03281	04.16.2021	04.16.2022
Discharge Gun	NoiseKen	TC-815R	-	04.16.2021	04.16.2022

Port:	Enclosure
Basic Standard:	EN 61000-4-3:2006/A2:2010
Performance Criteria:	A
Frequency range:	80 - 1000 MHz
Test Level:	80 - 1000 MHz: 3 V/m
Dwell Time:	1 seconds
Frequency Step Size:	1 %
Modulation:	1 kHz, 80 % amplitude modulated
Test result	Met criterion A / Pass
Test Date	03.21.2022

7.5 Radiated RF electromagnetic field immunity Test Results

7.5.1. Test Set-up and Procedure.

The test was performed at 3 m full anechoic chamber.

For floor standing equipment, the EUT was standing on the floor.

For tabletop equipment, the EUT was located on a wooden table 0.8 m above the floor.

The EUT was tested all sides, horizontal and vertical polarization.



7.5.2. Test Results

EUT Position	Polarity	Criteria	Results
Front	Horizontal	А	А
FION	Vertical	А	A
Deer	Horizontal	А	A
Rear	Vertical	A	A
Lofteide	Horizontal	А	A
Left side	Vertical	А	А
Dight side	Horizontal	A	А
Right side	Vertical	A	A



7.5.3. Radiated RF electromagnetic field immunity Test Configuration





7.5.4. Radiated RF electromagnetic field immunity Environmental Conditions

Power Supply	230 VAC
Temperature	16 ℃
Relative Humidity	34 % R.H.
Barometric Pressure	102.6 kPa

7.5.5. Test Equipment Used

Equipment	Manufacturer	Model	Serial no.	Cal date.	Cal due.
Signal Generator	Rohde & Schwarz	SMR20	100362	12.23.2021	12.23.2022
Amplifier	Amplifier Research	250W1000A M2	312495	N / A	N / A
Amplifier	Amplifier Research	250L	16037	N / A	N / A
Amplifier	Amplifier Research	60S1G4AM3	304211	N / A	N / A
Bilog Antenna	Schaffner	CBL6140A	1217	N / A	N / A
EUT Monitoring system	кт	K4010T	KTI-OS001	N / A	N / A
Power Sensor	Amplifier Research	PH2000	301204	06.11.2021	06.11.2022
Power Sensor	Amplifier Research	PH2000	34337	06.11.2021	06.11.2022
Power Meter	Amplifier Research	PM2002	301548	N / A	N / A

Port:	Power line
Basic Standard:	EN 61000-4-4:2012
Performance Criterion:	В
Test Duration (per cable/line):	1 minute
Burst duration:	Tr / Th = 5 / 50 ns
Spike Frequency:	5 kHz
Test level:	AC power : ± 1 kV DC power : ± 0.5 kV Ports for signal (lines and control lines) : ± 0.5 kV
Test result	Met criterion A / Pass
Test Date	03.21.2022

7.6 Electric fast transient/burst immunity Test Results

7.6.1. Test Set-up and Procedure.

A ground reference plane was located on the floor.

EFT generator was connected to reference ground plane via low impedance connection. For floor standing equipment, EUT was placed on a 0.1 m wooden table.

For desktop equipment, the EUT is placed on a wooden table (0.8 m) above the floor.

Test generator and coupling/decoupling network was placed on, and bounded to, the ground reference plane.

When using the coupling clamp, the minimum distance between the coupling plates and all other conductive surfaces, except the ground reference plane beneath the coupling clamp, Shall be 0.5 m.



7.6.2. Test Results

<Power Ports>

Line	Test Voltage [±kV]	Coupling (Direct/Clamp)	Criteria	Results
L1 (Positive)	0.5 &1	Direct	В	N/A
L2 (Negative)	0.5 &1	Direct	В	N/A
L1 - L2	0.5 &1	Direct	В	A
L1 - L2 - PE	0.5 &1	Direct	В	N/A

* There was no deviation from normal operation condition.


7.6.3. Electric fast transient/burst immunity Test Configuration





7.6.4. Electric fast transient/burst immunity Environmental Conditions

Power Supply	230 VAC
Temperature	16 ℃
Relative Humidity	34 % R.H.
Barometric Pressure	102.6 kPa

7.6.5. Test Equipment Used

Equipment	Manufacturer	Model	Serial no.	Cal date.	Cal due.
Multifunctional test generator	EM TEST	COMPACT NX5	P1715195770	03.31.2021	03.31.2022



7.7 Surge immunity Test Results

Port:	Power line
Basic Standard:	EN 61000-4-5:2014
Performance Criterion:	В
Test times:	5 times per each polarity / angle
Repetition rate:	1 per minute
Synchro angle:	0 ° , 90 ° , 180 ° , 270 °
Test level:	Line to Line: ± 1 kV Line to earth: ± 2 kV
Test result	Met criterion A / Pass
Test Date	03.21.2022

7.7.1. Test Set-up and Procedure.

The ground plane is on the ground. The SURGE generator is connected to the reference ground plane via a low impedance connection. For floor standing equipment, the EUT was placed on a 0.1 meter wooden table.

For desktop equipment, the EUT is placed on a wooden table (0.8 m) above the floor.

7.7.2. Monitoring of the EUT

The operating status of EUT was monitored by observation of change of output current.

7.7.3. Test Results

<Power Ports>

Line	Test Voltage [±kV]	Coupling (Direct/Clamp)	Criteria	Results
L1 - L2	± 0.5 & 1 & 2 kV	Direct	В	A
L1 - PE	± 0.5 & 1 & 2 kV	Direct	В	N/A
L2 - PE	± 0.5 & 1 & 2 kV	Direct	В	N/A

* There was no deviation from normal operation condition.



7.7.4. Surge immunity Test Configuration





7.7.5. Surge immunity Environmental Conditions

Power Supply	230 VAC
Temperature	16 ℃
Relative Humidity	34 % R.H.
Barometric Pressure	102.6 kPa

7.7.6. Test Equipment Used

Equipment	Manufacturer	Model	Serial no.	Cal date.	Cal due.
Multifunctional test generator	EM TEST	COMPACT NX5	P171519 5770	03.31.2021	03.31.2022

KTI)

Port:	Power line
Basic Standard:	EN 61000-4-6:2013
Performance Criterion:	A
Frequency range:	0.15 to 80 MHz
Test Level:	3 V
Dwell Time:	1 seconds
Frequency Step Size:	1 %
Modulation:	1 kHz, 80% amplitude modulated
Test result	Met criterion A / Pass
Test Date	03.21.2022

7.8 Conducted disturbance induced by RF fields immunity Test Results

7.8.1. Test Set-up and Procedure.

A ground reference plane was located on the floor. The test was performed on a ground reference plane on a 0.1 m wooden table. This test were performed using CDN for mains, clamp for signal and injection probe. The frequency range was swept from 150 kHz to 80 MHz. This frequency range was modulated with 1 kHz sine wave at 80 %.



7.8.2. Test Results

<Power Ports>

Coupling Point	Coupling Method	Criteria	Results
Main power input	CDN(M2)	А	A

*There was no deviation from normal operation condition.



7.8.3. Conducted disturbance induced by RF fields immunity Test Configuration





7.8.4. Conducted disturbance induced by RF fields immunity Environmental Conditions

Power Supply	230 VAC
Temperature	16 ℃
Relative Humidity	34 % R.H.
Barometric Pressure	102.6 kPa

7.8.5. Test Equipment Used

Equipment	Manufacturer	Model	Serial no.	Cal date.	Cal due.
Signal Generator	Signal Generator Hewlett Packard		3145A00 285	12.23.2021	12.23.2022
RF Power Amplifier	Amplifier Research	250L	16037	N / A	N / A
Power Sensor	er Sensor Amplifier Research		301204	06.11.2021	06.11.2022
Power Sensor	Amplifier Research	PH2000	34337	06.11.2021	06.11.2022
Power Meter	Amplifier Research	PM2002	301548	N / A	N / A
Coupling Decoupling Network	Fisher Corp	FCC-801-M 2-16A	9919	03.25.2021	03.25.2022



7.9 Voltage dips, Voltage interruptions Test Results

Port:	Power line
Basic Standard:	Voltage dips, Voltage interruptions: EN 61000-4-11:2004
Performance Criterion:	100 % during 0.5/0.5 cycles (50/60Hz) 60 % during 10/12 cycle (50/60Hz) 30 % during 25/30 cycles (50/60Hz)
Test result	C
Test Date	03.21.2022

7.9.1. Test Set-up and Procedure.

A ground reference plane was located on the floor. DIP generator was connected to reference ground plane via low impedance connection. For floor standing equipment, EUT was placed on a 0.1 m wooden table.

For table top equipment, EUT was placed on a wooden table (0.8 m) above the reference plane.



7.9.2. Test Results

<50Hz>

	Test level %U⊤	Duration (Cycle)	Criteria	Results
Dips	100	0.5	В	
	60	10	С	A
	30	25	С	

*There was no deviation from normal operation condition.

<60Hz>

	Test level %U⊤	Duration (Cycle)	Criteria	Results
Dips	100	0.5	В	
	60	12	С	A
	30	30	С	

*There was no deviation from normal operation condition.



7.9.3. Voltage dips, Voltage interruptions Test Configuration





7.9.4. Voltage dips, Voltage interruptions Test Environmental Conditions

Power Supply	230 VAC
Temperature	16 ℃
Relative Humidity	34 % R.H.
Barometric Pressure	102.6 kPa

7.9.5. Test Equipment Used

Equipment	Manufacturer	Model	Serial no.	Cal date.	Cal due.
Multifunctional test generator	EM TEST	COMPACT NX5	P1715195770	03.31.2021	03.31.2022



Test Standard:	IEC 61000-3-2 (Edition 5) Limits for harmonic current emissions (equipment input current < 16 A per phase)			
Company Name:	ESTECH			
Test Date :	03/22/2022 2:14:16 PM			
Measures & Analysis				
Measure Window :	10 periods	Voltage Range :	500 V	
Refresh Interval :	2 s	Current Range :	50 A	
Sampling Rate :	6.4 kS/s			
Scaled Window :	Rectangular			
According : Observation	IEC 61000-3-2 (Edition 5) Limits for harmonic current per phase) Quasi-stationary	emissions (equipmer	nt input current < 16 A	
Period :	-			

7.10. Limits for harmonic current emissions

Test Result	
E. U. T.:	PASS
Power Source:	PASS

7.10.1 Test Equipment Used

Equipment	Manufacturer	Model	Serial no.	Cal date.	Cal due.
Test System	HAEFELY	PHF555	08419-11	07.20.2021	07.20.2022
Harmonic & Flicker Test System	EM Test AG	DPA 500N	V1033107193	07.20.2021	07.20.2022

7.10.2 Test Result

	Measure Results
	Standard Specific Results for IEC 61000-3-2 (Edition 5)
Standard Group:	Industry
Standard Name:	IEC 61000-3-2 (Edition 5) Limits for harmonic current emissions (equipment input current < 16 A per phase)



Device Un	der Test:	PASS	5						
Power Sou	urce:	PASS	5						
Connectio	n Type:	L - N							
Classificat	ion:	Class	S A						
Appli. of L	imits:	less	than or eq	ual to 200	%				
Check H	Harmonics	240							
First ha	ormonic ord	der > 200	%						
Line 1:		N	lone						
Harmol	nics orders	: > 200 %							
Line 1:		N	lone						
Harmol	nics orders	with aver	age > 90	%					
Line 1:		N	lone						
First ha min	ormonic ord	der betwee	en 150% a	and 200% (during mol	re than 10	% of the i	test time o	r max. 10
Line 1:		N	lone						
Harmol	nic order b	etween 15	50% and 2	00% durin	g more the	an 10% of	f the test t	time or ma	x. 10 min
Line 1:		N	lone						
Measur	ed values								
Fundan	nental Curi	rent							
Line 1:		0	.775 A						
Active I	input Powe	er i					·		
Line 1:		1	78.484 W	*					
Circuit	power fact	or					I		
Line 1:		1	*						
* Absolute	e value.								
Current	Fest Resu	lt							
		А	verage an	d Maximur	n harmoni	c current r	results		
		Average	(90% *)			Maximun	n (200%)		
Hn	Ieff [A]	of Limit [%]	Limit [A]	Result	Ieff [A]	of Limit [%]	Limit [A]	Result	Harmonic Result



Report No.: KTI22EC03002

2	0.006	0.637	0.972	PASS	0.012	0.573	2.160	PASS	PASS
3	0.006	0.311	2.070	PASS	0.011	0.236	4.600	PASS	PASS
4	0.006	1.564	0.387	PASS	0.009	1.022	0.860	PASS	PASS
5	0.006	0.569	1.026	PASS	0.008	0.348	2.280	PASS	PASS
6	0.006	2.062	0.270	PASS	0.007	1.246	0.600	PASS	PASS
7	0.006	0.813	0.693	PASS	0.007	0.454	1.540	PASS	PASS
8	0.006	2.667	0.207	PASS	0.007	1.461	0.460	PASS	PASS
9	0.005	1.425	0.360	PASS	0.006	0.763	0.800	PASS	PASS
10	0.005	2.798	0.166	n/a	0.006	1.532	0.368	PASS	PASS
11	0.005	1.580	0.297	n/a	0.006	0.835	0.660	PASS	PASS
12	0.005	3.342	0.138	n/a	0.005	1.740	0.307	PASS	PASS
13	0.004	2.167	0.189	n/a	0.005	1.147	0.420	n/a	n/a
14	0.004	3.536	0.118	n/a	0.005	1.851	0.263	n/a	n/a
15	0.004	2.629	0.135	n/a	0.004	1.384	0.300	n/a	n/a
16	0.003	3.374	0.104	n/a	0.004	1.748	0.230	n/a	n/a
17	0.003	2.548	0.119	n/a	0.004	1.322	0.265	n/a	n/a
18	0.003	3.120	0.092	n/a	0.003	1.619	0.204	n/a	n/a
19	0.002	2.339	0.107	n/a	0.003	1.199	0.237	n/a	n/a
20	0.002	2.494	0.083	n/a	0.003	1.364	0.184	n/a	n/a
21	0.002	2.214	0.096	n/a	0.002	1.148	0.214	n/a	n/a
22	0.002	2.363	0.075	n/a	0.002	1.326	0.167	n/a	n/a
23	0.002	1.958	0.088	n/a	0.002	1.060	0.196	n/a	n/a
24	0.002	2.641	0.069	n/a	0.002	1.405	0.153	n/a	n/a
25	0.001	1.590	0.081	n/a	0.002	1.098	0.180	n/a	n/a
26	0.001	2.179	0.064	n/a	0.002	1.246	0.142	n/a	n/a
27	0.001	1.738	0.075	n/a	0.002	1.127	0.167	n/a	n/a
28	0.001	2.184	0.059	n/a	0.002	1.266	0.131	n/a	n/a
29	0.001	1.586	0.070	n/a	0.002	1.040	0.155	n/a	n/a
30	0.001	1.955	0.055	n/a	0.002	1.291	0.123	n/a	n/a
31	0.001	1.623	0.065	n/a	0.002	1.061	0.145	n/a	n/a
32	0.001	1.967	0.052	n/a	0.002	1.375	0.115	n/a	n/a
33	0.001	1.707	0.061	n/a	0.001	1.074	0.136	n/a	n/a
34	0.001	1.731	0.049	n/a	0.001	1.302	0.108	n/a	n/a
35	0.001	1.891	0.058	n/a	0.001	1.057	0.129	n/a	n/a
36	0.001	2.781	0.046	n/a	0.002	1.473	0.102	n/a	n/a
37	0.001	1.845	0.055	n/a	0.001	1.153	0.122	n/a	n/a
38	0.001	2.221	0.044	n/a	0.001	1.346	0.097	n/a	n/a
39	0.001	1.979	0.052	n/a	0.001	1.088	0.115	n/a	n/a
40	0.001	2.005	0.041	n/a	0.001	1.371	0.092	n/a	n/a



*Note: Harmonic currents less than 0.6 % of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded. * Application of limits for average is 200% for all harmonics.*

Voltage Source Verification

Harmonic voltage results					
Hn	Ueff [V]	Ueff [%]	Limit [%]	Result	
1	230.530	100.230			
2	0.012	0.005	0.200	PASS	
3	0.025	0.011	0.900	PASS	
4	0.010	0.004	0.200	PASS	
5	0.019	0.008	0.400	PASS	
6	0.008	0.003	0.200	PASS	
7	0.009	0.004	0.300	PASS	
8	0.009	0.004	0.200	PASS	
9	0.010	0.004	0.200	PASS	
10	0.008	0.003	0.200	PASS	
11	0.007	0.003	0.100	PASS	
12	0.013	0.006	0.100	PASS	
13	0.008	0.003	0.100	PASS	
14	0.011	0.005	0.100	PASS	
15	0.015	0.007	0.100	PASS	
16	0.010	0.004	0.100	PASS	
17	0.005	0.002	0.100	PASS	
18	0.006	0.002	0.100	PASS	
19	0.007	0.003	0.100	PASS	
20	0.007	0.003	0.100	PASS	
21	0.021	0.009	0.100	PASS	
22	0.019	0.008	0.100	PASS	
23	0.013	0.006	0.100	PASS	
24	0.012	0.005	0.100	PASS	
25	0.009	0.004	0.100	PASS	
26	0.008	0.003	0.100	PASS	
27	0.009	0.004	0.100	PASS	
28	0.008	0.004	0.100	PASS	
29	0.008	0.004	0.100	PASS	
30	0.011	0.005	0.100	PASS	
31	0.008	0.004	0.100	PASS	



32	0.009	0.004	0.100	PASS
33	0.008	0.004	0.100	PASS
34	0.011	0.005	0.100	PASS
35	0.012	0.005	0.100	PASS
36	0.020	0.009	0.100	PASS
37	0.015	0.007	0.100	PASS
38	0.014	0.006	0.100	PASS
39	0.009	0.004	0.100	PASS
40	0.013	0.006	0.100	PASS



7.10.3 Limits for harmonic current emissions Test Configuration





7.11 Limitation of voltages changes, voltage fluctuations and flicker

Test Standard:	IEC 61000-3-3 (Edition 3)
Company Name:	Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current \leq 16 A per phase and not subject to conditional connection
Company Name:	ESTECH
Test Date :	03/22/2022 4:48:55 PM

Test Result	PASS
-------------	------

7.11.1 Test Equipment used

Equipment	Manufacturer	Model	Serial no.	Cal date.	Cal due.
Test System	HAEFELY	PHF555	08419-11	07.20.2021	07.20.2022
Harmonic & Flicker Test System	EM Test AG	DPA 500N	V1033107193	07.20.2021	07.20.2022

7.11.2 Test Result

Flicker Results						
Standard Specific Results for IEC 61000-3-3 (Edition 3)						
Standard Group:	Industry					
Standard Name:	IEC 61000-3-3 (Edition 3)					
	Limitation of voltage changes, voltage fluctuations and flicker					
	in public low-voltage supply systems, for equipment with rated current \leq 16 A					
	per phase					
	and not subject to conditional connection					
Test Condition:	General Test Conditions					
Analysis Status:	PASS					



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i neiter i reabaremente	Jettings
Main line:	230V, 50Hz
Flicker Meter:	230V / 50Hz
Flicker Impedance:	Zref
Observation Time:	12 × 10 min
Measurements done:	12

Flicker Measurements							
	P _{lt}	Max P _{st}	Max D _c	Max D _{max}	Max T _{max}		
Line 1:	0.059	0.062	0.166	< 0.2	0		
Limits:	0.65	1	3.3	4	0.5		
Results:	PASS	PASS	PASS	PASS	PASS		

Flicker (Line 1)									
Meas.	P0,1	P1s	P3s	P10s	P50s	Pst	dc	dmax	Tmax
No.							[%]	[%]	[s]
1	0.081	0.01	0	0.001	0.005	0.062	0.149	0.198	0
2	0.077	0.004	0	0.001	0.005	0.058	0.163	0.186	0
3	0.079	0.005	0	0.001	0.005	0.059	0.129	0.182	0
4	0.079	0.006	0	0.001	0.005	0.059	0.163	0.185	0
5	0.076	0.004	0	0.001	0.005	0.058	0.164	0.186	0
6	0.082	0.01	0	0.001	0.005	0.062	0.148	0.19	0
7	0.078	0.004	0	0.001	0.005	0.058	0.141	0.185	0
8	0.078	0.004	0	0.001	0.005	0.058	0.147	0.185	0
9	0.081	0.006	0	0.001	0.005	0.06	0.134	0.188	0
10	0.077	0.004	0	0.001	0.005	0.058	0.16	0.187	0
11	0.079	0.005	0	0.001	0.005	0.059	0.166	0.187	0
12	0.077	0.004	0	0.001	0.005	0.058	0.137	0.183	0

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7.11.3 Limits for Flicker Test Configuration





8.0 Product Photo

<Front>



<Rear>





<Temperature controller Inside>



EOF.

EC Declaration of Conformity

Seggi Century Co., Ltd.

We 94, Yeonam-gil, Chopyeong-myeon, Jincheon-gun, Chungcheongbuk- do, Republic of Korea declare under our sole responsibility that the products;

Product :

HEATING FILM

Model No: APN-410-RS

Derived Models: HP-SPN-305, HP-SPN-308, HP-SPN-310, HP-ACN-405, HP-ACN-408, HP-ACN-410, HP-APN-405, HP-APN-410, HP-APH-410

The product identified above is tested by the requirements of the EU Directives of the following standards;

Related standards for Electromagnetic Compatibility Directives 2014/30/EU

EN 55014-1: 2017	Electromagnetic Compatibility (EMC)- Radio disturbance characteristics- Limits and methods of measurement
EN 55014-2: 2015	Electromagnetic compatibility (EMC) - Immunity characteristics- Limits and methods of measurement
EN 61000-3:2:2019	Electromagnetic compatibility (EMC)-
	Limits. Limits for harmonic current emissions
EN 61000-3-3:2013	Electromagnetic compatibility (EMC)-
+A1: 2019	Limits. Limitation of voltage changes, voltage fluctuations and
	flicker in public low-voltage supply systems

Above described products are fully complying with the essential requirements of the EU directives. But, the test report in accordance with EMC directive and others are additionally required, if need.

Issued date: March 23, 2022

Confirmed by; Seggi Century Co., Ltd.

Hoon Kyu Park/ CEO



KOREA TECHNOLOGY INSTITUTE CO., LTD.

TEST REPORT IEC/EN 60335-1 Safety of household and similar electrical appliances Report Number.....: KTI22SC03002 Date of issue.....: 2022.03.28 Total number of pages 93 pages Name of Testing Laboratory KOREA TECHNOLOGY INSTITUTE CO., LTD preparing the Report.....: #58-10, Sagiso-gil, Docheokmyun, Kwangju-si, Kyunggido 12816, Korea SEGGI CENTURY Co., LTD. Applicant's name: 94, Yeonam-gil, Chopyeong-myeon, Jincheon-gun, Address: Chungcheongbuk- do, Korea, Republic of Korea Test specification: Standard.....: IEC 60335-1:2010/COR1:2010/COR2:2010 /AMD1:2013/COR1:2014/AMD2:2016/COR1:2016 (EN 60335-1:2012 + AC:2014 + A11:2014 + A13:2017 + A1:2019 + A14:2019 + A2:2019 EN 62233:2008 + AC:2008) Test procedure: CE Scheme Non-standard test method: N/A Test Report Form No. IEC60335 1X Test Report Form(s) Originator: Nemko AS Master TRF..... Dated 2016-10 Copyright © 2016 IEC System of Conformity Assessment Schemes for Electrotechnical Equipment and Components (IECEE System). All rights reserved. This publication may be reproduced in whole or in part for non-commercial purposes as long as the IECEE is acknowledged as copyright owner and source of the material. IECEE takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context. If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed. This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02. General disclaimer: The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description	Heatin	g Film		
Trade Mark	-			
Manufacturer	SEGG	I CENTURY Co., LTD.		
Model/Type reference	APN-4	10-RS		
Ratings	220 V	ac 240 V ac, 50 / 60 H	z, 200 W	
Responsible Testing Laboratory (as a	pplical	ble), testing procedure	and testing location(s):	
CE Testing Laboratory:		KOREA TECHNOLOG	Y INSTITUTE CO., LTD	
Testing location/ address	:	#58-10, Sagiso-gil, Doc 12816, Korea	heokmyun, Kwangju-si, Kyunggi-do	
Tested by (name, function, signature)	:	WJ. Yoon	YW	
Approved by (name, function, signatu	ıre) :	SH. Song	Den	
			•	
Testing procedure: CTF Stage 1:				
Testing location/ address	:		_	
Tested by (name, function, signature)	:			
Approved by (name, function, signatu	ıre) :			
Iesting procedure: CTF Stage 2:				
Testing location/ address	:			
Tested by (name + signature)	:			
Witnessed by (name, function, signate	ure).:			
Approved by (name, function, signatu	ıre) :			
Testing procedure: CTF Stage 3	:			
Testing procedure: CTF Stage 4:	:			
Testing location/ address	:			
Tested by (name, function, signature)	:			
Witnessed by (name, function, signat	ure).:			
Approved by (name, function, signatu	ire) :			
Supervised by (name, function, signal	ture) :			
	•	1	1	

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List of Attachments (including a total number of pages in each attachment): N/A					
Summary of testing: Pass					
Tests performed (name of test and test clause)	Testing location:				
: Relevant tests were carried out according to	KOREA TECHNOLOGY INSTITUTE CO., LTD.				
clauses of the standards	#58-10, Sagiso-gil, Docheokmyun, Kwangju-si, Kyunggi-do 12816, Korea				
Summary of compliance with National Difference	a (list of countries addressed).				
Summary of compliance with National Differences (List of countries addressed): The product fulfils the requirements of EN 60335-1:2012 + AC:2014 + A11:2014 + A13:2017 + A1:2019 + A14:2019 + A2:2019, EN 62233:2008 + AC:2008					

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Copy of marking	plate:	
	HEAT PLUS	CE
	Heating Film	
	Model : APN-410-RS	
	Ratings : 230 V~, 50/60 Hz, 1 A	
	Serial No.:	
	SEGGI CENTURY Co., LTD.	
	Made in R.O.Korea	www. heatplus.co.kr

Test item particulars:	
Classification of installation and use	Built-in(Fixed) Appliance/Class II appliance
Supply Connection	Non-detachable wire
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:	
Date of receipt of test item:	2022.0307
Date (s) of performance of tests:	2022.0310 -2022.0324
General remarks:	
"(See Enclosure #)" refers to additional information ap "(See appended table)" refers to a table appended to the	opended to the report. ne report.
│ Throughout this report a ⊠ comma / □ point is u	sed as the decimal separator.
Manufacturer's Declaration per sub-clause 4.2.5 of	IECEE 02:
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided	 ☐ Yes ☑ Not applicable
When differences exist; they shall be identified in t	he General product information section.
Name and address of factory (ies):	-
General product information:	
 The appliance is Electric Carbon heating film The appliance has a class II protection against elect By manufacturer. Temperature controller information Model: UTH-170 Manufacturer: URIEL Electronics Co., Ltd. 	ric shock with the temperature controller submitted
 HP-SPN-305, HP-SPN-308, HP-SPN-310 is the sar HP-ACN-405, HP-ACN-408, HP-ACN-410 is the sa HP-APN-405, HP-APN-410, HP-APH-410 is the sar 	ne except for the width. ame except for model designation, me except for model designation.

IEC/EN 60335-1					
Clause	Requirement + Test	Result - Remark	Verdict		

5	GENERAL CONDITIONS FOR THE TESTS		
	Tests performed according to clause 5, e.g. nature of supply, sequence of testing, etc.		Р
6	CLASSIFICATION		
6.1	Protection against electric shock: Class 0, 0I, I, II, III:	Class II	Р
	For a class III construction with a detachable power supply part the appliance is classified according to the detachable power supply part		N/A
6.2	Protection against harmful ingress of water	IPX0	Р
7	MARKING AND INSTRUCTIONS		
7.1	Rated voltage or voltage range (V):		Р
	Symbol for nature of supply, or:		Р
	Rated frequency (Hz)		Р
	Rated power input (W), or:		Р
	Rated current (A):		N/A
	Manufacturer's or responsible vendor's name, trademark or identification mark	(See copy of marking plate)	Р
	Model or type reference:	(See copy of marking plate)	Р
	Symbol IEC 60417-5172, for class II appliances	(See copy of marking plate)	Р
	IP number, other than IPX0:	IPX0	N/A
	Symbol IEC 60417-5180, for class III appliances, unless		N/A
	the appliance is operated by batteries only, or		N/A
	for appliances powered by rechargeable batteries recharged in the appliance		N/A
	Symbol IEC 60417-5018, for class II and class III appliances incorporating a functional earth		N/A
	Symbol IEC 60417-5036, for the enclosure of electrically-operated water valves in external hose- sets for connection of an appliance to the water mains, if the working voltage exceeds extra-low voltage		N/A
7.2	Warning for stationary appliances for multiple supply	Single supply	N/A
	Warning placed in vicinity of terminal cover		N/A
7.3	Range of rated values marked with the lower and upper limits separated by a hyphen		N/A
	Different rated values marked with the values separated by an oblique stroke		N/A
7.4	Appliances adjustable for different rated voltages or rated frequencies, the voltage or the frequency setting is clearly discernible		N/A

IEC/EN 60335-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Requirement met if frequent changes are not required and the rated voltage or rated frequency to which the appliance is to be adjusted is determined from a wiring diagram		N/A
7.5	Appliances with more than one rated voltage or one or more rated voltage ranges, marked with rated input or rated current for each rated voltage or range, unless		N/A
	the power input or current are related to the arithmetic mean value of the rated voltage range		Р
	Relation between marking for upper and lower limits of rated power input or rated current and voltage is clear		N/A
7.6	Correct symbols used		Р
	Symbol for nature of supply placed next to rated voltage		N/A
	Symbol for class II appliances placed unlikely to be confused with other marking	(See copy of marking plate)	Р
	Units of physical quantities and their symbols according to international standardized system		Р
7.7	Connection diagram fixed to appliances to be connected to more than two supply conductors and appliances for multiple supply, unless		N/A
	correct mode of connection is obvious		N/A
7.8	Except for type Z attachment, terminals for connection to the supply mains indicated as follows:		-
	- marking of terminals exclusively for the neutral conductor (letter N)		N/A
	- marking of protective earthing terminals (symbol IEC 60417-5019)		N/A
	- marking of functional earthing terminals (symbol IEC 60417-5018)		N/A
	- marking not placed on removable parts		N/A
7.9	Marking or placing of switches which may cause a hazard		N/A
7.10	Indications of switches on stationary appliances and controls on all appliances by use of figures, letters or other visual means		N/A
	This applies also to switches which are part of a control		N/A
	If figures are used, the off position indicated by the figure 0		N/A
	The figure 0 indicates only OFF position, unless no confusion with the OFF position		N/A
7.11	Indication for direction of adjustment of controls		N/A
7.12	Instructions for safe use provided		Р

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Clause	Requirement + Test	Result - Remark	Verdict
	Details concerning precautions during user maintenance		Р
	The instructions state that:		-
	- the appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction		Р
	- children being supervised not to play with the appliance		Р
	For a part of class III construction supplied from a detachable power supply unit, the instructions state that the appliance is only to be used with the unit provided		N/A
	Instructions for class III appliances state that it must only be supplied at SELV, unless		N/A
	it is a battery-operated appliance, the battery being charged outside the appliance		N/A
	For appliances for altitudes exceeding 2000 m, the maximum altitude is stated:		N/A
	The instructions for appliances incorporating a functional earth states that the appliance incorporates an earth connection for functional purposes only		N/A
7.12.1	Sufficient details for installation supplied		N/A
	For an appliance intended to be permanently connected to the water mains and not connected by a hose-set, this is stated		N/A
	If different rated voltages or different rated frequencies are marked, the instructions state what action to be taken to adjust the appliance		N/A
7.12.2	Stationary appliances not fitted with means for disconnection from the supply mains having a contact separation in all poles that provide full disconnection under overvoltage category III, the instructions state that means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules		N/A
7.12.3	Insulation of the fixed wiring in contact with parts exceeding 50 K during clause 11; instructions state that the fixed wiring must be protected		N/A
7.12.4	Instructions for built-in appliances:		-
	- dimensions of space		Р
	- dimensions and position of supporting and fixing		Р
	- minimum distances between parts and surrounding structure		N/A
	- minimum dimensions of ventilating openings and arrangement		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- connection to supply mains and interconnection of separate components		Р
	- allow disconnection of the appliance after installation, by accessible plug or a switch in the fixed wiring, unless		N/A
	a switch complying with 24.3		N/A
7.12.5	Replacement cord instructions, type X attachment with a specially prepared cord		N/A
	Replacement cord instructions, type Y attachment	Evaluated in the end application	N/A
	Replacement cord instructions, type Z attachment		N/A
7.12.6	Caution in the instructions for appliances incorporating a non-self-resetting thermal cut-out that is reset by disconnection of the supply mains, if this cut-out is required to comply with the standard		N/A
7.12.7	Instructions for fixed appliances stating how the appliance is to be fixed		N/A
7.12.8	Instructions for appliances connected to the water ma	ains:	-
	- max. inlet water pressure (Pa):		N/A
	- min. inlet water pressure, if necessary (Pa):		N/A
	Instructions concerning new and old hose-sets for appliances connected to the water mains by detachable hose-sets		N/A
7.12.9	Instructions specified in 7.12 and from 7.12.1 to 7.12.8 appear together before any other instructions supplied with the appliance		Р
	These instructions may be supplied with the appliance separately from any functional use booklet		N/A
	They may follow the description of the appliance that identifies parts, or follow the drawings/sketches		Р
	In addition, instructions are also available in an alternative format such as on a website or on request from the user in a format such as a DVD		N/A
7.13	Instructions and other texts in an official language	English	Р
7.14	Markings clearly legible and durable:		-
	Signal words WARNING, CAUTION, DANGER in uppercase having a height as specified		Р
	Uppercase letter of the text explaining the signal word not smaller than 1,6 mm		Р
	Moulded in, engraved, or stamped markings either raised above or have a depth below the surface of at least 0,25 mm, unless		N/A
	contrasting colours are used		N/A
	Markings checked by inspection, measurement and rubbing test as specified		Р

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Clause	Requirement + Test	Result - Remark	Verdict
7 15	Markings on a main part		P
7.10	Marking clearly discernible from the outside, if		P
	necessary after removal of a cover		
	For portable appliances, cover can be removed or opened without a tool		N/A
	For stationary appliances, name, trademark or identification mark and model or type reference visible after installation		N/A
	For fixed appliances, name, trademark or identification mark and model or type reference visible after installation according to the instructions		N/A
	Indications for switches and controls placed on or near the components. Marking not on parts which can be positioned or repositioned in such a way that the marking is misleading		N/A
	The symbol IEC 60417-5018 placed next to the symbol IEC 60417-5172 or IEC 60417-5180		N/A
7.16	Marking of a possible replaceable thermal link or fuse link clearly visible with regard to replacing the link		N/A
8	PROTECTION AGAINST ACCESS TO LIVE PARTS	3	
8.1	Adequate protection against accidental contact with live parts		Р
8.1.1	Requirement applies for all positions, detachable parts removed		Р
	Lamps behind a detachable cover not removed, if conditions met		N/A
	Insertion or removal of lamps, protection against contact with live parts of the lamp cap		N/A
	Use of test probe B of IEC 61032, with a force not exceeding 1 N: no contact with live parts		Р
	Use of test probe B of IEC 61032 through openings, with a force of 20N: no contact with live parts		Р
8.1.2	Use of test probe 13 of IEC 61032, with a force not exceeding 1 N, through openings in class 0 appliances and class II appliances/constructions: no contact with live parts		Р
	Test probe 13 also applied through openings in earthed metal enclosures having a non-conductive coating: no contact with live parts		Р
8.1.3	For appliances other than class II, use of test probe 41 of IEC 61032, with a force not exceeding 1 N: no contact with live parts of visible glowing heating elements or supporting parts		N/A
	For a single switching action obtained by a switching device, requirements as specified		N/A
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Clause	Requirement + Test	Result - Remark	Verdict
	For appliances with a supply cord and without a		N/A
	switching device, the single switching action may be obtained by the withdrawal of the plug		
8.1.4	Accessible part not considered live if:		-
	- safety extra-low a.c. voltage: peak value not exceeding 42.4 V		N/A
	- safety extra-low d.c. voltage: not exceeding 42.4 V		N/A
	- or separated from live parts by protective impedance		N/A
	If protective impedance: d.c. current not exceeding 2 mA, and		N/A
	a.c. peak value not exceeding 0.7 mA		N/A
	- for peak values over 42.4 V up to and including 450 V, capacitance not exceeding 0,1 μF		N/A
	- for peak values over 450 V up to and including 15 kV, discharge not exceeding 45 μC		N/A
	- for peak values over 15kV, the energy in the discharge not exceeding 350 mJ		N/A
8.1.5	Live parts protected at least by basic insulation before	e installation or assembly:	-
	- built-in appliances		N/A
	- fixed appliances		N/A
	- appliances delivered in separate units		N/A
8.2	Class II appliances and constructions constructed so that there is adequate protection against accidental contact with basic insulation and metal parts separated from live parts by basic insulation only		Р
	Only possible to touch parts separated from live parts by double or reinforced insulation		Р
9	STARTING OF MOTOR-OPERATED APPLIANCES		
	Requirements and tests are specified in part 2 when necessary		N/A
10	POWER INPUT AND CURRENT		
10.1	Power input at normal operating temperature, rated voltage and normal operation not deviating from rated power input by more than shown in table 1.:	(see appended table)	Р
	If the power input varies throughout the operating cycle and the maximum value of the power input exceeds, by a factor greater than two, the arithmetic mean value of the power input occurring during a representative period, the power input is the maximum value that is exceeded for more than 10 % of the representative period		N/A
	Otherwise the power input is the arithmetic mean value		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Test carried out at upper and lower limits of the ranges for appliances with one or more rated voltage ranges, unless		N/A
	the rated power input is related to the arithmetic mean value		N/A
10.2	Current at normal operating temperature, rated voltage and normal operation not deviating from rated current by more than shown in table 2:	(see appended table)	N/A
	If the current varies throughout the operating cycle and the maximum value of the current exceeds, by a factor greater than two, the arithmetic mean value of the current occurring during a representative period, the current is the maximum value that is exceeded for more than 10 % of the representative period		N/A
	Otherwise the current is the arithmetic mean value		N/A
	Test carried out at upper and lower limits of the ranges for appliances with one or more rated voltage ranges, unless		N/A
	the rated current is related to the arithmetic mean value of the range		N/A
11	HEATING		
11.1	No excessive temperatures in normal use		Р
11.2	The appliance is held, placed or fixed in position as described:		Р
11.3	Temperature rises, other than of windings, determined by thermocouples		Р
	Temperature rises of windings determined by resistance method, unless		N/A
	the windings are non-uniform or it is difficult to make the necessary connections		N/A
11.4	Heating appliances operated under normal operation at 1.15 times rated power input (W):		Р
11.5	Motor-operated appliances operated under normal operation at most unfavourable voltage between 0.94 and 1.06 times rated voltage (V)		N/A
11.6	Combined appliances operated under normal operation at most unfavourable voltage between 0.94 and 1.06 times rated voltage (V)		N/A
11.7	Operation duration corresponding to the most unfavourable conditions of normal use		Р
11.8	Temperature rises monitored continuously and not exceeding the values in table 3	(see appended table)	Р
	If the temperature rise of a motor winding exceeds the value of table 3, or		N/A
	if there is doubt with regard to classification of insulation,		N/A
	tests of Annex C are carried out		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Sealing compound does not flow out		N/A
	Protective devices do not operate, except		N/A
	components in protective electronic circuits tested		N/A

	for the number of cycles specified in 24.1.4		
13	LEAKAGE CURRENT AND ELECTRIC STRENGTH TEMPERATURE	AT OPERATING	
13.1	Leakage current not excessive and electric strength adequate		Р
	Heating appliances operated at 1.15 times the rated power input (W)		N/A
	Motor-operated appliances and combined appliances supplied at 1.06 times the rated voltage (V):		N/A
	Protective impedance and radio interference filters disconnected before carrying out the tests		N/A
13.2	The leakage current is measured by means of the circuit described in Figure 4 of IEC 60990:1999		Р
	For class 0I appliances and class I appliances, except parts of class II construction, C may be replaced by a low impedance ammeter		N/A
	Leakage current measurements	(see appended table)	Р
13.3	The appliance is disconnected from the supply		Р
	Electric strength tests according to table 4:	(see appended table)	Р
	No breakdown during the tests		Р
14	TRANSIENT OVERVOLTAGES		
	Appliances withstand the transient over-voltages to which they may be subjected		N/A
	Clearances having a value less than specified in table 16 subjected to an impulse voltage test, the test voltage specified in table 6	(see appended table)	N/A
	No flashover during the test, unless		N/A
	of functional insulation if the appliance complies with clause 19 with the clearance short-circuited		N/A
15	MOISTURE RESISTANCE		
15.1	Enclosure provides the degree of moisture protection according to classification of the appliance	IPX0	N/A
	Compliance checked as specified in 15.1.1, taking into account 15.1.2, followed by the electric strength test of 16.3		N/A
	No trace of water on insulation which can result in a reduction of clearances or creepage distances below values specified in clause 29		N/A
15.1.1	Appliances, other than IPX0, subjected to tests as specified in IEC 60529	IPX0	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Water valves containing live parts in external hoses for connection of an appliance to the water mains tested as specified for IPX7 appliances		N/A
15.1.2	Hand-held appliance turned continuously through the most unfavourable positions during the test		N/A
	Built-in appliances installed according to the instructions		N/A
	Appliances placed or used on the floor or table placed on a horizontal unperforated support		N/A
	Appliances normally fixed to a wall and appliances with pins for insertion into socket-outlets are mounted on a wooden board		N/A
	For IPX3 appliances, the base of wall mounted appliances is placed at the same level as the pivot axis of the oscillating tube		N/A
	For IPX4 appliances, the horizontal centre line of the appliance is aligned with the pivot axis of the oscillating tube, and		N/A
	for appliances normally used on the floor or table, the movement is limited to two times 90° for a period of 5 min, the support being placed at the level of the pivot axis of the oscillating tube		N/A
	Wall-mounted appliances, take into account the distance to the floor stated in the instructions		N/A
	Appliances normally fixed to a ceiling are mounted underneath a horizontal unperforated support, the pivot axis of the oscillating tube located at the level of the underside of the support, and		N/A
	for IPX4 appliances, the movement of the tube is limited to two times 90° from the vertical for a period of 5 min		N/A
	Appliances with type X attachment fitted with a flexible cord as described		N/A
	Detachable parts subjected to the relevant treatment with the main part		N/A
	However, if a part has to be removed for user maintenance and a tool is needed, this part is not removed		N/A
15.2	Spillage of liquid does not affect the electrical insulation		N/A
	Spillage solution comprising water containing approximately 1 % NaCl and 0,6 % rinsing agent		N/A
	Appliances with type X attachment fitted with a flexible cord as described		N/A
	Appliances incorporating an appliance inlet tested with or without an connector, whichever is most unfavourable		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Detachable parts are removed		N/A
	Overfilling test with additional amount of the solution, over a period of 1 min (I):		N/A
	The appliance withstands the electric strength test of 16.3		N/A
	No trace of water on insulation that can result in a reduction of clearances or creepage distances below values specified in clause 29		N/A
15.3	Appliances proof against humid conditions		Р
	Checked by test Cab: Damp heat steady state in IEC 60068-2-78		Р
	Detachable parts removed and subjected, if necessary, to the humidity test with the main part		Р
	Humidity test for 48 h in a humidity cabinet		Р
	Reassembly of those parts that may have been removed		Р
	The appliance withstands the tests of clause 16		Р
16	LEAKAGE CURRENT AND ELECTRIC STRENGTH	l	
16.1	Leakage current not excessive and electric strength adequate		Р
	Protective impedance disconnected from live parts before carrying out the tests		N/A
	Tests carried out at room temperature and not connected to the supply		Р
16.2	Single-phase appliances: test voltage 1.06 times rated voltage (V)		Р
	Three-phase appliances: test voltage 1.06 times rated voltage divided by $\sqrt{3}$ (V)		N/A
	Leakage current measurements:	(see appended table)	Р
	Limit values doubled if:		-
	- all controls have an off position in all poles, or		N/A
	- the appliance has no control other than a thermal cut-out, or		N/A
	 all thermostats, temperature limiters and energy regulators do not have an off position, or 		N/A
	- the appliance has radio interference filters		N/A
	With the radio interference filters disconnected, the leakage current do not exceed limits specified:	(see appended table)	N/A
16.3	Electric strength tests according to table 7:	(see appended table)	P
	Test voltage applied between the supply cord and inlet bushing and cord guard and cord anchorage as specified	(see appended table)	N/A
	No breakdown during the tests		Р
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Clause	Requirement + Test	Result - Remark	Verdict

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	(see appended table)	N/A
	Appliance supplied with 1.06 or 0.94 times rated voltage under the most unfavourable short-circuit or overload likely to occur in normal use (V)		N/A
	Basic insulation is not short-circuited		N/A
	Temperature rise of insulation of the conductors of safety extra-low voltage circuits not exceeding the relevant value specified in table 3 by more than 15 K		N/A
	Temperature of the winding not exceeding the value specified in table 8		N/A
	However, limits do not apply to fail-safe transformers complying with sub-clause 15.5 of IEC 61558-1		N/A
18	ENDURANCE		
	Requirements and tests are specified in part 2 when necessary		N/A
19	ABNORMAL OPERATION		
19.1	The risk of fire, mechanical damage or electric shock under abnormal or careless operation obviated		Р
	Electronic circuits so designed and applied that a fault will not render the appliance unsafe		N/A
	Appliances incorporating heating elements subjected to the tests of 19.2 and 19.3, and		Р
	if the appliance also has a control that limit the temperature during clause 11 it is subjected to the test of 19.4, and		N/A
	if applicable, to the test of 19.5		N/A
	Appliances incorporating PTC heating elements are also subjected to the test of 19.6		N/A
	Appliances incorporating motors subjected to the tests of 19.7 to 19.10, as applicable		N/A
	Appliances incorporating electronic circuits subjected to the tests of 19.11 and 19.12, as applicable		N/A
	Appliances incorporating contactors or relays subjected to the test of 19.14, being carried out before the tests of 19.11		N/A
	Appliances incorporating voltage selector switches subjected to the test of 19.15		N/A
	Unless otherwise specified, the tests are continued until a non-self-resetting thermal cut-out operates, or		N/A
	until steady conditions are established		Р

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Clause	Requirement + Test	Result - Remark	Verdict
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	If a heating element or intentionally weak part becomes open-circuited, the relevant test is repeated on a second sample		N/A
19.2	Test of appliances with heating elements with restricted heat dissipation; test voltage (V), power input of 0.85 times rated power input (W)		N/A
19.3	Test of 19.2 repeated; test voltage (V), power input of 1.24 times rated power input (W):		N/A
19.4	Test conditions as in clause 11, any control limiting the temperature during tests of clause 11 short-circuited		N/A
19.5	Test of 19.4 repeated on Class 0I and I appliances with tubular sheathed or embedded heating elements. No short-circuiting, but one end of the element connected to the sheath		N/A
	The test repeated with reversed polarity and the other end of the heating element connected to the sheath		N/A
	The test is not carried out on appliances intended to be permanently connected to fixed wiring and on appliances where an all-pole disconnection occurs during the test of 19.4		N/A
19.6	Appliances with PTC heating elements tested at rated voltage, establishing steady conditions		N/A
	The working voltage of the PTC heating element is increased by 5% and the appliance is operated until steady conditions are re-established. The voltage is then increased in similar steps until 1.5 times working voltage or until the PTC heating element ruptures (V)		N/A
19.7	Stalling test by locking the rotor if the locked rotor torque is smaller than the full load torque, or		N/A
	locking moving parts of other appliances		N/A
	Locked rotor, capacitors open-circuited one at a time		N/A
	Test repeated with capacitors short-circuited one at a time, unless		N/A
	the capacitor is of class S2 or S3 of IEC 60252-1		N/A
	Appliances with timer or programmer supplied with rated voltage for each of the tests, for a period equal to the maximum period allowed:		N/A
	An electronic timer or programmer that operates to ensure compliance with the test before the maximum period under the conditions of Clause 11 is reached, is a protective electronic circuit		N/A
	Other appliances supplied with rated voltage for a period as specified		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Winding temperatures not exceeding values specified in table 8	(see appended table)	N/A
19.8	Multi-phase motors operated at rated voltage with one phase disconnected		N/A
19.9	Running overload test on appliances incorporating motors intended to be remotely or automatically controlled or liable to be operated continuously		N/A
	Motor-operated and combined appliances for which 30.2.3 is applicable and that use overload protective devices relying on electronic circuits to protect the motor windings, are also subjected to the test		N/A
	Winding temperatures not exceeding values as specified:		N/A
19.10	Series motor operated at 1.3 times rated voltage for 1 min (V):		N/A
	During the test, parts not being ejected from the appliance		N/A
19.11	Electronic circuits, compliance checked by evaluation of the fault conditions specified in 19.11.2 for all circuits or parts of circuits, unless		N/A
	they comply with the conditions specified in 19.11.1		N/A
	Appliances incorporating an electronic circuit that relies upon a programmable component to function correctly, subjected to the test of 19.11.4.8, unless		N/A
	restarting does not result in a hazard		N/A
	Appliances having a device with an off position obtained by electronic disconnection, or a device placing the appliance in a stand-by mode, subjected to the tests of 19.11.4		N/A
	If the safety of the appliance under any of the fault conditions depends on the operation of a miniature fuse-link complying with IEC 60127, the test of 19.12 is carried out		N/A
	During and after each test the following is checked:		-
	- the temperature of the windings do not exceed the values specified in table 8		N/A
	- the appliance complies with the conditions specified in 19.13		N/A
	- any current flowing through protective impedance not exceeding the limits specified in 8.1.4		N/A
	If a conductor of a printed board becomes open-circul considered to have withstood the particular test, provisiond the particular test, provision of test,	ited, the appliance is ided both of the following	-
	- the base material of the printed circuit board withstands the test of Annex E		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- any loosened conductor does not reduce clearance or creepage distances between live parts and accessible metal parts below the values specified in clause 29		N/A
19.11.1	Fault conditions a) to g) in 19.11.2 are not applied to a meeting both of the following conditions:	circuits or parts of circuits	-
	- 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/A
	- the protection against electric shock, fire hazard, mechanical hazard or dangerous malfunction of other parts of the appliance does not rely on the correct functioning of the electronic circuit		N/A
19.11.2	Fault conditions applied one at a time, the appliance of specified in clause 11, but supplied at rated voltage, of specified:	operating under conditions Juration of the tests as	-
	a) short circuit of functional insulation if clearances or creepage distances are less than the values specified in clause 29		N/A
	b) open circuit at the terminals of any component		N/A
	c) short circuit of capacitors, unless		N/A
	they comply with IEC 60384-14		N/A
	d) short circuit of any two terminals of an electronic component, other than integrated circuits		N/A
	This fault condition is not applied between the two circuits of an optocoupler		N/A
	e) failure of triacs in the diode mode		N/A
	f) failure of microprocessors and integrated circuits		N/A
	g) failure of an electronic power switching device		N/A
	Each low power circuit is short-circuited by connecting the low-power point to the pole of the supply source from which the measurements were made		N/A
19.11.3	If the appliance incorporates a protective electronic circuit that operates to ensure compliance with clause 19, the appliance is tested as specified		N/A
19.11.4	Appliances having a device with an off position obtained by electronic disconnection, or		N/A
	a device that can be placed in the stand-by mode,		N/A
	subjected to the tests of 19.11.4.1 to 19.11.4.7, the device being set in the off position or in the stand-by mode		N/A
	Appliances incorporating a protective electronic circuit subjected to the tests of 19.11.4.1 to 19.11.4.7, the tests being carried out after the protective electronic circuit has operated, except that		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	appliances operated for 30 s or 5 min during the test of 19.7 are not subjected to the tests for electromagnetic phenomena.		N/A
	Surge protective devices disconnected, unless		N/A
	They incorporate spark gaps		N/A
19.11.4.1	The appliance is subjected to electrostatic discharges in accordance with IEC 61000-4-2, test level 4		N/A
19.11.4.2	The appliance is subjected to radiated fields in accordance with IEC 61000-4-3, at frequency ranges specified		N/A
19.11.4.3	The appliance is subjected to fast transient bursts in accordance with IEC 61000-4-4, test level 3 or 4 as specified		N/A
19.11.4.4	The power supply terminals of the appliance subjected to voltage surges in accordance with IEC 61000-4-5, test level 3 or 4 as specified		N/A
	An open circuit test voltage of 2 kV is applicable for the line-to-line coupling mode		N/A
	An open circuit test voltage of 4 kV is applicable for the line-to-earth coupling		N/A
	Earthed heating elements in class I appliances disconnected		N/A
19.11.4.5	The appliance is subjected to injected currents in accordance with IEC 61000-4-6, test level 3		N/A
19.11.4.6	Appliances having a rated current not exceeding 16 A are subjected to the Class 3 voltage dips and interruptions in accordance with IEC 61000-4-11		N/A
	Appliances having a rated current exceeding 16 A are subjected to the Class 3 voltage dips and interruptions in accordance with IEC 61000-4-34		N/A
19.11.4.7	The appliance is subjected to mains signals in accordance with IEC 61000-4-13, test level class 2		N/A
19.11.4.8	The appliance is supplied at rated voltage and operated under normal operation. After 60s the power supply is reduced to a level such that the appliance ceases to respond or parts controlled by the programmable component cease to operate		N/A
	The appliance continues to operate normally, or		N/A
	requires a manual operation to restart		N/A
19.12	If the safety of the appliance for any of the fault conditions specified in 19.11.2 depends on the operation of a miniature fuse-link complying with IEC 60127, the test is repeated, measuring the current flowing through the fuse-link; measured current (A); rated current of the fuse-link (A):		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
19.13	During the tests the appliance does not emit flames, molten metal, poisonous or ignitable gas in hazardous amounts		Р
	Temperature rises not exceeding the values shown in table 9:	(see appended table)	Р
	Compliance with clause 8 not impaired		Р
	If the appliance can still be operated it complies with 20.2		Р
	Insulation, other than of class III appliances or class I contain live parts, withstands the electric strength test specified in table 4:	II constructions that do not t of 16.3, the test voltage as	-
	- basic insulation (V)		N/A
	- supplementary insulation (V)		N/A
	- reinforced insulation (V)		Р
	After operation or interruption of a control, clearances and creepage distances across the functional insulation withstand the electric strength test of 16.3, the test voltage being twice the working voltage		Р
	The appliance does not undergo a dangerous malfunction, and		Р
	no failure of protective electronic circuits, if the appliance is still operable		N/A
	Appliances tested with an electronic switch in the off mode:	position, or in the stand-by	-
	- do not become operational, or		N/A
	- if they become operational, do not result in a dangerous malfunction during or after the tests of 19.11.4		N/A
	If the appliance contains lids or doors that are control one of the interlocks may be released provided that:	led by one or more interlocks,	-
	- the lid or door does not move automatically to an open position when the interlock is released, and		N/A
	- the appliance does not start after the cycle in which the interlock was released		N/A
19.14	Appliances operated under the conditions of clause 11, any contactor or relay contact operating under the conditions of clause 11 being short-circuited		N/A
	For a relay or contactor with more than one contact, all contacts are short-circuited at the same time		N/A
	A relay or contactor operating only to ensure the appliance is energized for normal use is not short- circuited		N/A
	If more than one relay or contactor operates in clause 11, they are short-circuited in turn		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
19.15	For appliances with a mains voltage selector switch, the switch is set to the lowest rated voltage position and the highest value of rated voltage is applied		N/A
20	STABILITY AND MECHANICAL HAZARDS		
20.1	Appliances having adequate stability		N/A
	Tilting test through an angle of 10°, appliance placed on an inclined plane/horizontal support, not connected to the supply mains; appliance does not overturn		N/A
	Tilting test repeated on appliances with heating elements, angle of inclination increased to 15°		N/A
	Possible heating test in overturned position; temperature rise does not exceed values shown in table 9		N/A
20.2	Moving parts adequately arranged or enclosed as to provide protection against personal injury	No moving parts	N/A
	Protective enclosures, guards and similar parts are non-detachable, and		N/A
	have adequate mechanical strength		N/A
	Enclosures that can be opened by overriding an interlock are considered to be detachable parts		N/A
	Self-resetting thermal cut-outs and overcurrent protective devices not causing a hazard by unexpected closure		N/A
	Not possible to touch dangerous moving parts with the test probe described		N/A
21	MECHANICAL STRENGTH		
21.1	Appliance has adequate mechanical strength and is constructed as to withstand rough handling		Р
	Checked by applying 3 blows to every point of the enclosure like to be weak, in accordance with test Ehb of IEC 60068-2-75, spring hammer test, with an impact energy of 0,5 J	(see appended table)	Р
	The appliance shows no damage impairing compliance with this standard, and		Р
	compliance with 8.1, 15.1 and clause 29 not impaired		Р
	If doubt, supplementary or reinforced insulation subjected to the electric strength test of 16.3		N/A
	If necessary, repetition of groups of three blows on a new sample		N/A
21.2	Accessible parts of solid insulation having strength to prevent penetration by sharp implements		N/A
	Test not applicable if the thickness of supplementary insulation is at least 1 mm and reinforced insulation at least 2 mm		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	The insulation is tested as specified, and does withstand the electric strength test of 16.3		N/A
22	CONSTRUCTION		
22.1	Appliance marked with the first numeral of the IP system, relevant requirements of IEC 60529 are fulfilled		N/A
22.2	Stationary appliance: means to ensure all-pole disconne provided:	ection from the supply being	-
	- a supply cord fitted with a plug, or		N/A
	- a switch complying with 24.3, or		N/A
	- a statement in the instruction sheet that a disconnection incorporated in the fixed wiring is to be provided, or		N/A
	- an appliance inlet		N/A
	Singe-pole switches and single-pole protective devices for the disconnection of heating elements in single-phase, permanently connected class 01 and class I appliances, connected to the phase conductor		N/A
22.3	Appliance provided with pins: no undue strain on socket-outlets		N/A
	Applied torque not exceeding 0.25 Nm		N/A
	Pull force of 50N to each pin after the appliance has being placed in the heating cabinet; when cooled to room temperature the pins are not displaced by more than 1mm		N/A
	Each pin subjected to a torque of 0.4Nm; the pins are not rotating, unless		N/A
	rotating does not impair compliance with this standard		N/A
22.4	Appliance for heating liquids and appliance causing undue vibration not provided with pins for insertion into socket-outlets		N/A
22.5	No risk of electric shock when touching pins, for appliances having a capacitor with rated capacitance equal to or greater than $0,1\mu$ F, the appliance being disconnected from the supply at the instant of voltage peak		N/A
	Voltage not exceeding 34 V (V):		N/A
	If compliance relies on the operation of an electronic circuit, the electromagnetic phenomena tests of 19.11.4.3 and 19.11.4.4 are applied		N/A
	The discharge test is then repeated three times, voltage not exceeding 34 V (V):		N/A
22.6	Electrical insulation not affected by condensing water or leaking liquid		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Electrical insulation of Class II appliances not affected if a hose ruptures or seal leaks		N/A
	In case of doubt, test as described		N/A
22.7	Adequate safeguards against the risk of excessive pressure in appliances containing liquid or gases or having steam-producing devices		N/A
22.8	Electrical connections not subject to pulling during cleaning of compartments to which access can be gained without the aid of a tool, and that are likely to be cleaned in normal use		N/A
22.9	Insulation, internal wiring, windings, commutators and slip rings not exposed to oil, grease or similar substances, unless		Р
	the substance has adequate insulating properties		N/A
22.10	Not possible to reset voltage-maintained non-self- resetting thermal cut-outs by the operation of an automatic switching device incorporated within the appliance, if:		N/A
	- a non-self-resetting thermal cut-out is required by the standard, and		N/A
	- a voltage maintained non-self-resetting thermal cut-out is used to meet it		N/A
	Non-self-resetting thermal motor protectors have a trip-free action, unless		N/A
	they are voltage maintained		N/A
	Reset buttons of non-self-resetting controls so located or protected that accidental resetting is unlikely		N/A
22.11	Reliable fixing of non-detachable parts that provide the necessary degree of protection against electric shock, moisture or contact with moving parts		N/A
	Obvious locked position of snap-in devices used for fixing such parts		N/A
	No deterioration of the fixing properties of snap-in devices used in parts that are likely to be removed during installation or servicing		N/A
	Tests as described		N/A
22.12	Handles, knobs etc. fixed in a reliable manner, if loosening result in a hazard		N/A
	Removing or fixing in wrong position of handles, knobs etc. indicating position of switches or similar components not possible, if resulting in a hazard		N/A
	A choking hazard does not apply to appliances for commercial use		N/A
	Axial force 15 N applied to parts, the shape being so that an axial pull is unlikely to be applied		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Axial force 30 N applied to parts, the shape being so that an axial pull is likely to be applied		N/A
	If the part is removed and can be contained within the small parts cylinder, it is considered to be a choking hazard		N/A
22.13	Unlikely that handles, when gripped as in normal use, make the operator's hand touch parts having a temperature rise exceeding the value specified for handles which are held for short periods only		N/A
22.14	No ragged or sharp edges creating a hazard for the user in normal use, or during user maintenance		Р
	No exposed pointed ends of self-tapping screws or other fasteners, likely to be touched by the user in normal use or during user maintenance		Р
22.15	Storage hooks and the like for flexible cords smooth and well rounded		N/A
22.16	Automatic cord reels cause no undue abrasion or damage to the sheath of the flexible cord, no breakage of conductors strands and no undue wear of contacts		N/A
	Cord reel tested with 6000 operations, as specified		N/A
	Electric strength test of 16.3, voltage of 1000 V applied		N/A
22.17	Spacers not removable from the outside by hand or by means of a screwdriver or a spanner		N/A
22.18	Current-carrying parts and other metal parts resistant to corrosion		Р
22.19	Driving belts not relied upon to provide the required level of insulation, unless		N/A
	constructed to prevent inappropriate replacement		N/A
22.20	Direct contact between live parts and thermal insulation effectively prevented, unless		N/A
	material used is non-corrosive, non-hygroscopic and non-combustible		N/A
22.21	Wood, cotton, silk, ordinary paper and fibrous or hygroscopic material not used as insulation, unless		Р
	impregnated		N/A
	This requirement does not apply to magnesium oxide and mineral ceramic fibres used for the electrical insulation of heating elements		N/A
22.22	Appliances not containing asbestos		Р
22.23	Oils containing polychlorinated biphenyl (PCB) not used		Р
22.24	Bare heating elements, except in class III appliances or class III constructions that do not contain live parts, adequately supported		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	In case of rupture, the heating conductor is unlikely to come in contact with accessible metal parts		N/A
22.25	Sagging heating conductors, except in class III appliances or class III constructions that do not contain live parts, cannot come into contact with accessible metal parts		N/A
22.26	For class III constructions the insulation between parts operating at safety extra-low voltage and other live parts complies with the requirements for double or reinforced insulation		N/A
22.27	Parts connected by protective impedance separated by double or reinforced insulation		N/A
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/A
22.29	Class II appliances permanently connected to fixed wiring so constructed that the required degree of access to live parts is maintained after installation		N/A
22.30	Parts serving as supplementary or reinforced insulation fixed so that they cannot be removed without being seriously damaged, or		N/A
	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/A
22.31	Neither clearances nor creepage distances over supplementary and reinforced insulation reduced below values specified in clause 29 as a result of wear		Р
	Neither clearances nor creepage distances between live parts and accessible parts reduced below values for supplementary insulation if wires, screws etc. become loose		Р
22.32	Supplementary and reinforced insulation constructed or protected against pollution so that clearances or creepage distances are not reduced below the values in clause 29		Р
	Supplementary insulation of natural or synthetic rubber resistant to ageing, or arranged and dimensioned so that creepage distances are not reduced below values specified in 29.2		N/A
	Ceramic material not tightly sintered, similar materials or beads alone not used as supplementary or reinforced insulation		N/A
	Ceramic and similar porous material in which heating conductors are embedded is considered to be basic insulation, not reinforced insulation		N/A
	Oxygen bomb test at 70 °C for 96 h and 16 h at room temperature		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
22.33	Conductive liquids that are or may become accessible in normal use and conductive liquids that are in contact with unearthed accessible metal parts are not in direct contact with live parts, or		N/A
	unearthed metal parts separated from live parts by basic insulation only		N/A
	Electrodes not used for heating liquids		N/A
	For class II constructions, conductive liquids that are or may become accessible in normal use and conductive liquids that are in contact with unearthed accessible metal parts, not in direct contact with basic or reinforced insulation, unless		N/A
	the reinforced insulation consists of at least 3 layers		N/A
	For class II constructions, conductive liquids which are in contact with live parts, not in direct contact with reinforced insulation, unless		N/A
	the reinforced insulation consists of at least 3 layers		N/A
	An air layer not used as basic or supplementary insulation in a double insulation system if likely to be bridged by leaking liquid		N/A
22.34	Shafts of operating knobs, handles, levers etc. not live, unless		N/A
	the shaft is not accessible when the part is removed		N/A
22.35	For other than class III constructions, handles, levers and knobs, held or actuated in normal use, not becoming live in the event of a failure of basic insulation		N/A
	Such parts being of metal, and their shafts or fixings are likely to become live in the event of a failure of basic insulation, are either adequately covered by insulation material or their accessible parts are separated from their shafts or fixings by supplementary insulation		N/A
	This requirement does not apply to handles, levers and knobs on stationary appliances and cordless appliances, other than those of electrical components, provided they are reliably connected to an earthing terminal or earthing contact, or separated from live parts by earthed metal		N/A
	Insulating material covering metal handles, levers and knobs withstand the electric strength test of 16.3 for supplementary insulation		N/A
22.36	For appliances other than class III, handles continuously held in the hand in normal use so constructed that when gripped as in normal use, the operators hand is not likely to touch metal parts, unless		N/A
	they are separated from live parts by double or reinforced insulation		N/A

IEC/EN 60335-1			
Clause	Requirement + Test	Result - Remark	Verdict
22.37	Capacitors in Class II appliances not connected to accessible metal parts and their casings, if of metal, separated from accessible metal parts by supplementary insulation, unless		N/A
	the capacitors comply with 22.42		N/A
22.38	Capacitors not connected between the contacts of a thermal cut-out		N/A
22.39	Lamp holders used only for the connection of lamps		N/A
22.40	Motor-operated appliances and combined appliances intended to be moved while in operation, or having accessible moving parts, fitted with a switch to control the motor. The actuating member of the switch being easily visible and accessible		N/A
	If the appliance cannot operate continuously, automatically or remotely without giving rise to a hazard, appliances for remote operation being fitted with a switch for stopping the operation. The actuating member of the switch being easily visible and accessible		N/A
22.41	No components, other than lamps, containing mercury		Р
22.42	Protective impedance consisting of at least two separate components		N/A
	Values specified in 8.1.4 not exceeded if any one of the components are short-circuited or open-circuited		N/A
	Resistors checked by the test of 14.1 a) in IEC 60065		N/A
	Capacitors checked by the tests for class Y capacitors in IEC 60384-14		N/A
22.43	Appliances adjustable for different voltages, accidental changing of the setting of the voltage unlikely to occur		N/A
22.44	Appliances not having an enclosure that is shaped or decorated like a toy		Р
22.45	When air is used as reinforced insulation, clearances not reduced below the values specified in 29.1.3 due to deformation as a result of an external force applied to the enclosure		Р
22.46	For programmable protective electronic circuits used to ensure compliance with the standard, the software contains measures to control the fault/error conditions in table R.1		N/A
	Software that contains measures to control the fault/error conditions specified in table R.2 is to be specified in parts 2 for particular constructions or to address specific hazards		N/A
	These requirements are not applicable to software used for functional purpose or compliance with clause 11		N/A

	IEC/EN 60335-1		
Clause	Requirement + Test	Result - Remark	Verdict
22.47	Appliances connected to the water mains withstand the water pressure expected in normal use		N/A
	No leakage from any part, including any inlet water hose		N/A
22.48	Appliances connected to the water mains constructed to prevent backsiphonage of non- potable water		N/A
22.49	For remote operation, the duration of operation is to be set before the appliance can be started, unless		N/A
	the appliance switches off automatically or can operate continuously without hazard		N/A
22.50	Controls incorporated in the appliance take priority over controls actuated by remote operation		N/A
22.51	There is a control on the appliance manually adjusted to the setting for remote operation before the appliance can be operated in this mode		N/A
	There is a visual indication showing that the appliance is adjusted for remote operation		N/A
	These requirements not necessary on appliances tha without giving rise to a hazard:	t can operate as follows,	-
	- continuously, or		N/A
	- automatically, or		N/A
	- remotely		N/A
22.52	Socket-outlets on appliances accessible to the user in accordance with the socket-outlet system used in the country in which the appliance is sold		N/A
22.53	Class II appliances and class III appliances that incorporate functionally earthed parts have at least double insulation or reinforced insulation between live parts and the functionally earthed parts		N/A
22.54	Button cells and batteries designated R1 not accessible without the aid of a tool, unless		N/A
	the cover of their compartment can only be opened after at least two independent movements have been applied simultaneously		N/A
22.55	Devices operated to stop the intended function of the appliance, if any, are be distinguished from other manual devices by means of shape, size, surface texture or position		Ρ
	The requirement concerning position does not preclude use of a push on push off switch		N/A
	An indication when the device has been operated is g	given by:	-
	 – tactile feedback from the actuator or from the appliance, or 		N/A
	– reduction in heat output; or		N/A
	– audible and visible feedback		Р

IEC/EN 60335-1			
Clause	Requirement + Test	Result - Remark	Verdict
22.56	Detachable power supply part provided with the part of class III construction		N/A
22.57	The properties of non-metallic materials do not degrade from exposure to UV-C radiation, as specified in Annex T		N/A
	This requirement does not apply to glass, ceramics or similar materials		N/A
23	INTERNAL WIRING		
23.1	Wireways smooth and free from sharp edges		Р
	Wires protected against contact with burrs, cooling fins etc.		Р
	Wire holes in metal well-rounded or provided with bushings		N/A
	Wiring effectively prevented from coming into contact with moving parts		N/A
23.2	Beads etc. on live wires cannot change their position, and are not resting on sharp edges		N/A
	Beads inside flexible metal conduits contained within an insulating sleeve		N/A
23.3	Electrical connections and internal conductors movable relatively to each other not exposed to undue stress		N/A
	Flexible metallic tubes not causing damage to insulation of conductors		N/A
	Open-coil springs not used		N/A
	Adequate insulating lining provided inside a coiled spring, the turns of which touch one another		N/A
	No damage after 10 000 flexings for conductors flexed during normal use, or		N/A
	100 flexings for conductors flexed during user maintenance		N/A
	Electric strength test of 16.3, 1000 V between live parts and accessible metal parts		N/A
	Not more than 10% of the strands of any conductor broken, and		N/A
	not more than 30% for wiring supplying circuits that consume no more than 15W		N/A
23.4	Bare internal wiring sufficiently rigid and fixed		N/A
23.5	The insulation of internal wiring subjected to the supply mains voltage withstanding the electrical stress likely to occur in normal use		N/A
	Basic insulation electrically equivalent to the basic insulation of cords complying with IEC 60227 or IEC 60245, or		N/A

	IEC/EN 60335-1		
Clause	Requirement + Test	Result - Remark	Verdict
	no breakdown when a voltage of 2000 V is applied for 15 min between the conductor and metal foil wrapped around the insulation		N/A
	For class II construction, the requirements for supplementary insulation and reinforced insulation apply,		N/A
	except that the sheath of a cord complying with IEC 60227 or IEC 60245 may provide supplementary insulation.		N/A
	A single layer of internal wiring insulation does not provide reinforced insulation		N/A
23.6	Sleeving used as supplementary insulation on internal wiring retained in position by clamping at both ends, or		N/A
	be such that it can only be removed by breaking or cutting		N/A
23.7	The colour combination green/yellow only used for earthing conductors		N/A
23.8	Aluminium wires not used for internal wiring		Р
23.9	Stranded conductors not consolidated by soldering where they are subjected to contact pressure, unless		Р
	the contact pressure is provided by spring terminals		N/A
23.10	The insulation and sheath of internal wiring, incorporated in external hoses for the connection of an appliance to the water mains, at least equivalent to that of light polyvinyl chloride sheathed flexible cord (60227 IEC 52)		N/A
24	COMPONENTS		
24.1	Components comply with safety requirements in relevant IEC standards		Р
	List of components	(see appended table)	Р
	Motors not required to comply with IEC 60034-1, they are tested as part of the appliance		N/A
	Relays tested as part of the appliance, or		N/A
	alternatively acc. to IEC 60730-1, and meeting the additional requirements in IEC 60335-1		N/A
	The requirements of Clause 29 apply between live parts of components and accessible parts of the appliance		N/A
	Components can comply with the requirements for clearances and creepage distances for functional insulation in the relevant component standard		N/A
	30.2 of this standard apply to parts of non-metallic material in components including parts of non- metallic material supporting current-carrying connections		N/A

	IEC/EN 60335-1		
Clause	Requirement + Test	Result - Remark	Verdict
	Components that have not been previously tested to comply with the IEC standard for the relevant component are tested according to the requirements of 30.2		N/A
	Components that have been previously tested to comply with the resistance to fire requirements in the IEC standard for the relevant component need not be retested provided the specified conditions are met		N/A
	If these conditions are not satisfied, the component is tested as part of the appliance.		N/A
	Power electronic converter circuits not required to comply with IEC 62477-1, they are tested as part of the appliance		N/A
	If components have not been tested and found to comply with relevant IEC standard for the number of cycles specified, they are tested in accordance with 24.1.1 to 24.1.9		N/A
	For components mentioned in 24.1.1 to 24.1.9 no additional tests specified in the relevant component standard are necessary other than those specified in 24.1.1 to 24.1.9		Ρ
	Components not tested and found to comply with relevant IEC standard and components not marked or not used in accordance with its marking, tested under the conditions occurring in the appliance		Р
	Lampholders and starterholders that have not being tested and found to comply with the relevant IEC standard, tested as a part of the appliance and additionally according to the gauging and interchangeability requirements of the relevant IEC standard		N/A
	No additional tests specified for nationally standardized plugs such as those detailed in IEC/TR 60083 or connectors complying with the standard sheets of IEC 60320-1 and IEC 60309		N/A
24.1.1	Capacitors likely to be permanently subjected to the supply voltage and used for radio interference suppression or for voltage dividing, comply with IEC 60384-14		N/A
	If the capacitors have to be tested, they are tested according to Annex F		N/A
24.1.2	Transformers in associated switch mode power supplies comply with Annex BB of IEC 61558-2-16		N/A
	Safety isolating transformers comply with IEC 61558-2-6		N/A
	If they have to be tested, they are tested according to Annex G		N/A
24.1.3	Switches comply with IEC 61058-1, the number of cycles of operation being at least 10 000		N/A

	IEC/EN 603	335-1		
Clause	Requirement + Test		Result - Remark	Verdict
	If they have to be tested, they are tested acc to Annex H	ording		N/A
	If the switch operates a relay or contactor, th complete switching system is subjected to the	e e test		N/A
	If the switch only operates a motor staring re complying with IEC 60730-2-10 with the num cycles of a least 10 000 as specified, the cor switching system need not be tested	lay iber of nplete		N/A
24.1.4	Automatic controls comply with IEC 60730-1 cycles of operation being at least:	with the	relevant part 2. The number of	-
	- thermostats:	10 000		N/A
	- temperature limiters:	1 000		N/A
	- self-resetting thermal cut-outs:	300		N/A
	 voltage maintained non-self-resetting thermal cut-outs: 	1 000		N/A
	- other non-self-resetting thermal cut-outs:	30		N/A
	- timers:	3 000		N/A
	- energy regulators:	10 000		N/A
	The number of cycles for controls operating clause 11 need not be declared, if the applia meets the requirements of this standard whe are short-circuited	during nce n they		N/A
	Thermal motor protectors are tested in comb with their motor under the conditions specific Annex D	ination ed in		N/A
	For water valves containing live parts and the incorporated in external hoses for connection appliance to the water mains, the degree of protection declared for subclause 6.5.2 of IE 60730-2-8 is IPX7	at are n of an C		N/A
	Thermal cut-outs of the capillary type comply the requirements for type 2.K controls in IEC 2-9	/ with 60730-		N/A
24.1.5	Appliance couplers comply with IEC 60320-1			N/A
	However, for class II appliances classified hi than IPX0, the appliance couplers comply wi 60320-2-3	gher th IEC		N/A
	Interconnection couplers comply with IEC 60	320-2-2		N/A
24.1.6	Small lamp holders similar to E10 lampholde comply with IEC 60238, the requirements for lampholders being applicable	ers E10		N/A
24.1.7	For remote operation of the appliance via a telecommunication network, the relevant star for the telecommunication interface circuitry appliance is IEC 62151	ndard in the		N/A
24.1.8	The relevant standard for thermal links is IEC	C 60691		N/A

IEC/EN 60335-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Thermal links not complying with IEC 60691 are considered to be an intentionally weak part for the purposes of Clause 19		N/A
24.1.9	Contactors and relays, other than motor starting relays, tested as part of the appliance		N/A
	They are also tested in accordance with Clause 17 of IEC 60730-1, the number of cycles of operations in 24.1.4 selected according to the contactor or relay function in the appliance:		N/A
24.2	Appliances not fitted with:		-
	- switches, automatic controls or power supplies in flexible cords		Р
	- devices causing the protective device in the fixed wiring to operate in the event of a fault in the appliance		N/A
	- thermal cut-outs that can be reset by soldering, unless		N/A
	the solder has a melding point of at least 230 $^\circ C$		N/A
24.3	Switches intended for all-pole disconnection of stationary appliances are directly connected to the supply terminals and have a contact separation in all poles, providing full disconnection under overvoltage category III conditions		N/A
24.4	Plugs and socket-outlets for extra-low voltage circuits and heating elements, not interchangeable with plugs and socket-outlets listed in IEC/TR 60083 or IEC 60906-1 or with connectors and appliance inlets complying with the standard sheets of IEC 60320-1		N/A
24.5	Capacitors in auxiliary windings of motors marked with their rated voltage and capacitance, and used accordingly		N/A
	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/A
24.6	Working voltage of motors connected to the supply mains and having basic insulation that is inadequate for the rated voltage of the appliance, not exceeding 42 V		N/A
	In addition, the motors comply with the requirements of Annex I		N/A
24.7	Detachable hose-sets for connection of appliances to the water mains comply with IEC 61770		N/A
	They are supplied with the appliance		N/A
	Appliances intended to be permanently connected to the water mains not connected by a detachable hose-set		N/A

IEC/EN 60335-1			
Clause	Requirement + Test	Result - Remark	Verdict
24.8	Motor running capacitors in appliances for which 30.2.3 is applicable and that are permanently connected in series with a motor winding, not causing a hazard in event of a failure		N/A
	One or more of the following conditions are to be met		-
	- the capacitors are of class S2 or S3 according to IEC 60252-1		N/A
	- the capacitors are housed within a metallic or ceramic enclosure		N/A
	- the distance of separation of the outer surface to adjacent non-metallic parts exceeds 50 mm		N/A
	- adjacent non-metallic parts within 50 mm withstand the needle-flame test of Annex E		N/A
	- adjacent non-metallic parts within 50 mm classified as at least V-1 according to IEC 60695-11-10		N/A
25	SUPPLY CONNECTION AND EXTERNAL FLEXIBL	E CORDS	
25.1	Appliance not intended for permanent connection to f connection to the supply:	ixed wiring, means for	-
	- supply cord fitted with a plug, the current rating and voltage rating of the plug being not less than the corresponding ratings of its associated appliance		N/A
	- an appliance inlet having at least the same degree of protection against moisture as required for the appliance, or		N/A
	- pins for insertion into socket-outlets		N/A
25.2	Appliance not provided with more than one means of connection to the supply mains		Р
	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/A
25.3	Appliance intended to be permanently connected to f the following means for connection to the supply main	ixed wiring provided with one of	-
	- a set of terminals allowing the connection of a flexible cord		N/A
	- a fitted supply cord		N/A
	- a set of supply leads accommodated in a suitable compartment		N/A
	- a set of terminals for the connection of cables of fixed wiring, cross-sectional areas specified in 26.6, and the appliance allows the connection of the supply conductors after the appliance has been fixed to its support		N/A

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Clause	Requirement + Test Result -	Remark	Verdict
	- a set of terminals and cable entries, conduit entries, knock-outs or glands, allowing connection of appropriate types of cable or conduit, and the appliance allows the connection of the supply conductors after the appliance has been fixed to its support		N/A
	For a fixed appliance constructed so that parts can be removed to facilitate easy installation, this requirement is met if it is possible to connect the fixed wiring without difficulty after a part of the appliance has been fixed to its support		N/A
25.4	Cable and conduit entries, rated current of appliance not exceeding 16 A, dimension according to table 10 (mm)		N/A
	Introduction of conduit or cable does not reduce clearances or creepage distances below values specified in clause 29		N/A
25.5	Method for assembling the supply cord to the appliance:		-
	- type X attachment		N/A
	- type Y attachment		N/A
	- type Z attachment, if allowed in relevant part 2		N/A
	Type X attachment, other than those with a specially prepared cord, not used for flat twin tinsel cords		N/A
	For multi-phase appliances supplied with a supply cord and that are intended to be permanently connected to fixed wiring, the supply cord is assembled to the appliance by type Y attachment		N/A
25.6	Plugs fitted with only one flexible cord Evaluat applicat	ed in the end tion	N/A
25.7	Supply cords, other than for class III appliances, being one of	the following types:	-
	- rubber sheathed (at least 60245 IEC 53)		N/A
	- polychloroprene sheathed (at least 60245 IEC 57)		N/A
	- polyvinyl chloride sheathed. Not used if they are likely to tout temperature rise exceeding 75 K during the test of clause 11	ch metal parts having a	N/A
	 light polyvinyl chloride sheathed cord (60227 IEC 52), for appliances not exceeding 3 kg 		N/A
	 ordinary polyvinyl chloride sheathed cord (60227 IEC 53), for other appliances 		N/A
	- heat resistant polyvinyl chloride sheathed. Not used for type than specially prepared cords	X attachment other	N/A
	 heat-resistant light polyvinyl chloride sheathed cord (60227 IEC 56), for appliances not exceeding 3 kg 		N/A
	heat-resistant polyvinyl chloride sheathed cord (60227 IEC 57), for other appliances		N/A
	- halogen-free, low smoke, thermoplastic insulated and sheathed		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	 light duty halogen-free low smoke flexible cable (62821 IEC 101) for circular cable and (62821 IEC 101f) for flat cable 		N/A
	 Ordinary duty halogen-free low smoke flexible cable (62821 IEC 102) for circular cable and (62821 IEC 102f(for flat cable 		N/A
	Supply cords for class III appliances adequately insulated		N/A
	Test with 500 V for 2 min for supply cords of class III appliances that contain live parts		N/A
25.8	Nominal cross-sectional area of supply cords not less than table 11; rated current (A); cross-sectional area (mm ²):		N/A
25.9	Supply cords not in contact with sharp points or edges		N/A
25.10	Supply cord of class I appliances have a green/yellow core for earthing		N/A
	In multi-phase appliances, the colour of the neutral conductor of the supply cord is blue		N/A
	Where additional neutral conductors are provided in t	he supply cord:	-
	 other colours may be used for these additional neutral conductors; 		N/A
	 – all of the neutral conductors and line conductors are identified by marking using the alpha numeric notation specified in IEC 60445 		N/A
	– the supply cord is fitted to the appliance		N/A
25.11	Conductors of supply cords not consolidated by soldering where they are subject to contact pressure, unless		N/A
	the contact pressure is provided by spring terminals		N/A
25.12	Insulation of the supply cord not damaged when moulding the cord to part of the enclosure		N/A
25.13	Inlet openings so constructed as to prevent damage to the supply cord		N/A
	If it is not evident that the supply cord can be introduced without risk of damage, a non-detachable lining or bushing complying with 29.3 for supplementary insulation provided		N/A
	If unsheathed supply cord, a similar additional bushing or lining is required, unless the appliance is		N/A
	class 0, or		N/A
	a class III appliance not containing live parts		N/A
25.14	Supply cords moved while in operation adequately protected against excessive flexing		N/A
	Flexing test, as described:		_
	- applied force (N):		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- number of flexings		N/A
	The test does not result in:		-
	- short-circuit between the conductors, such that the current exceeds a value of twice the rated current		N/A
	- breakage of more than 10% of the strands of any conductor		N/A
	- separation of the conductor from its terminal		N/A
	- loosening of any cord guard		N/A
	- damage to the cord or the cord guard		N/A
	- broken strands piercing the insulation and becoming accessible		N/A
25.15	For appliances with supply cord and appliances to be permanently connected to fixed wiring by a flexible cord, conductors of the supply cord relieved from strain, twisting and abrasion by use of cord anchorage		N/A
	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/A
	Pull and torque test of supply cord:		-
	- fixed appliances: pull 100 N; torque (not on automatic cord reel) (Nm):		N/A
	- other appliances: values shown in table 12: mass (kg); pull (N); torque (not on automatic cord reel) (Nm):		N/A
	Cord not damaged and max. 2 mm displacement of the cord		N/A
25.16	Cord anchorages for type X attachments constructed	and located so that:	-
	- replacement of the cord is easily possible		N/A
	- it is clear how the relief from strain and the prevention of twisting are obtained		N/A
	- they are suitable for different types of supply cord		N/A
	- cord cannot touch the clamping screws of cord anchorage if these screws are accessible, unless		N/A
	they are separated from accessible metal parts by supplementary insulation		N/A
	- the cord is not clamped by a metal screw which bears directly on the cord		N/A
	- at least one part of the cord anchorage securely fixed to the appliance, unless		N/A
	it is part of a specially prepared cord		N/A
	- screws which have to be operated when replacing the cord do not fix any other component, unless		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	the appliance becomes inoperative or incomplete or the parts cannot be removed without a tool		N/A
	- if labyrinths can be bypassed the test of 25.15 is nevertheless withstood		N/A
	- for class 0, 0I and I appliances they are of insulating material or are provided with an insulating lining, unless		N/A
	failure of the insulation of the cord does not make accessible metal parts live		N/A
	- for class II appliances they are of insulating material, or		N/A
	if of metal, they are insulated from accessible metal parts by supplementary insulation		N/A
	After the test of 25.15, under the conditions specified, the conductors have not moved by more than 1 mm in the terminals		N/A
25.17	Adequate cord anchorages for type Y and Z attachment, test with the cord supplied with the appliance		N/A
25.18	Cord anchorages only accessible with the aid of a tool, or		N/A
	Constructed so that the cord can only be fitted with the aid of a tool		N/A
25.19	Type X attachment, glands not used as cord anchorage in portable appliances		N/A
	Tying the cord into a knot or tying the cord with string not used		N/A
25.20	The conductors of the supply cord for type Y and Z attachment insulated from accessible metal parts		N/A
25.21	Space for supply cord for type X attachment or for co constructed:	nnection of fixed wiring	-
	- to permit checking of conductors with respect to correct positioning and connection before fitting any cover		N/A
	- so there is no risk of damage to the conductors or their insulation when fitting the cover		N/A
	- for portable appliances, so that the uninsulated end of a conductor, if it becomes free from the terminal, prevented from contact with accessible metal parts		N/A
	2 N test to the conductor for portable appliances; no contact with accessible metal parts		N/A
25.22	Appliance inlets:		-
	- live parts not accessible during insertion or removal		N/A
	Requirement not applicable to appliance inlets complying with IEC 60320-1		N/A

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Clause	Requirement + Test Result - Remark	Verdict	
	- connector can be inserted without difficulty	N/A	
	- the appliance is not supported by the connector	N/A	
	- not for cold conditions if temp. rise of external metal parts exceeds 75 K during clause 11, unless	N/A	
	the supply cord is unlikely to touch such metal parts	N/A	
25.23	Interconnection cords comply with the requirements for the supply cord, exc	ept that: -	
	- the cross-sectional area of the conductors is determined on the basis of the maximum current during clause 11	N/A	
	- the thickness of the insulation may be reduced	N/A	
	- for class I or class II appliance with class III construction, the cross sectional areas of the conductors need not comply with 25.8 if specified conditions are met	N/A	
	If necessary, electric strength test of 16.3	N/A	
25.24	Interconnection cords not detachable without the aid of a tool if compliance with this standard is impaired when they are disconnected	N/A	
25.25	Dimensions of pins that are inserted into socket- outlets compatible with the dimensions of the relevant socket-outlet.	N/A	
	Dimensions of pins and engagement face in accordance with the dimensions of the relevant plug in IEC/TR 60083	N/A	
26	TERMINALS FOR EXTERNAL CONDUCTORS		
26.1	Appliances provided with terminals or equally effective devices for connection of external conductors	N/A	
	Terminals only accessible after removal of a non- detachable cover, except	N/A	
	for class III appliances that do not contain live parts	N/A	
	Earthing terminals may be accessible if a tool is required to make the connections and means are provided to clamp the wire independently from its connection	N/A	
26.2	Appliances with type X attachment and appliances for the connection of cables of fixed wiring provided with terminals in which connections are made by means of screws, nuts or similar devices, unless	N/A	
	the connections are soldered	N/A	
	Screws and nuts not used to fix any other component, except	N/A	
	internal conductors, if so arranged that they are unlikely to be displaced when fitting the supply conductors	N/A	

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Clause	Requirement + Test	Result - Remark	Verdict	
	If soldered connections used, the conductor so positioned or fixed that reliance is not placed on soldering alone, unless		N/A	
	barriers provided so that neither clearances nor creepage distances between live parts and other metal parts reduced below the values for supplementary insulation if the conductor becomes free at the soldered joint		N/A	
26.3	Terminals for type X attachment and for connection of cables of fixed wiring so constructed that the conductor is clamped between metal surfaces with sufficient contact pressure but without damaging the conductor		N/A	
	Terminals fixed so that when the clamping means is	tightened or loosened:	-	
	- the terminal does not become loose		N/A	
	- internal wiring is not subjected to stress		N/A	
	- neither clearances nor creepage distances are reduced below the values in clause 29		N/A	
	Compliance checked by inspection and by the test of subclause 9.6 of IEC 60999-1, the torque applied being equal to two-thirds of the torque specified (Nm)		N/A	
	No deep or sharp indentations of the conductors		N/A	
26.4	Terminals for type X attachment, except those having a specially prepared cord and those for the connection of cables of fixed wiring, no special preparation of conductors such as by soldering, use of cable lugs, eyelets or similar, and		N/A	
	so constructed or placed that conductors prevented from slipping out when clamping screws or nuts are tightened		N/A	
26.5	Terminals for type X attachment so located or shielded that if a wire of a stranded conductor escapes, no risk of accidental connection to other parts that result in a hazard		N/A	
	Stranded conductor test, 8 mm insulation removed		N/A	
	No contact between live parts and accessible metal parts and,		N/A	
	for class II constructions, between live parts and metal parts separated from accessible metal parts by supplementary insulation only		N/A	
26.6	Terminals for type X attachment and for connection of cables of fixed wiring suitable for connection of conductors with cross-sectional area according to table 13; rated current (A); nominal cross-sectional area (mm ²)		N/A	
	If a specially prepared cord is used, terminals need only be suitable for that cord		N/A	

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Clause	Requirement + Test	Result - Remark	Verdict
26.7	Terminals for type X attachment, except in class III appliances not containing live parts, accessible after removal of a cover or part of the enclosure		N/A
26.8	Terminals for the connection of fixed wiring, including the earthing terminal, located close to each other		N/A
26.9	Terminals of the pillar type constructed and located as specified		N/A
26.10	Terminals with screw clamping and screwless terminals not used for flat twin tinsel cords, unless		N/A
	conductors ends fitted with means suitable for screw terminals		N/A
	Pull test of 5 N to the connection		N/A
26.11	For type Y and Z attachment, soldered, welded, crimped or similar connections may be used		N/A
	For Class II appliances, the conductor so positioned or fixed that reliance is not placed on soldering, welding or crimping alone	Class II appliances	N/A
	If soldering, welding or crimping alone used, barriers provided so that clearances and creepage distances between live parts and other metal parts are not reduced below the values for supplementary insulation if the conductor becomes free		N/A
27	PROVISION FOR EARTHING		
27.1	Accessible metal parts of Class 0I and I appliances permanently and reliably connected to an earthing terminal or earthing contact of the appliance inlet		N/A
	Earthing terminals and earthing contacts not connected to the neutral terminal		N/A
	Class 0, II and III appliances have no provision for protective earthing		Р
	Class II appliances and class III appliances can incorporate an earth for functional purposes	Class II appliances	N/A
	Safety extra-low voltage circuits not earthed, unless		N/A
	protective extra-low voltage circuits		N/A
27.2	Clamping means of earthing terminals adequately secured against accidental loosening		N/A
	Terminals for the connection of external equipotential bonding conductors allow connection of conductors of 2.5 to 6 mm ² , and		N/A
	- do not provide earthing continuity between different parts of the appliance, and		N/A
	- conductors cannot be loosened without the aid of a tool		N/A
	Requirements not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes		N/A

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Clause	Requirement + Test	Result - Remark	Verdict	
27.3	For a detachable part having an earth connection and being plugged into another part of the appliance, the earth connection is made before and separated after current-carrying connections when removing the part		N/A	
	For appliances with supply cords, current-carrying conductors become taut before earthing conductor, if the cord slips out of the cord anchorage		N/A	
	Requirements not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes		N/A	
27.4	No risk of corrosion resulting from contact between parts of the earthing terminal and the copper of the earthing conductor or other metal		N/A	
	Parts providing earthing continuity, other than parts of a metal frame or enclosure, have adequate resistance to corrosion		N/A	
	If of steel, these parts provided with an electroplated coating with a thickness at least 5 μm		N/A	
	Adequate protection against rusting of parts of coated or uncoated steel, only intended to provide or transmit contact pressure		N/A	
	In the body of the earthing terminal is a part of a frame or enclosure of aluminium or aluminium alloys, precautions taken to avoid risk of corrosion		N/A	
	Requirements not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes		N/A	
27.5	Low resistance of connection between earthing terminal and earthed metal parts		N/A	
	This requirement does not apply to connections providing earthing continuity in the protective extra- low voltage circuit, provided the clearances of basic insulation are based on the rated voltage of the appliance		N/A	
	Requirements not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes		N/A	
	Resistance not exceeding 0,1 Ω at the specified low-resistance test (Ω)		N/A	
27.6	The printed conductors of printed circuit boards not used to provide earthing continuity in hand-held appliances.		N/A	
	They may be used to provide earthing continuity in other appliances if at least two tracks are used with independent soldering points and the appliance complies with 27.5 for each circuit		N/A	
	Requirements not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes		N/A	

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Clause	Requirement + Test	Result - Remark	Verdict
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28.1 Fixings, electrical connections and connections	N/A
providing earthing continuity withstand mechanical stresses	
Screws not of soft metal liable to creep, such as zinc or aluminium	N/A
Diameter of screws of insulating material min. 3 mm	N/A
Screws of insulating material not used for any electrical connections or connections providing earthing continuity	N/A
Screws used for electrical connections or connections providing earthing continuity screwed into metal	N/A
Screws not of insulating material if their replacement by a metal screw can impair supplementary or reinforced insulation	N/A
For type X attachment, screws to be removed for replacement of supply cord or for user maintenance, not of insulating material if their replacement by a metal screw impairs basic insulation	N/A
For screws and nuts; torque-test as specified in table 14:	N/A
28.2 Electrical connections and connections providing earthing continuity constructed so that contact pressure is not transmitted through non-ceramic insulating material liable to shrink or distort, unless	N/A
there is resiliency in the metallic parts to compensate for shrinkage or distortion of the insulating material	N/A
This requirement does not apply to electrical connections in circuits of appliances for which:	-
 30.2.2 is applicable and that carry a current not exceeding 0,5 A 	N/A
30.2.3 is applicable and that carry a current not exceeding 0,2 A	N/A
28.3 Space-threaded (sheet metal) screws only used for electrical connections if they clamp the parts together	N/A
Thread-cutting (self-tapping) screws and thread rolling screws only used for electrical connections if they generate a full form standard machine screw thread	N/A
Thread-cutting (self-tapping) screws not used if they are likely to be operated by the user or installer	N/A
Thread-cutting, thread rolling and space threaded screws may be used in connections providing earthing continuity provided it is not necessary to disturb the connection:	-
- in normal use,	N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	- during user maintenance,		N/A
	- when replacing a supply cord having a type X attachment, or		N/A
	- during installation		N/A
	At least two screws being used for each connection providing earthing continuity, unless		N/A
	the screw forms a thread having a length of at least half the diameter of the screw		N/A
28.4	Screws and nuts that make mechanical connection secured against loosening if they also make electrical connections or connections providing earthing continuity		N/A
	This requirement does not apply to screws in the earthing circuit if at least two screws are used, or		N/A
	if an alternative earthing circuit is provided		N/A
	Rivets for electrical connections or connections providing earthing continuity secured against loosening if the connections are subjected to torsion		N/A
29	CLEARANCES, CREEPAGE DISTANCES AND SO	LID INSULATION	
	Clearances, creepage distances and solid insulation withstand electrical stress		Р
	For coatings used on printed circuits boards to protect the microenvironment (Type 1) or to provide basic insulation (Type 2), Annex J applies		N/A
	The microenvironment is pollution degree 1 under type 1 protection		N/A
	For type 2 protection, the spacing between the conductors before the protection is applied is not less than the values specified in Table 1 of IEC 60664-3		N/A
	These values apply to functional, basic, supplementary and reinforced insulation		N/A
29.1	Clearances not less than the values specified in table 16, taking into account the rated impulse voltage for the overvoltage categories of table 15, unless	(see appended table)	Ρ
	for basic insulation and functional insulation they comply with the impulse voltage test of clause 14		N/A
	However, if the distances are affected by wear, distortion, movement of the parts or during assembly, the clearances for rated impulse voltages of 1500V and above are increased by 0,5 mm and the impulse voltage test is not applicable		Ρ
	For appliances intended for use at altitudes exceeding 2 000 m, the clearances in Table 16 is increased according to the relevant multiplier values in Table A.2 of IEC 60664-1		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	Impulse voltage test is not applicable:		-
	- when the microenvironment is pollution degree 3, or		N/A
	- for basic insulation of class 0 and class 01 appliances, or		N/A
	- to appliances intended for use at altitudes exceeding 2 000 m		N/A
	Appliances are in overvoltage category II		Р
	A force of 2 N is applied to bare conductors, other than heating elements		Р
	A force of 30 N is applied to accessible surfaces		Р
29.1.1	Clearances of basic insulation withstand the overvoltages, taking into account the rated impulse voltage		N/A
	The values of table 16 or the impulse voltage test of clause 14 are applicable	(see appended table)	N/A
	Clearance at the terminals of tubular sheathed heating elements may be reduced to 1,0 mm if the microenvironment is pollution degree 1		N/A
	Lacquered conductors of windings considered to be bare conductors		N/A
29.1.2	Clearances of supplementary insulation not less than those specified for basic insulation in table 16:	(see appended table)	N/A
29.1.3	Clearances of reinforced insulation not less than those specified for basic insulation in table 16, using the next higher step for rated impulse voltage:	(see appended table)	Р
	For double insulation, with no intermediate conductive part between basic and supplementary insulation, clearances are measured between live parts and the accessible surface, and the insulation system is treated as reinforced insulation		N/A
29.1.4	Clearances for functional insulation are the largest values determined from:		-
	- table 16 based on the rated impulse voltage:	(see appended table)	N/A
	- table F.7a in IEC 60664-1, frequency not exceeding 30 kHz		N/A
	- clause 4 of IEC 60664-4, frequency exceeding 30 kHz		N/A
	If values of table 16 are largest, the impulse voltage test of clause 14 may be applied instead, unless		N/A
	the microenvironment is pollution degree 3, or		N/A
	the distances can be affected by wear, distortion, movement of the parts or during assembly		N/A
	However, clearances are not specified if the appliance complies with clause 19 with the functional insulation short-circuited		N/A
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Clause	Requirement + Test Result - Remark	Verdict	
	Lacquered conductors of windings considered to be bare conductors	N/A	
	However, clearances at crossover points are not measured	N/A	
	Clearance between surfaces of PTC heating elements may be reduced to 1mm	N/A	
29.1.5	Appliances having higher working voltages than rated voltage, clearances for basic insulation are the largest values determined from:	-	
	- table 16 based on the rated impulse voltage:	N/A	
	- table F.7a in IEC 60664-1, frequency not exceeding 30 kHz	N/A	
	- clause 4 of IEC 60664-4, frequency exceeding 30 kHz	N/A	
	If clearances for basic insulation are selected from Table F.7a of IEC 60664-1 or Clause 4 of IEC 60664-4, the clearances of supplementary insulation are not less than those specified for basic insulation	N/A	
	If clearances for basic insulation are selected from Table F.7a of IEC 60664-1, the clearances of reinforced insulation dimensioned as specified in Table F.7a are to withstand 160% of the withstand voltage required for basic insulation	N/A	
	If clearances for basic insulation are selected from Clause 4 of IEC 60664-4, the clearances of reinforced insulation are twice the value required for basic insulation	N/A	
	If the secondary winding of a step-down transformer is earthed, or if there is an earthed screen between the primary and secondary windings, clearances of basic insulation on the secondary side not less than those specified in table 16, but using the next lower step for rated impulse voltage	N/A	
	Circuits supplied with a voltage lower than rated voltage, clearances of functional insulation are based on the working voltage used as the rated voltage in table 15	N/A	
29.2	Creepage distances not less than those appropriate (see appended table) for the working voltage, taking into account the material group and the pollution degree:	Р	
	Pollution degree 2 applies, unless	Р	
	- precautions taken to protect the insulation; pollution degree 1	N/A	
	- insulation subjected to conductive pollution; pollution degree 3	N/A	
	A force of 2 N is applied to bare conductors, other than heating elements	N/A	
	A force of 30 N is applied to accessible surfaces	Р	

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Clause	Requirement + Test	Result - Remark	Verdict
	In a double insulation system, the working voltage for both the basic and supplementary insulation is taken as the working voltage across the complete double insulation system		P
29.2.1	Creepage distances of basic insulation not less than specified in table 17	(see appended table)	Р
	However, if the working voltage is periodic and has a frequency exceeding 30 kHz, the creepage distances are also determined from table 2 of IEC 60664-4, these values being used if exceeding the values in table 17		N/A
	Except for pollution degree 1, corresponding creepage distance not less than the minimum specified for the clearance in table 16, if the clearance has been checked according to the test of clause 14		N/A
29.2.2	Creepage distances of supplementary insulation at least those specified for basic insulation in table 17, or	(see appended table)	N/A
	Table 2 of IEC 60664-4, as applicable		N/A
29.2.3	Creepage distances of reinforced insulation at least double those specified for basic insulation in table 17, or	(see appended table)	Р
	Table 2 of IEC 60664-4, as applicable		N/A
29.2.4	Creepage distances of functional insulation not less than specified in table 18	(see appended table)	N/A
	However, if the working voltage is periodic and has a frequency exceeding 30 kHz, the creepage distances are also determined from table 2 of IEC 60664-4, these values being used if exceeding the values in table 18		N/A
	Creepage distances may be reduced if the appliance complies with clause 19 with the functional insulation short-circuited		N/A
29.3	Supplementary and reinforced insulation have adequate thickness, or a sufficient number of layers, to withstand the electrical stresses		Р
	Compliance checked:		-
	- by measurement, in accordance with 29.3.1, or		N/A
	- by an electric strength test in accordance with 29.3.2, or		N/A
	- for insulation, other than single layer internal wiring insulation, by an assessment of the thermal quality of the material combined with an electric strength test, in accordance with 29.3.3, and		N/A
	for accessible parts of reinforced insulation consisting of a single layer, by measurement in accordance with 29.3.4, or		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- by an assessment of the thermal quality of the material according to 29.3.3 combined with an electric strength test in accordance with 23.5, for each single layer internal wiring insulation touching each other, or		N/A
	- as specified in subclause 6.3 of IEC 60664-4 for insulation that is subjected to any periodic voltage having a frequency exceeding 30 kHz		N/A
29.3.1	Supplementary insulation have a thickness of at least 1 mm		Р
	Reinforced insulation have a thickness of at least 2 mm		N/A
29.3.2	Each layer of material withstand the electric strength test of 16.3 for supplementary insulation		N/A
	Supplementary insulation consist of at least 2 layers		N/A
	Reinforced insulation consist of at least 3 layers		N/A
29.3.3	The insulation is subjected to the dry heat test Bb of IEC 60068-2-2, followed by		N/A
	the electric strength test of 16.3		N/A
	If the temperature rise during the tests of clause 19 does not exceed the value specified in table 3, the test of IEC 60068-2-2 is not carried out		N/A
29.3.4	Thickness of accessible parts of reinforced insulation consisting of a single layer not less than specified in table 19		N/A
30	RESISTANCE TO HEAT AND FIRE		
30.1	External parts of non-metallic material,		N/A
	parts supporting live parts, and		N/A
	parts of thermoplastic material providing supplementary or reinforced insulation		N/A
	sufficiently resistant to heat		N/A
	Ball-pressure test according to IEC 60695-10-2		N/A
	External parts tested at 40 °C plus the maximum temperature rise determined during the test of clause 11, or at 75 °C, whichever is the higher; temperature (°C):	(see appended table)	N/A
	Parts supporting live parts tested at 40°C plus the maximum temperature rise determined during the test of clause 11, or at 125 °C, whichever is the higher; temperature (°C):	(see appended table)	N/A
	Parts of thermoplastic material providing supplementary or reinforced insulation tested at 25 °C plus the maximum temperature rise determined during clause 19, if higher; temperature (°C):	(see appended table)	N/A

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Clause	Requirement + Test	Result - Remark	Verdict	
30.2	Parts of non-metallic material resistant to ignition and spread of fire		N/A	
	This requirement does not apply to:		-	
	parts having a mass not exceeding 0,5 g, provided the cumulative effect is unlikely to propagate flames that originate inside the appliance by propagating flames from one part to another, or		N/A	
	decorative trims, knobs and other parts unlikely to be ignited or to propagate flames that originate inside the appliance		N/A	
	Compliance checked by the test of 30.2.1, and in addition:		N/A	
	- for attended appliances, 30.2.2 applies		N/A	
	- for unattended appliances, 30.2.3 applies		N/A	
	For appliances for remote operation, 30.2.3 applies		N/A	
	For base material of printed circuit boards, 30.2.4 applies		N/A	
30.2.1	Parts of non-metallic material subjected to the glow- wire test of IEC 60695-2-11 at 550°C	(see appended table 30.2)	N/A	
	However, test not carried out if the material is classified as having a glow-wire flammability index according to IEC 60695-2-12 of at least 550 °C, or		N/A	
	the material is classified at least HB40 according to IEC 60695-11-10		N/A	
	Parts for which the glow-wire test cannot be carried out need to meet the requirements in ISO 9772 for material classified HBF		N/A	
30.2.2	Appliances operated while attended, parts of non- metallic material supporting current-carrying connections, and		N/A	
	parts of non-metallic material within a distance of 3mm of such connections,		N/A	
	subjected to the glow-wire test of IEC 60695-2-11 with appropriate severity level:	(see appended table 30.2)	N/A	
	- 750 °C, for connections carrying a current exceeding 0,5 A during normal operation		N/A	
	- 650 °C, for other connections		N/A	
	Glow-wire applied to an interposed shielding material, if relevant		N/A	
	The glow-wire test is not carried out on parts of mate wire flammability index according to IEC 60695-2-12	rial classified as having a glow- of at least:	-	

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Clause	Requirement + Test	Result - Remark	Verdict
	- 750 °C, for connections carrying a current exceeding 0,5 A during normal operation		N/A
	- 650 °C, for other connections		N/A
	The glow-wire test is also not carried out on small part	rts. These parts are to:	-
	- comprise material having a glow-wire flammability index of at least 750 °C, or 650 °C as appropriate, or		N/A
	- comply with the needle-flame test of Annex E, or	(see appended table)	N/A
	- comprise material classified as V-0 or V-1 according to IEC 60695-11-10		N/A
	Glow-wire test not applicable to conditions as specified:		N/A
30.2.3	Appliances operated while unattended, tested as specified in 30.2.3.1 and 30.2.3.2		N/A
	The tests are not applicable to conditions as specified:		N/A
30.2.3.1	Parts of non-metallic material supporting connections carrying a current exceeding 0,2 A during normal operation, and		N/A
	parts of non-metallic material, other than small parts, within a distance of 3 mm,		N/A
	subjected to the glow-wire test of IEC 60695-2-11 with a test severity of 850 °C	(see appended table)	N/A
	Glow-wire applied to an interposed shielding material, if relevant		N/A
	The glow-wire test is not carried out on parts of material classified as having a glow-wire flammability index according to IEC 60695-2-12 of at least 850 °C		N/A
30.2.3.2	Parts of non-metallic material supporting connections, and		N/A
	parts of non-metallic material within a distance of 3mm,		N/A
	subjected to the glow-wire test of IEC 60695-2-11 with appropriate severity level:	(see appended table 30.2)	N/A
	- 750 °C, for connections carrying a current exceeding 0,2 A during normal operation		N/A
	- 650 °C, for other connections		N/A
	Glow-wire applied to an interposed shielding material, if relevant		N/A
	However, the glow-wire test of 750 °C or 650 °C as a parts of material fulfilling both or either of the following	ppropriate, is not carried out on g classifications:	-
	- a glow-wire ignition temperature according to IEC 60695-2-13 of at least:		N/A
	 775 °C, for connections carrying a current exceeding 0,2 A during normal operation 		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	• 675 °C for other connections		N/A
	- a glow-wire flammability index according to IEC 60695-2-12 of at least:		N/A
	- 750 °C, for connections carrying a current exceeding 0,2 A during normal operation		N/A
	- 650 °C, for other connections		N/A
	The glow-wire test is also not carried out on small par	rts. These parts are to:	-
	- comprise material having a glow-wire ignition temperature of at least 775 °C or 675 °C as appropriate, or		N/A
	- comprise material having a glow-wire flammability index of at least 750 °C or 650 °C as appropriate, or		N/A
	- comply with the needle-flame test of Annex E, or		N/A
	- comprise material classified as V-0 or V-1 according to IEC 60695-11-10		N/A
	The consequential needle-flame test of Annex E appl encroach within the vertical cylinder placed above the and on top of the non-metallic parts supporting currer parts of non-metallic material within a distance of 3 m parts are those:	ied to non-metallic parts that e centre of the connection zone nt-carrying connections, and im of such connections if these	-
	- parts that withstood the glow-wire test of IEC 60695-2-11 of 750 °C or 650 °C as appropriate, but produce a flame that persist longer than 2 s, or		N/A
	- parts that comprised material having a glow-wire flammability index of at least 750 °C or 650 °C as appropriate, or		N/A
	- small parts, that comprised material having a glow- wire flammability index of at least 750 °C or 650 °C as appropriate, or		N/A
	- small parts for which the needle-flame test of Annex E was applied, or		N/A
	- small parts for which a material classification of V- 0 or V-1 was applied		N/A
	However, the consequential needle-flame test is not parts, including small parts, within the cylinder that ar	carried out on non-metallic e:	-
	- parts having a glow-wire ignition temperature of at least 775 °C or 675 °C as appropriate, or		N/A
	- parts comprising material classified as V-0 or V-1 according to IEC 60695-11-10, or		N/A
	- parts shielded by a flame barrier that meets the needle-flame test of Annex E or that comprises material classified as V-0 or V-1 according to IEC 60695-11-10		N/A
30.2.4	Base material of printed circuit boards subjected to the needle-flame test of Annex E	(see appended table 30.2/30.2.4)	N/A
	Test not applicable to conditions as specified:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
31	RESISTANCE TO RUSTING		
	Relevant ferrous parts adequately protected against rusting		N/A
	Tests specified in part 2 when necessary		N/A
32	RADIATION, TOXICITY AND SIMILAR HAZARDS		
	Appliance does not emit harmful radiation or present a toxic or similar hazard due to their operation in normal use		N/A
	Compliance is checked by the limits or tests specified in part 2, if relevant		N/A
Α	ANNEX A (INFORMATIVE) ROUTINE TESTS		
	Description of routine tests to be carried out by the manufacturer		N/A
В	ANNEX B (NORMATIVE) APPLIANCES POWERED BY RECHARGEABLE BA RECHARGED IN THE APPLIANCE	TTERIES THAT ARE	
	The following modifications to this standard are applicable for appliances powered by batteries that are recharged in the appliance		N/A
	Three forms of construction covered:		-
	a) Appliance supplied directly from the supply mains or a renewable energy source, the battery charging circuitry and other supply unit circuitry incorporated within the appliance		N/A
	b) The part of the appliance incorporating the battery is supplied from the supply mains or a renewable energy source, via a detachable supply unit. The battery charging circuitry is incorporated within the part of the appliance containing the battery		N/A
	c) The part of the appliance incorporating the battery is supplied from the supply mains or a renewable energy source, via a detachable supply unit. The battery charging circuitry is incorporated within the detachable supply unit		N/A
3.1.9	Appliance operated under the following conditions:		-
	- the appliance, supplied by its fully charged battery, operated as specified in relevant part 2		N/A
	- the battery is charged, the battery being initially discharged to such an extent that the appliance cannot operate		N/A
	-if possible, the appliance is supplied from the supply mains through its battery charger, the battery being initially discharged to such an extent that the appliance cannot operate. The appliance is operated as specified in relevant part 2		N/A

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Clause	Requirement + Test Result - Remark	Verdict	
	- if the appliance incorporates inductive coupling between two parts that are detachable from each other, the appliance is supplied from the supply mains with the detachable part removed	N/A	
3.6.2	Part to be removed in order to discard the battery is not considered to be detachable	N/A	
5.B.101	Appliances supplied from the supply mains tested as specified for motor-operated appliances	N/A	
7.1	Battery compartment for batteries intended to be replaced by the user, marked with battery voltage (V) and polarity of the terminals	N/A	
	The positive terminal indicated by symbol IEC 60417-5005 and the negative terminal by symbol IEC 60417-5006	N/A	
	Appliances intending to be supplied from a detachable supply unit marked with symbol IEC 60417-6181 and its type reference along with symbol ISO 7000-0790 (2004-01), or	N/A	
	use only with <model designation=""> supply unit:</model>	N/A	
7.6	Additional symbols	N/A	
7.12	The instructions give information regarding charging	N/A	
	Instructions for appliances incorporating batteries intended to be replaced by the user include required information	N/A	
	Instructions for appliances containing non user-replaceable batteries state the substance of the following:	-	
	This appliance contains batteries that are only replaceable by skilled persons	N/A	
	Instructions for appliances containing non-replaceable batteries shall state the substance of the following:	-	
	This appliance contains batteries that are non- replaceable	N/A	
	For appliances intending to be supplied from a detachable supply unit for the purposes of recharging the battery, the type reference of the detachable supply unit is stated along with the following:	-	
	WARNING: For the purposes of recharging the battery, only use the detachable supply unit provided with this appliance	N/A	
	If the symbol for detachable supply unit is used, its meaning is explained	N/A	
7.15	Markings placed on the part of the appliance connected to the supply mains	N/A	
	The type reference of the detachable supply unit is placed in close proximity to the symbol	N/A	
8.2	Appliances having batteries that according to the instruction may be replaced by the user need only have basic insulation between live parts and the inner surface of the battery compartment	N/A	

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Clause	Requirement + Test	Result - Remark	Verdict
	If the appliance can be operated without batteries, double or reinforced insulation required		N/A
11.7	The battery is charged for the period stated in the instructions or 24 h		N/A
11.8	Temperature rise of the battery surface does not exceed the limit in the battery manufacturer's specification; measured (K); limit (K)		N/A
	If no limit specified, the temperature rise does not exceed 20 K; measured (K):		N/A
19.1	Appliances subjected to tests of 19.B.101, 19.B.102 and 19.B.103		N/A
19.10	Not applicable		N/A
19.B.101	Appliances supplied at rated voltage for 168 h, the battery being continually charged		N/A
19.B.102	For appliances having batteries that can be removed without the aid of a tool, short-circuit of the terminals of the battery, the battery being fully charged,		N/A
19.B.103	Appliances having batteries replaceable by the user supplied at rated voltage under normal operation with the battery removed or in any position allowed by the construction		N/A
19.13	The battery does not rupture or ignite		N/A
21.B.101	Appliances having pins for insertion into socket- outlets have adequate mechanical strength		N/A
	Part of the appliance incorporating the pins subjected 2, of IEC 60068-2-31, the number of falls being:	to the free fall test, procedure	-
	- 100, if the mass of the part does not exceed 250 g (g):		N/A
	- 50, if the mass of the part exceeds 250 g		N/A
	After the test, the requirements of 8.1, 15.1.1, 16.3 and clause 29 are met		N/A
22.3	Appliances having pins for insertion into socket- outlets tested as fully assembled as possible		N/A
25.13	An additional lining or bushing not required for interconnection cords in class III appliances or class III constructions operating at safety extra-low voltage not containing live parts		N/A
30.2	For parts of the appliance connected to the supply mains during the charging period, 30.2.3 applies		N/A
	For other parts, 30.2.2 applies		N/A
С	ANNEX C (NORMATIVE) AGEING TEST ON MOTORS		
	Tests, as described, carried out when doubt with regard to the temperature classification of the insulation of a motor winding		N/A

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Clause	Requirement + Test Result - Remark	Verdict
		Γ
	Test conditions as specified	N/A
D	ANNEX D (NORMATIVE) THERMAL MOTOR PROTECTORS	
	Applicable to appliances having motors that incorporate thermal motor protectors necessary for compliance with the standard	N/A
	Test conditions as specified	N/A
E	ANNEX E (NORMATIVE) NEEDLE-FLAME TEST	
	Needle-flame test carried out in accordance with IEC 60695-11-5, with the following modifications:	-
7	Severities	-
	The duration of application of the test flame is 30 s ± 1 s	N/A
9	Test procedure	-
9.1	The specimen so arranged that the flame can be applied to a vertical or horizontal edge as shown in the examples of Figure 1	N/A
9.2	The first paragraph does not apply	N/A
	If possible, the flame is applied at least 10 mm from a corner	N/A
9.3	The test is carried out on one specimen	N/A
	If the specimen does not withstand the test, the test may be repeated on two additional specimens, both withstanding the test	N/A
11	Evaluation of test results	-
	The duration of burning not exceeding 30 s	N/A
	However, for printed circuit boards, the duration of burning not exceeding 15 s	N/A
F	ANNEX F (NORMATIVE) CAPACITORS	
	Capacitors likely to be permanently subjected to the supply voltage, and used for radio interference suppression or voltage dividing, comply with the following clauses of IEC 60384-14, with the following modifications:	-
1.5	Terms and definitions	-
1.5.3	Class X capacitors tested according to subclass X2	N/A
1.5.4	This subclause is applicable	N/A
1.6	Marking	-
	Items a) and b) are applicable	N/A
3.4	Approval testing	-
3.4.3.2	Table 3 is applicable as described	N/A
4.1	Visual examination and check of dimensions	-
	This subclause is applicable	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
4.2	Electrical tests		-
4.2.1	This subclause is applicable		N/A
4.2.5	This subclause is applicable		N/A
4.2.5.2	Only table 11 is applicable		N/A
	Values for test A apply		N/A
	However, for capacitors in heating appliances the values for test B or C apply		N/A
4.12	Damp heat, steady state		-
	This subclause is applicable		N/A
	Only insulation resistance and voltage proof are checked		N/A
4.13	Impulse voltage		-
	This subclause is applicable		N/A
4.14	Endurance		-
	Subclauses 4.14.1, 4.14.3, 4.14.4 and 4.14.7 are applicable		N/A
4.14.7	Only insulation resistance and voltage proof are checked		N/A
	No visible damage		N/A
4.17	Passive flammability test		-
	This subclause is applicable		N/A
4.18	Active flammability test		-
	This subclause is applicable		N/A
G	ANNEX G (NORMATIVE) SAFETY ISOLATING TRANSFORMERS		
	The following modifications to this standard are applications to this standard are applications formers:	able for safety isolating	-
7	Marking and instructions		N/A
7.1	Transformers for specific use marked with:		-
	-name, trademark or identification mark of the manufacturer or responsible vendor		N/A
	-model or type reference:		N/A
17	Overload protection of transformers and associated ci	rcuits	-
	Fail-safe transformers comply with subclause 15.5 of IEC 61558-1		N/A
22	Construction		-
	Subclauses 19.1 and 19.1.2 of IEC 61558-2-6 are applicable		N/A
29	Clearances, creepage distances and solid insulation		-
29.1, 29.2, 29.3	The distances specified in items 2a, 2c and 3 in table 13 of IEC 61558-1 apply		N/A

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Clause	Requirement + Test Result - Remark	Verdict
		N1/A
	subclause 19.12.3 of IEC 61558-1 there are no requirements for clearances or creepage distances	N/A
	For windings providing reinforced insulation, the distance specified in item 2c of table 13 of IEC 61558-1 is not assessed	N/A
	For safety isolating transformers subjected to periodic voltages with a frequency exceeding 30 kHz, the clearances, creepage distances and solid insulation values specified in IEC 60664-4 are applicable, if greater than the values specified in items 2a, 2c and 3 in table 13 of IEC 61558-1	N/A
н	ANNEX H (NORMATIVE) SWITCHES	
	Switches comply with the following clauses of IEC 61058-1, as modified below:	-
	The tests of IEC 61058-1 carried out under the conditions occurring in the appliance	N/A
	Before being tested, switches are operated 20 times without load	N/A
8	Marking and documentation	-
	Switches are not required to be marked	N/A
	However, a switch that can be tested separately from the appliance marked with the manufacturer's name or trade mark and the type reference	N/A
13	Mechanism	-
	The tests may be carried out on a separate sample	N/A
15	Insulation resistance and dielectric strength	-
15.1	Not applicable	N/A
15.2	Not applicable	N/A
15.3	Applicable for full disconnection and micro- disconnection	N/A
17	Endurance	-
	Compliance is checked on three separate appliances or switches	N/A
	For 17.2.4.4, the number of cycles declared according to 7.1.4 is 10 000, unless	N/A
	otherwise specified in 24.1.3 of the relevant part 2 of IEC 60335	N/A
	Switches for operation under no load and which can be operated only by a tool, and	N/A
	switches operated by hand that are interlocked so that they cannot be operated under load,	N/A
	are not subjected to the tests	N/A

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Clause	Requirement + Test Result - Remark	Verdict
	However, switches without this interlock are subjected to the test of 17.2.4.4 for 100 cycles of operation	N/A
	Subclauses 17.2.2 and 17.2.5.2 not applicable	N/A
	The ambient temperature during the test is that occurring in the appliance during the test of Clause 11 in IEC 60335-1	N/A
	The temperature rise of the terminals not more than 30 K above the temperature rise measured in clause 11 of IEC 60335-1 (K)	N/A
20	Clearances, creepage distances, solid insulation and coatings of rigid printed board assemblies	N/A
	Clause 20 is applicable to clearances across full disconnection and micro-disconnection	N/A
	It is also applicable to creepage distances for functional insulation, across full disconnection and micro-disconnection, as stated in Table 24	N/A
1	ANNEX I (NORMATIVE) MOTORS HAVING BASIC INSULATION THAT IS INADEQUATE FOR THE RATED VOLTAGE OF THE APPLIANCE	
	The following modifications to this standard are applicable for motors having basic insulation that is inadequate for the rated voltage of the appliance:	-
8	Protection against access to live parts	-
8.1	Metal parts of the motor are considered to be bare live parts	N/A
11	Heating	-
11.3	The temperature rise of the body of the motor is determined instead of the temperature rise of the windings	N/A
11.8	The temperature rise of the body of the motor, where in contact with insulating material, not exceeding values in table 3 for the relevant insulating material	N/A
16	Leakage current and electric strength	-
16.3	Insulation between live parts of the motor and its other metal parts is not subjected to the test	N/A
19	Abnormal operation	-
19.1	The tests of 19.7 to 19.9 are not carried out	N/A
19.I.101	Appliance operated at rated voltage with each of the following fault conditions:	-
	- short circuit of the terminals of the motor, including any capacitor incorporated in the motor circuit	N/A
	- short circuit of each diode of the rectifier	N/A
	- open circuit of the supply to the motor	N/A
	- open circuit of any parallel resistor, the motor being in operation	N/A

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Clause	Requirement + Test Result - Remark	Verdict			
	Only one fault simulated at a time, the tests carried out consecutively	N/A			
22	Construction	-			
22.I.101	For class I appliances incorporating a motor supplied by a rectifier circuit, the d.c. circuit being insulated from accessible parts of the appliance by double or reinforced insulation	N/A			
	Compliance checked by the tests specified for double and reinforced insulation	N/A			
J	ANNEX J (NORMATIVE) COATED PRINTED CIRCUIT BOARDS				
	Testing of protective coatings of printed circuit boards carried out in accordance with IEC 60664-3 with the following modifications:	-			
5.7	Conditioning of the test specimens	-			
	When production samples are used, three samples of the printed circuit board are tested	N/A			
5.7.1	Cold	-			
	The test is carried out at -25 °C	N/A			
5.7.3	Rapid change of temperature	-			
	Severity 1 is specified	N/A			
5.9	Additional tests	-			
	This subclause is not applicable	N/A			
к	ANNEX K (NORMATIVE) OVERVOLTAGE CATEGORIES				
	The information on overvoltage categories is extracted from IEC 60664-1	N/A			
	Overvoltage category is a numeral defining a transient overvoltage condition	N/A			
	Equipment of overvoltage category IV is for use at the origin of the installation	N/A			
	Equipment of overvoltage category III is equipment in fixed installations and for cases where the reliability and the availability of the equipment is subject to special requirements	N/A			
	Equipment of overvoltage category II is energy consuming equipment to be supplied from the fixed installation	N/A			
	If such equipment is subjected to special requirements with regard to reliability and availability, overvoltage category III applies	N/A			
	Equipment of overvoltage category I is equipment for connection to circuits in which measures are taken to limit transient overvoltages to an appropriate low level	N/A			

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Clause	Requirement + Test Result - Remark	Verdict	
L	ANNEX L (INFORMATIVE) GUIDANCE FOR THE MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES		
	Information for the determination of clearances and creepage distances	Р	
М	ANNEX M (NORMATIVE) POLLUTION DEGREE		
	The information on pollution degrees is extracted from IEC 60664-1	Р	
	Pollution	-	
	The microenvironment determines the effect of pollution on the insulation, taking into account the macroenvironment	Р	
	Means may be provided to reduce pollution at the insulation by effective enclosures or similar	Р	
	Minimum clearances specified where pollution may be present in the microenvironment	Р	
Degrees of pollution in the microenvironment			
For evaluating creepage distances, the following degrees of pollution in the microenvironment are established:			
	- pollution degree 1: no pollution or only dry, non- conductive pollution occurs. The pollution has no influence	N/A	
	- pollution degree 2: only non-conductive pollution occurs, except that occasionally a temporary conductivity caused by condensation is to be expected	Ρ	
	- pollution degree 3: conductive pollution occurs or dry non-conductive pollution occurs that becomes conductive due to condensation that is to be expected	N/A	
	- pollution degree 4: the pollution generates persistent conductivity caused by conductive dust or by rain or snow	N/A	
N	ANNEX N (NORMATIVE) PROOF TRACKING TEST		
	The proof tracking test is carried out in accordance with IEC 60112 with the following modifications:	-	
7	Test apparatus	-	
7.3	Test solutions	-	
	Test solution A is used	N/A	
10	Determination of proof tracking index (PTI)	-	
10.1	Procedure	-	
	The proof voltage is 100V, 175V, 400V or 600V:	N/A	
	The test is carried out on five specimens	N/A	

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Clause	Requirement + Test Result - Remark	Verdict
	In case of doubt, additional test with proof voltage reduced by 25V, the number of drops increased to 100	N/A
10.2	Report	-
	The report states if the PTI value was based on a test using 100 drops with a test voltage of (PTI-25) V	N/A
0	ANNEX O (INFORMATIVE) SELECTION AND SEQUENCE OF THE TESTS OF CLAUSE 30	
	Description of tests for determination of resistance to heat and fire	N/A
P	ANNEX P (INFORMATIVE) GUIDANCE FOR THE APPLICATION OF THIS STANDARD TO APPLIANCES USED IN TROPICAL CLIMATES	
	Modifications applicable for class 0 and 01 appliances having a rated voltage exceeding 150V, intended to be used in countries having a tropical climate and that are marked with symbol IEC 60417-6332	N/A
	Modifications may also be applied to class 1 appliances having a rated voltage exceeding 150V, intended to be used in countries having a tropical climate and that are marked with symbol IEC 60417-6332, if liable to be connected to a supply mains that excludes the protective earthing conductor	N/A
5.7	The ambient temperature for the tests of clauses 11 and 13 is 40 +3/0 °C	N/A
7.1	The appliance marked with symbol IEC 60417- 6332	N/A
7.12	The instructions state that the appliance is to be supplied through a residual current device (RCD) having a rated residual operating current not exceeding 30 mA	N/A
	The instructions state that the appliance is considered to be suitable for use in countries having a tropical climate, but may also be used in other countries	N/A
	If symbol IEC 60417-6332 is used, its meaning is explained	N/A
11.8	The values of Table 3 are reduced by 15 K	N/A
13.2	The leakage current for class I appliances not exceeding 0,5 mA	N/A
15.3	The value of t is 37 °C	N/A
16.2	The leakage current for class I appliances not exceeding 0,5 mA (mA):	N/A
19.13	The leakage current test of 16.2 is applied in addition to the electric strength test of 16.3	N/A
Q	ANNEX Q (INFORMATIVE) SEQUENCE OF TESTS FOR THE EVALUATION OF ELECTRONIC CIRCUITS	
	Description of tests for appliances incorporating electronic circuits	-

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Clause	Requirement + Test Result - Remark	Verdict		
R	ANNEX R (NORMATIVE) SOFTWARE EVALUATION			
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2 validated in accordance with the requirements of this annex	N/A		
R.1	Programmable electronic circuits using software	-		
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2 constructed so that the software does not impair compliance with the requirements of this standard	N/A		
R.2	Requirements for the architecture	-		
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2 use measures to control and avoid software-related faults/errors in safety-related data and safety-related segments of the software	N/A		
R.2.1.1	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.2 have one of the following structures:	-		
	- single channel with periodic self-test and monitoring	N/A		
	- dual channel (homogenous) with comparison	N/A		
	- dual channel (diverse) with comparison	N/A		
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.1 have one of the following structures:	-		
	- single channel with functional test	N/A		
	- single channel with periodic self-test	N/A		
	- dual channel without comparison	N/A		
R.2.2	Measures to control faults/errors	-		
R.2.2.1	When redundant memory with comparison is provided on two areas of the same component, the data in one area is stored in a different format from that in the other area	N/A		
R.2.2.2	Programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.2 and that use dual channel structures with comparison, have additional fault/error detection means for any fault/errors not detected by the comparison	N/A		

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Clause	Requirement + Test	Result - Remark	Verdict	
R.2.2.3	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2, means are provided for the recognition and control of errors in transmissions to external safety- related data paths		N/A	
R.2.2.4	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2, the programmable electronic circuits incorporate measures to address the fault/errors in safety-related segments and data indicated in table R.1 and R.2 as appropriate		N/A	
R.2.2.5	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2, detection of a fault/error occur before compliance with clause 19 is impaired		N/A	
R.2.2.6	The software is referenced to relevant parts of the operating sequence and the associated hardware functions		N/A	
R.2.2.7	Labels used for memory locations are unique		N/A	
R.2.2.8	The software is protected from user alteration of safety-related segments and data		N/A	
R.2.2.9	Software and safety-related hardware under its control is initialized and terminates before compliance with clause 19 is impaired		N/A	
R.3	Measures to avoid errors		-	
R.3.1	General		-	
	For programmable electronic circuits with functions rec measures to control the fault/error conditions specified following measures to avoid systematic fault in the sof	quiring software incorporating I in table R.1 or R.2, the itware are applied	N/A	
	Software that incorporates measures used to control the fault/error conditions specified in table R.2 is inherently acceptable for software required to control the fault/error conditions specified in table R.1		N/A	
R.3.2	Specification		-	
R.3.2.1	Software safety requirements:	Software Id:	N/A	
	The specification of the software safety requirements includes the descriptions listed		N/A	
R.3.2.2	Software architecture		-	

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Clause	Requirement + Test	Result - Remark	Verdict	
R.3.2.2.1	The specification of the software architecture includes the aspects listed	Document ref. No:	N/A	
	- techniques and measures to control software faults/errors (refer to R.2.2);			
	- interactions between hardware and software;			
	- partitioning into modules and their allocation to the specified safety functions;			
	- hierarchy and call structure of the modules (control flow);			
	- interrupt handling;			
	- data flow and restrictions on data access;			
	- architecture and storage of data;			
	- time-based dependencies of sequences and data			
R.3.2.2.2	The architecture specification is validated against the specification of the software safety requirements by static analysis		N/A	
R.3.2.3	Module design and coding		-	
R.3.2.3.1	Based on the architecture design, software is suitably refined into modules		N/A	
	Software module design and coding is implemented in a way that is traceable to the software architecture and requirements		N/A	
R.3.2.3.2	Software code is structured		N/A	
R.3.2.3.3	Coded software is validated against the module specification by static analysis		N/A	
	The module specification is validated against the architecture specification by static analysis		N/A	
R.3.3.3	Software validation		-	
	The software is validated with reference to the requirements of the software safety requirements specification		N/A	
	Compliance is checked by simulation of:		-	
	- input signals present during normal operation		N/A	
	- anticipated occurrences		N/A	
	- undesired conditions requiring system action		N/A	

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Clause	Requirement + Test	Result - Remark	Verdict				

TABLE R.1 ° – GENERAL FAULT/ERROR CONDITIONS						
Component ^a	Fault/error	Acceptable measures ^{b, c}	Definitions	Document reference for applied measure	Document reference for applied test	Ver-dict
1 CPU						N/A
1.1 De minterne	Otherste at	Free stienes to stee st	110405			
Registers	Stuck at	Functional test, or	H.2.16.5			
		periodic self-test using eitner:	H.2.10.0			
		- static memory test, or	H.2.19.0			
		- word protection with single bit redundancy	H.2.19.8.2			
1.2 VOID						
1.3 Dragona marca	Stuck at	Functional test, or	H.2.16.5			N/A
counter		Periodic self-test, or	H.2.16.6			
		Independent time-slot monitoring, or	H.2.18.10.4			
		Logical monitoring of the programme sequence	H.2.18.10.2			
2	No	Functional test, or	H.2.16.5			N/A
Interrupt handling and execution	interrupt or too frequent interrupt	time-slot monitoring	H.2.18.10.4			
3	Wrong	Frequency monitoring, or	H.2.18.10.1			N/A
Clock	frequency (for quartz synchroniz ed clock: harmonics/ sub- harmonics only)	time slot monitoring	H.2.18.10.4			
4. Memory						N/A
4.1	All single	Periodic modified checksum,	H.2.19.3.1			
Invariable memory	bit faults	or	H.2.19.3.2			
,		multiple checksum, or	H.2.19.8.2			
		word protection with single bit redundancy				
4.2	DC fault	Periodic static memory test,	H.2.19.6			N/A
Variable		or	H.2.19.8.2			
memory		word protection with single bit redundancy				

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Clause	Requirement	+ Test		Result	- Remark	Verdict
4.3 Addressing (relevant to variable and invariable memory)	Stuck at	Word protection with single bit redundancy including the address	H.2.19	8.2		N/A
5 Internal data path	Stuck at	Word protection with single bit redundancy	H.2.19	8.2		N/A
5.1 VOID						
5.2 Addressing	Wrong address	Word protection with single bit redundancy including the address	H.2.19	8.2		N/A
6 External	Hamming distance 3	Word protection with multi-bit redundancy, or	H.2.19	8.1		N/A
ion		CRC – single work, or	H.2.19	4.1		
		Transfer redundancy, or	H.2.18	2.2		
		Protocol test	H.2.18	.14		
6.1 VOID						
6.2 VOID						
6.3 Timing	Wrong point in time	Time-slot monitoring, or	H.2.18	10.4		N/A
T IIIIIII Y		scheduled transmission	H.2.18	.18		
		Time-slot and logical monitoring, or	H.2.18	10.3		
		comparison of redundant communication channels by either:				
		- reciprocal	H.2.18	15		
		comparison	H.2.18	3		
	Wrong	- independent hardware comparator	H.2.18	10.2		
	sequence		H.2.18	10.4		
		time-slot monitoring, or	H.2.18	18		
-		Scheduled transmission	110.40	10		N1/A
/ Input/output periphery	Fault conditions specified in 19.11.2	Plausibility check	H.2.18	.13		N/A
7.1 VOID						
7.2 Analog I/O						N/A
7.2.1 A/D and D/A- converter	Fault conditions specified in 19.11.2	Plausibility check	H.2.18	13		

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Clause	Requirement + Test	Result - Remark	Verdict			

7.2.2 Analog multiplexer	Wrong addressing	Plausibility check	H.2.18.13			N/A
8 VOID						
9 Custom chips ^d e.g. ASIC, GAL, gate array	Any output outside the static and dynamic functional specificatio n	Periodic self-test	H.2.16.6			N/A
NOTE A Stu	uck-at fault m	odel denotes a fault model repr	esenting an op	en circuit or a	a non-varying	g signal

NOTE A Stuck-at fault model denotes a fault model representing an open circuit or a non-varying signal level. A DC fault model denotes a stuck-at fault model incorporating short circuit between signal lines.

^{a)} For fault/error assessment, some components are divided into their sub-functions.

^{b)} For each sub-function in the table, the Table R.2 measure will cover the software fault/error.

^{c)} Where more than one measure is given for a sub-function, these are alternatives.

^{d)} To be divided as necessary by the manufacturer into sub-functions.

^{e)} Table R.1 is applied according to the requirements of R.1 to R.2.2.9 inclusive.

S	ANNEX S (NORMATIVE) BATTERY OPERATED APPLIANCES POWERED BY BATTERIES THAT ARE NON-RECHARGEABLE OR NOT RECHARGED IN THE APPLIANCE	
	The following modifications to this standard are applicable for battery-operated appliances where the batteries are either non-rechargeable (primary batteries), or	N/A
	rechargeable batteries (secondary batteries) that are not recharged in the appliance	N/A
5.8.1	If the supply terminals for the connection of the battery have no indication of polarity, the more unfavourable polarity is applied	N/A
5.S.101	Appliances intended for use with a battery box are tested with the battery box supplied with the appliance or with the battery box recommended in the instructions	N/A
5.S.102	Appliances are tested as motor-operated appliances.	N/A
7.1	Appliances marked with the battery voltage (V) and the polarity of the terminals, unless:	N/A
	the polarity is irrelevant	N/A
	Appliances also marked with:	-
	– name, trade mark or identification mark of the manufacturer or responsible vendor	N/A
	– model or type reference:	N/A
	 – IP number according to degree of protection against ingress of water, other than IPX0 	N/A
	- type reference of battery or batteries:	N/A
	If relevant, the positive terminal is indicated by the symbol IEC 60417-5005 and the negative terminal by the symbol IEC 60417-5006	N/A

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Clause	Requirement + Test R	esult - Remark	Verdict		
	If appliances use more than one battery, they are marke indicate correct polarity connection of the batteries	d to	N/A		
7.6	Additional symbols		N/A		
7.12	The instructions contain the following, as applicable:				
	- the types of batteries that may be used		N/A		
	– how to remove and insert the batteries		N/A		
	- non-rechargeable batteries are not to be recharged		N/A		
	 rechargeable batteries are to be removed from the apple before being charged 	pliance	N/A		
	 different types of batteries or new and used batteries a to be mixed 	are not	N/A		
	 batteries are to be inserted with the correct polarity 		N/A		
	 exhausted batteries are to be removed from the applia and safely disposed of 	ince	N/A		
	 if the appliance is to be stored unused for a long period batteries are removed 	d, the	N/A		
	– the supply terminals are not to be short-circuited				
11.5	Appliances are supplied with the most unfavourable supply voltage between				
	 – 0,55 and 1,0 times the battery voltage, if the appliance be used with non-rechargeable batteries 	e can	N/A		
	 – 0,75 and 1,0 times battery voltage, if the appliance is designed for use with rechargeable batteries only 		N/A		
	The values specified in Table S.101 for the internal resis per cell of the battery is taken into account	stance	N/A		
19.1	The tests are carried out with the battery fully charged u otherwise specified	nless	N/A		
19.13	The battery does not rupture or ignite		N/A		
19.S.101	Appliances are supplied with the voltage specified in 11. supply terminals having an indication of polarity are cont to the opposite polarity, unless	5. The nected	N/A		
	such a connection is unlikely to occur due to the constru of the appliance	ction	N/A		
19.S.102	For appliances with provision for multiple batteries, one more of the batteries are reversed and the appliance is operated, if reversal of batteries is allowed by the constr	or	N/A		
25.5	The flexible leads or flexible cord used to connect an ex- battery or battery box in is connected to the appliance by type X attachment	ternal y a	N/A		
25.13	This requirement is not applicable to the flexible leads of flexible cord connecting external batteries or a battery be an appliance	r ox with	N/A		
25.S.101	Appliances have suitable means for connection of the ball of the type of battery is marked on the appliance, the me connection is suitable for this type of battery	attery. ans of	N/A		

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Clause	Requirement + Test Result - Remark	Verdict			
26.5	26.5 Terminal devices in an appliance for the connection of the flexible leads or flexible cord connecting an external battery or battery box are so located or shielded that there is no risk of accidental connection between supply terminals				
30.2.3.2	3.2 There is no battery in the area of the vertical cylinder used for the consequential needle flame test, unless				
	the battery is shielded by a barrier that meets the needle flame test of Annex E, or				
	that comprises material classified as V-0 or V-1 according to IEC 60695-11-10				
т	ANNEX T (NORMATIVE) UV-C RADIATION EFFECT ON NON-METALLIC MATERIALS				
	Requirements for non-metallic materials subject to direct or reflected UV-C radiation exposure and whose mechanical and electrical properties are relied upon for compliance with the	N/A			
	Does not apply to glass, ceramic and similar materials	N/A			
	Tested as specified in ISO 4892-1 and ISO 4892-2, with the following modifications:	-			
	Modifications to ISO 4892-1:	-			
5.1.6	The UV-C emitter is a low pressure mercury lamp with a quartz envelope having a continuous spectral irradiance of 10 W/m2 at 254 nm	N/A			
	Subclause 5.1.6.1 and Table 1 are not applicable	N/A			
5.2.4	The black-panel temperature shall be 63 °C +/- 3 °C	N/A			
5.3.1	Humidification of the chamber air is specified in part 2 when necessary	N/A			
9	This clause is not applicable	-			
	Modifications to ISO 4892-2:	-			
7.1	At least three test specimens are tested	N/A			
	Ten samples of internal wiring is tested	N/A			
7.2	The specimens are attached to the specimen holders such that they are not subject to any stress	N/A			
7.3	Apparatus prepared as specified	N/A			
	The test specimens and, if used, the irradiance-measuring instrument are exposed for 1 000 h	N/A			
7.4	If used, a radiometer is mounted and calibrated such that it measures the irradiance at the exposed surface of the test specimen	N/A			
7.5	Material properties and test methods for parts providing mechanical support or impact resistance as specified in Table T.1	N/A			
	Material properties and test method for electrical insulation of internal wiring as specified in Table T.2	N/A			
8	This clause is not applicable	N/A			

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Clause	Requirement + Test	Result - Remark	Verdict			

10.1	TABLE: Power input deviation						Р
Input deviation of/at:		P rated (W)	P measured (W)	ΔΡ	Required Δ P	R	emark
220V, 50Hz		220	207	+5.9 %	±10 %		Ρ
230V, 50Hz		220	224	+1.8 %	±10 %		Ρ
240V, 50Hz		220	236	+7.3 %	±10 %		Р
Supplementary information: P-rated 220W = 110W/m x 2m							

10.2	TABLE: Current deviation					N/A
Current deviation of/at:		I rated (A)	I measured (A)	Δ١	Required Δ I	Remark
Suppleme	entary information:				·	

11.8	.8 TABLE: Heating test				
	Test voltage (V)	:	254.	.5 V	
	Ambient (°C)	:	22	6	
Thermocouple locations:		Max. tem measur	perature rise Max. tempera red, Δ T (K) limit, Δ T		ture rise (K)
Terminal in	controller		7.6	60	
AC Input Wire		5.2		50	
Enclosure of Controller		6.4		60	
Button of Controller		3.5		60	
Heating Sur	rface(top)	12.7		-	
Heating Sur	face(middle)	11.8		-	
Heating Sur	rface(bottom)	16.5		-	
Test corner		1.5		80	
Supplement	tary information:				

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Clause	Requirement + Test	Result - Remark	Verdict			

11.8	TABLE: Heating test, resistance method						
	Test voltage (V):						
Ambient, t1 (°C):						_	
	Ambient, t2 (°C):						
Tempera	ature rise of winding:	R1 (Ω)	R2 (Ω)	ΔΤ(Κ)	Max. Δ T (K)	Ins	ulation class
Supplem	entary information:						

13.2	2 TABLE: Leakage current			
	Heating appliances: 1.15 x rated input (W) :	1.15 Pr		
	Motor-operated and combined appliances: 1.06 x rated voltage (V):	-		
Leakage current between:		l (mA)	Max. allowe	ed I (mA)
Live Part and Enclosure with metal foil		0.001	0.3	5
Supplement	ary information:			

13.3	TABLE: Dielectric strength				
Test voltage applied between:		Test potential applied (V)	applied Breakdown / fl (Yes/No		
Livepartsanda	accessible parts over reinforced	3 000	No		
insulation					
Supplement	ary information:				

14	TABLE: Transient overvoltages						N/A
Clearance between:		CI (mm)	Required Cl (mm)	Rated impulse voltage (V)	Impulse test voltage (V)	FI (ashover Yes/No)

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Clause	Requirement + Test			Result - Remark		Verdict		

16.2	TABLE: Leakage current			Р
	Single phase appliances: 1.06 x rated voltage (V):	2443	V	—
	Three phase appliances 1.06 x rated voltage divided by $\sqrt{3}$ (V):	-		—
Leakage	current between:	l (mA)	Max. allowe	ed I (mA)
Live Part a	and Enclosure with metal foil	0.001	0.2	5
Suppleme	ntary information:			

16.3	TABLE: Dielectric strength					
Test volta	age applied between:	Test potential applied (V)	Breakdown / (Yes/N	flashover o)		
Live parts and accessible parts over reinforced insulation		3 000 No				
Suppleme	entary information:					

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Clause	Requirement + Test	Result - Remark	Verdict			

17	TABLE: Overload protection			N/A
Thermocouple locations:		Max. temperature rise measured, Δ T (K)	Max. tempera limit, Δ T	ture rise (K)
Supplem	entary information:	•		

17	TABLE: Overload protection, resistance method						N/A
	Test voltage (V)		:				
Ambient, t1 (°C):							
Ambient, t2 (°C):							
Temperature of winding: R1 (Ω) R2 (Ω)			ΔΤ(Κ)	T (°C)	Ма	ах. Т (°С)	
Suppleme	ntary information:						

19 Abnormal operation conditions							Р
Operation	al characteristics		YES/NO	Operatio	onal conditi	ons	
Are there electronic circuits to control the appliance operation?		No					
Are there	"off" or "stand-by"	' position?	No				
The unintended operation of the appliance results in dangerous malfunction?		No					
Sub- clause	Operatin <u>g</u> conditions description	Test results description	PEC description	EMP 19.11.4	Software type required	19.11.3 PEC	Final result
19.2	Operation to 0.85 rated power	Steady Condition, No hazard	N/A	N/A	N/A	N/A	Ρ
19.3	Operation to 1.24	Steady Condition, No hazard	N/A	N/A	N/A	N/A	Ρ
19.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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Clause	Requiremen	it + Test		Result - F	Remark		Verdict			
19.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
19.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
19.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
19.10	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
19.11.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
19.11.4.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
19.10X	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
Suppleme	ntary informa	tion:	· · · · ·			•	•			

19.7	TABLE: Abnormal operation, locked rotor/moving parts						
	Test voltage (V):						_
	Ambient, t1 (°C):						_
	Ambient, t2 (°C):						_
Temperature of winding: R1 (Ω) R2 (Ω)			ΔΤ(Κ)	T (°C)	Ма	ax. T (°C)	
DC Step Mo	otor	-	-	-	-		-
Supplemen	tary information:						

19.9	TABLE: Abnormal operation, running overload						
	Test voltage (V)		:				_
Ambient, t1 (°C):						_	
Ambient, t2 (°C):						_	
Temperature of winding: R1 (Ω) R2 (Ω)		ΔΤ(Κ)	T (°C)	Ма	ax. T (°C)		
Supplemen	tary information:						

19.13 TABLE: Abnormal operation, temperature rises				
Thermocouple locations:Max. temperature rise measured, Δ T (K)Max. temper limit, Δ			Max. temperat limit, Δ T	ture rise (K)
Input Wire		4.9	150	
Test Conner1.315			150	

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Clause	Requirement + Test	Result - Remark	Verdict					

21.1	TABLE: Im	pact resistance			Р		
Impacts p	er surface	Surface tested	Impact energy (Nm)	Commei	nts		
3	3	External Enclosure (controller)	0.5	No haza	rd		
Supplementary information:							

24.1	TAB	BLE: Critical compo	nents informat	ion			Р	
Object / pa No.	rt	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark conf	k(s) of formity	
Connection between controller ar the film	wire nd	Seoul Electric Wire Co., Ltd.	H07V-K	450/750 V	EN50502-2-31	CE		
Heating film		Seggi Century Co., Ltd.	APN-410	110W/m	EN60335-1	-		
Temperatur Controller	е	URIEL Electronics Co., Ltd.	UTH-170	85-265Vac, max.18A	KC60730-1, EN61000-6-4	KC, (CE	
PCB		Various	Various	Min. V-1 105 °C	UL796	UL		
Plastic enclosure material		Various	Various	Min. V-1	UL94	UL		
Supplement	Supplementary information:							

28.1	TABLE: Thread	led part torque test			N/A
Threaded p identification	art on:	Diameter of thread (mm)	Column number (I, II, or III)	Applied torqu	ıe (Nm)
Supplement	ary information:	·			

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Clause	Requirement + Test	Result - Remark	Verdict					

29.1	TABLE: Clearances						Р
	Overvoltage categor	у		.: II			
			Type of ir	nsulation:			
Rated impulse voltage (V)	Min. cl (mm)	Basic (mm)	Supplementar y (mm)	Reinforced (mm)	Functional (mm)	Verd Ren	lict / nark
330	0,2* / 0,5 / 0,8**						
500	0,2* / 0,5 / 0,8**						
800	0,2* / 0,5 / 0,8**						
1 500	0,5 / 0,8** / 1,0***						
2 500	1,5 / 2,0***	V	V			N	/A
4 000	3,0 / 3,5***			V		F	D
6 000	5,5 / 6,0***						
8 000	8,0 / 8,5***						
10 000	11,0 / 11,5***						

*) For tracks on printed circuit boards if pollution degree 1 and 2
 **) For pollution degree 3
 ***) If the construction is affected by wear, distortion, movement of the parts or during assembly

29.2	TABLE:	Creep	Creepage distances, basic, supplementary and reinforced insulation									Р
Working (V)	Vorking voltage Creepage distance (V): (mm) Pollution degree											
		1	1 2				3		ר in	Гуре о sulatio	f on	
			Ма	iterial g	roup	Ма	terial g	roup				
			I	Ш	IIIa/IIIb	I	Ш	IIIa/IIIb*	B**	S**	R**	Verdict
≤50)	0,18	0,6	0,85	1,2	1,5	1,7	1,9		_	_	
≤50)	0,18	0,6	0,85	1,2	1,5	1,7	1,9				
≤50)	0,36	1,2	1,7	2,4	3,0	3,4	3,8				
125	5	0,28	0,75	1,05	1,5	1,9	2,1	2,4				
125	5	0,28	0,75	1,05	1,5	1,9	2,1	2,4				
125	5	0,56	1,5	2,1	3,0	3,8	4,2	4,8				
250)	0,56	1,25	1,8	2,5	3,2	3,6	4,0				N/A
250)	0,56	1,25	1,8	2,5	3,2	3,6	4,0				N/A
250)	1,12	2,5	3,6	5,0	6,4	7,2	8,0			V	Р
400)	1,0	2,0	2,8	4,0	5,0	5,6	6,3				

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Clause	Require	ment +	Test				Res	sult - Rem	ark			Verdict
400	<u> </u>	10	2.0	20	4.0	5.0	5.6	6.2				
400	<u> </u>	1,0	2,0	2,0 5.6	4,0	5,0	0,0	0,3				
400	5	2,0	4,0	5,0	8,0	10,0	7.4	12,0				
500	5	1,3	2,5	3,6	5,0	6,3	7,1	8,0				
500	5	1,3	2,5	3,6	5,0	6,3	7,1	8,0				
500) 	2,6	5,0	7,2	10,0	12,6	14,2	16,0				
>630 and	d ≤800	1,8	3,2	4,5	6,3	8,0	9,0	10,0				
>630 and	d ≤800	1,8	3,2	4,5	6,3	8,0	9,0	10,0				
>630 and	d ≤800	3,6	6,4	9,0	12,6	16,0	18,0	20,0				
>800 and	≤1000	2,4	4,0	5,6	8,0	10,0	11,0	12,5		—		
>800 and	≤1000	2,4	4,0	5,6	8,0	10,0	11,0	12,5				
>800 and	≤1000	4,8	8,0	11,2	16,0	20,0	22,0	25,0				
>1000 and	d ≤1250	3,2	5,0	7,1	10,0	12,5	14,0	16,0				
>1000 and	d ≤1250	3,2	5,0	7,1	10,0	12,5	14,0	16,0				
>1000 and	d ≤1250	6,4	10,0	14,2	20,0	25,0	28,0	32,0		—		
>1250 and	d ≤1600	4,2	6,3	9,0	12,5	16,0	18,0	20,0			_	
>1250 and	d ≤1600	4,2	6,3	9,0	12,5	16,0	18,0	20,0	—		_	
>1250 and	d ≤1600	8,4	12,6	18,0	25,0	32,0	36,0	40,0				
>1600 and	d ≤2000	5,6	8,0	11,0	16,0	20,0	22,0	25,0				
>1600 and	d ≤2000	5,6	8,0	11,0	16,0	20,0	22,0	25,0				
>1600 and	d ≤2000	11,2	16,0	22,0	32,0	40,0	44,0	50,0		_		
>2000 and	d ≤2500	7,5	10,0	14,0	20,0	25,0	28,0	32,0				
>2000 and	d ≤2500	7,5	10,0	14,0	20,0	25,0	28,0	32,0				
>2000 and	d ≤2500	15,0	20,0	28,0	40,0	50,0	56,0	64,0				
>2500 and	d ≤3200	10,0	12,5	18,0	25,0	32,0	36,0	40,0				
>2500 and	d ≤3200	10,0	12,5	18,0	25,0	32,0	36,0	40,0				
>2500 and	d ≤3200	20,0	25,0	36,0	50,0	64,0	72,0	80,0				
>3200 and	d ≤4000	12,5	16,0	22,0	32,0	40,0	45,0	50,0		_		
>3200 and	d ≤4000	12,5	16,0	22,0	32,0	40,0	45,0	50,0				
>3200 and	d ≤4000	25,0	32,0	44,0	64,0	80,0	90,0	100,0				
>4000 and	d ≤5000	16,0	20,0	28,0	40,0	50,0	56,0	63,0		_	_	
>4000 and	d ≤5000	16,0	20,0	28,0	40,0	50,0	56,0	63,0			_	
>4000 and	d ≤5000	32,0	40,0	56,0	80,0	100,0	112,0	126,0				
>5000 and	d ≤6300	20,0	25,0	36,0	50,0	63,0	71,0	80,0				
>5000 and	d ≤6300	20,0	25,0	36,0	50,0	63,0	71,0	80,0			_	
>5000 and	d ≤6300	40,0	50,0	72,0	100,0	126,0	142,0	160,0				
>6300 and	d ≤8000	25,0	32,0	45,0	63,0	80,0	90,0	100,0				

IEC/EN 60335-1													
Clause	Requirer	ment +	nent + Test Result - Remark							Verdict			
>6300 and	≤8000	25,0	32,0	45,0	63,0	80,0	90,	,0	100,0				
>6300 and	≤8000	50,0	64,0	90,0	126,0	160,0	180),0	200,0		_		
>8000 and	≤10000	32,0	40,0	56,0	80,0	100,0	110),0	125,0				
>8000 and	≤10000	32,0	40,0	56,0	80,0	100,0	110),0	125,0	_			
>8000 and	≤10000	64,0	80,0	112,0	160,0	200,0	220),0	250,0				
>10000 and	≤12500	40,0	50,0	71,0	100,0	125,0	140),0	160,0				
>10000 and	≤12500	40,0	50,0	71,0	100,0	125,0	140),0	160,0				
>10000 and	≤12500	80,0	100,0	142,0	200,0	250,0	280),0	320,0				
Supplement	onvinforn	action											

^{*)} Material group IIIb is allowed if the working voltage does not exceed 50 V $^{**)}$ B = Basic insulation, S = Supplementary insulation, R = Reinforced insulation

29.2 TABLE: Creepage distances, functional insulation									
Working voltage (V):	•		Cre Po	epage di (mm) ollution d	stance egree				
	1		2			3			
		Ма	terial g	roup	Ма	terial g	roup		
		I	II	llla/lllb	I	П	llla/lllb*	Verdict / Re	mark
≤10	0,08	0,4	0,4	0,4	1,0	1,0	1,0		
50	0,16	0,56	0,8	1,1	1,4	1,6	1,8		
125	0,25	0,71	1,0	1,4	1,8	2,0	2,2		
250	0,42	1,0	1,4	2,0	2,5	2,8	3,2		
400	0,75	1,6	2,2	3,2	4,0	4,5	5,0		
500	1,0	2,0	2,8	4,0	5,0	5,6	6,3		
>630 and ≤800	1,8	3,2	4,5	6,3	8,0	9,0	10,0		
>800 and ≤1000	2,4	4,0	5,6	8,0	10,0	11,0	12,5		
>1000 and ≤1250	3,2	5,0	7,1	10,0	12,5	14,0	16,0		
>1250 and ≤1600	4,2	6,3	9,0	12,5	16,0	18,0	20,0		
>1600 and ≤2000	5,6	8,0	11,0	16,0	20,0	22,0	25,0		
>2000 and ≤2500	7,5	10,0	14,0	20,0	25,0	28,0	32,0		
>2500 and ≤3200) 10,0	12,5	18,0	25,0	32,0	36,0	40,0		
>3200 and ≤4000	12,5	16,0	22,0	32,0	40,0	45,0	50,0		
>4000 and ≤5000	16,0	20,0	28,0	40,0	50,0	56,0	63,0		
>5000 and ≤6300	20,0	25,0	36,0	50,0	63,0	71,0	80,0		
>6300 and ≤8000	25,0	32,0	45,0	63,0	80,0	90,0	100,0		
>8000 and ≤1000	0 32,0	40,0	56,0	80,0	100,0	110,0	125,0		

IEC/EN 60335-1											
Clause	Requirer	nent +	Test				F	Result - Rem	ark	Verdic	ct
>10000 and	l ≤12500	40,0	50,0	71,0	100,0	125,0	140,	,0 160,0			
Supplementary information:											

 $^{\ast)}$ Material group IIIb is allowed if the working voltage does not exceed 50 V

30.1	TABLE: Ball Pr	essure Test of Therm	oplastics		N/A
Allowed im	pression diame	ter (mm):			_
Object/ Pai	rt No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diam	eter (mm)
Supplemen	tary information:				

IEC/EN 60335-1							
Clause	Requirement + Test	Result - Remark	Verdict				

30.2	TA	TABLE: Resistance to heat and fire - Glow wire tests N/A						
Object/ Part No./ Material	Manufacturer / trademark	Glow wire test (GWT); (°C)						
		550	650		750		950	Verdict
		550	te	ti	te	ti	800	
Object/ Part No./ Material	Manufacturer /	Glow-wire flammability index (GWFI), °C				GW ignition temp. (GWIT), °C		Verdict
	trademark	550	650	750	850	675	775	
The test spec	imen passed the	e glow wire	e test (GV	VT) with no	o ignition [(t	te – ti) ≤ 2s]	(Yes/No):	
If no, then su	rrounding parts p	bassed the	e needle-f	lame test o	of annex E	(Yes/No)	:	
The test spec with the glow-	timen passed the -wire (Yes/No)?.	e test by vi	irtue of m	ost of the f	laming mai	terial being	withdrawn :	
Ignition of the specified layer placed underneath the test specimen (Yes/No)								
Supplementary information:								
 - 550 °C GWT not relevant (or applicable) to parts of material classified at least HB40 or if relevant HBF - The GWIT pre-selection option, the 850 °C GWFI pre-selection option, and the 850 °C GWT are not relevant (or applicable) for attended appliances 								

30.2/30.2.4	TABLE: Needle- flame test (NFT)					N/A
Object/ Part No./ Material		Manufacturer/ trademark	Duration of application of test flame (ta); (s)	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdic t
Supplementary information:						
- NFT not relevant (or applicable) for Parts of material classified as V-0 or V-1						

- NFT not relevant (or applicable) for Base material of PCBs classified as V-0 or if relevant VTM-0

Ρ

IEC/EN 60335-1							
Clause	Requirement + Test	Result - Remark	Verdict				

		IEC 60335_1X ATTACHMEN	IT				
Clause	Requirement + Test			Result - Remark	Verdict		
	A ⁻ EUROPEAN GROU HOUSEHOLD AND PAI	IEC 60335-1 IEC 60335-1 P DIFFERENCES AND NATIO SIMILAR ELECTRICAL APPL RT 1: GENERAL REQUIREMI	ORT ONAL DIFFE LIANCES – S ENTS	RENCES AFETY –			
Differences a	according to	EN 60335-1:2012 + AC:201 A14:2019 + A2:2019 EN 62233:2008 + AC:2008	4 + A11:2014	4 + A13:2017 + A1::	2019 +		
Attachment	Form No	EU_GD_IEC60335_1X					
Attachment	Originator	Nemko AS					
Master Attac	hment:	2019-09-24					
Copyright © (IECEE), Gen	2019 IEC System for Co eva, Switzerland. All rig	onformity Testing and Certi ghts reserved.	fication of E	lectrical Equipme	nt		
	CENELEC COMMON MODIFICATIONS (EN)						
6.1	Delete "class 0" and "c	lass 01"			Р		
7.1	Single-phase appliance supply mains: 230 V co	es to be connected to the overed			Р		
	Multi-phase appliances to be connected to the supply mains: 400 V covered				N/A		
7.12	The instructions include the substance of the following:						
	- this appliance can be 8 years and above and physical, sensory or me experience and knowle supervision or instruction appliance in a safe way hazards involved	used by children aged from I persons with reduced ental capabilities or lack of edge if they have been given on concerning use of the y and understand the			Ρ		
	- children shall not play		Р				
	- cleaning and user ma made by children witho	intenance shall not be out supervision			Р		
8.1.1	Also test probe 18 of E		Р				
	The appliance being in during the test, except	every possible position that			Р		
	appliances normally us	ed on the floor and having			Р		

a mass exceeding 40 kg are not tilted

increased to 10 N when probe 18 is used

The force on the probe in the straight position is
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	IEC 60335_1X ATTACHMEN	NT		
Clause	Requirement + Test		Result - Remark	Verdict
	When using test probe 18 the appliance is fully assembled as in normal use without any parts removed, and			Р
	parts intended to be removed for user maintenance are also not removed			Р
8.1.3	Instead of test probe B, test probe 18 and test probe 13, for appliances other than those of class II, test probe 41 of IEC 61032 is applied with a force not exceeding 1 N to live parts of visibly glowing heating elements, all poles of which can be disconnected by a single switching action			N/A
8.2	Compliance is checked by inspection and by applying the test probes of EN 61032 in accordance with the conditions specified in 8.1.1			Р
	Test probe B and probe 18 of EN 61032 are applied to built-in appliances and fixed appliances only after installation			N/A
15.1.2	Appliances with an automatic cord reel tested with the cord in the most unfavourable position so that the reeling of the wet cord may affect electrical insulation during operation, the cord not being dried before reeling			N/A
20.2	For appliances having dangerous moving parts, due to their working function, e.g. the needle of a sewing machine, tools of kitchen machines or the blade of an electrical knife, full protection is not possible for performing their intended use			N/A
	When using a test probe similar to test probe B of EN 61032, having a circular stop face and applied with a force of 5N, the accessories and detachable covers are removed			Р
	When using test probe 18 it is applied with a force of 2,5N on the appliance fully assembled			Р
22.12	Other parts intended to be detached during use, maintenance or cleaning (e.g. batteries, battery covers, lids, attachments, steam nozzles) are not considered as parts providing a similar function as handles, knobs, grips, levers			Ρ
22.17	The requirement is not applicable to built-in appliances			N/A
24.1	Components comply with the safety requirements specified in the relevant EN standards as far as they reasonably apply			Р
	Motors are not required to comply with EN 60034- 1, but tested as part of the appliance according to this standard			Р
	Relays are tested as part of the appliance according to this standard			N/A
	Relays may be alternatively tested to EN 60730-1 and the additional requirements in EN 60335-1			N/A

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IEC 60335_1X ATTACHMENT				
Clause	Requirement + Test		Result - Remark	Verdict
	The requirements of Clause 29 of this standard apply between live parts of components and accessible parts of the appliance			Р
	Components may comply with the requirements for clearances and creepage distances for functional insulation as specified in the relevant component standard			Р
	The requirements of 30.2 of this standard apply to parts of non-metallic material in components including parts of non-metallic material supporting current-carrying connections inside components			N/A
	Components that have not been tested and shown to comply with the EN standard for the relevant component are tested according to the requirements of 30.2 of this standard			Р
	Components that have been tested and shown to correquirements in the EN standard for the relevant corprovided that:	omply with the mponent nee	e resistance to fire d not be retested	-
	- the severity specified in the component standard is not less than the severity specified in 30.2, and			Р
	- the test report for the component states the values of $t_{\rm e}$ and $t_{\rm i}$ acc. to EN 60695-2-11			N/A
	If the above two conditions are not satisfied, the component is tested as part of the appliance			N/A
	Power electronic converter circuits are not required to comply with EN 62477-1, but tested as part of the appliance according to this standard			N/A
	Unless components have been tested and found to comply with the relevant EN standard for the number of cycles specified, they are tested in accordance with 24.1.1 to 24.1.9			N/A
	For components mentioned in 24.1.1 to 24.1.9, no additional tests specified in the relevant EN standard for the component are necessary other than those specified in 24.1.1 to 24.1.9			Ρ
	Components that have not been tested and found to comply with the relevant EN standard, and			Р
	components that are not marked or not used in accordance with their marking,			Ρ
	are tested in accordance with the conditions occurring in the appliance, the number of samples being that required by the relevant standard			Р
	Lamp-holders and starter-holders that have not been tested and found to comply with the relevant EN standard are tested as a part of the appliance and additionally comply with the gauging and interchangeability requirements of the relevant EN standard under the conditions occurring in the appliance			N/A

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IEC 60335_1X ATTACHMENT				
Clause	Requirement + Test		Result - Remark	Verdict
	Where the relevant EN standard specifies these gauging and interchangeability requirements at elevated temperatures, the temperatures measured during the tests of Clause 11 are used			N/A
	There are no additional tests specified for nationally standardized plugs such as those detailed in IEC/TR 60083 or connectors complying with the standard sheets of EN 60320-1 and EN 60309, unless they are specifically mentioned in the text of this standard			N/A
	Plugs and socket-outlets and other connecting devices of interconnection cords are not interchangeable with plugs and socket-outlets listed in IEC/TR 60083 or IEC 60906-1, or			N/A
	with connectors and appliance inlets complying with the standard sheets of EN 60320-1, if			N/A
	direct supply to these parts from the supply mains gives rise to a hazard			N/A
	For plugs used in CENELEC countries Annex ZH applies			N/A
24.1.7	When the remote operation of the appliance is via a telecommunication network, the relevant standard for the telecommunication interface circuitry in the appliance is EN 41003			N/A
	Compliance with Clause 8 of this standard is not impaired by connecting the appliance to a device covered by EN 41003			N/A
24.Z1	Type S2 and S3 capacitors according to EN 60252-1 are not required to undergo the testing as required by 30.2.2 and 30.2.3.1			N/A
25.1	Plugs and pins for insertion into socket outlets follow the relevant standards sheets in Annex ZH			N/A
25.7	Rubber sheathed cords (60245 IEC 53) are not suitable for appliances intended to be used outdoors, or			N/A
	when they are liable to be exposed to significant amount of ultraviolet radiation			N/A
25.25	Instead of IEC/TR 60083, dimensions of the pins and engagement face of plugs of appliances that are inserted into socket-outlets are in accordance with the dimensions of the relevant plug standard			N/A
	Common plugs and socket-outlets types in CENELEC countries as shown in Annex ZH			N/A
26.11	Conductors connected by soldering are not considered to be positioned or fixed so that reliance is not placed upon the soldering alone to maintain them in position,			Р
	unless they are held in place near the terminals independently of the solder			N/A

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	IEC 60335_1X ATTACHMEN	NT	
Clause	Requirement + Test	Result - Remark	Verdict
29.3.Z1	Appliance constructed so that if there is a possibility of damaging the insulation during installation, the insulation withstands the scratch and penetration test of 21.2		N/A
32	Compliance regarding electromagnetic fields is checked according to EN 62233		N/A
Annex I, 19.I.101	The appliance is supplied at rated voltage and operated under normal operation with each of the fault conditions specified		N/A
	The duration of any of the tests is as specified in 19.7		N/A
ZA	ANNEX ZA (NORMATIVE) SPECIAL NATIONAL CONDITIONS (EN)		
	Denmark, Sweden, Norway and Finland		Р
7.12.8	The maximum inlet water pressure is at least 1,0 MPa:		Р
	Norway		N/A
19.5	The test is also applicable to appliances intended to be permanently connected to fixed wiring		N/A
			N/A
	Norway		N/A
22.2	The second paragraph of this subclause, dealing with single-phase, permanently connected class I appliances having heating elements, is not applicable due to the supply system		N/A
			N/A
	Denmark		N/A
22.47	The maximum inlet water pressure is at least 1,0 MPa		N/A
			N/A
	Ireland and United Kingdom		N/A
25.8	In the table, the line >10 A and ≤16 A is replaced wi	ith:	
	> 10 and ≤ 13 1,25 (1,0) ^b		N/A
	> 13 and ≤ 16 1,5 (1,0) ^b		N/A
			N/A

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	IEC 60335_1X ATTACHMENT	
Clause	Requirement + Test Result - Remark	Verdict
ZB	ANNEX ZB (INFORMATIVE) A-DEVIATIONS	
		N/A
	Ireland	N/A
25.1 and 25.25	These regulations apply to all plugs for domestic use at a voltage of not less than 200 V and in general allow only plugs complying with I.S. 401:1997, or equivalent, to be fitted to domestic appliances	N/A
		N/A
	United Kingdom	N/A
25.1 and 25.25	These regulations apply to all plugs for domestic use at a voltage of not less than 200 V and in general allow only plugs to BS 1363 to be fitted to domestic appliances.	N/A
	It also allows plugs to BS 4573 and EN 50075 to be fitted to shavers and toothbrushes	N/A
		N/A
ZC	ANNEX ZC (NORMATIVE) NORMATIVE REFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR CORRESPONDING EUROPEAN PUBLICATIONS	
	A list of documents referred to in the text of this standard in such a way that some or all of their content constitutes requirements of this document	Р
		N/A
ZD	ANNEX ZD (INFORMATIVE) IEC and CENELEC CODE DESIGNATIONS FOR FLEXIBLE CORDS	
	List of IEC and CENELEC code designations for flexible cords	Р
		N/A
ZE	ANNEX ZE (INFORMATIVE) SPECIFIC ADDITIONAL REQUIREMENTS FOR APPLIANCES AND MACHINES INTENDED FOR COMMERCIAL USE	
7.1	Business name and full address of the manufacturer and, where applicable, his authorized representative:	N/A
	Model or type reference:	N/A
	Serial number, if any	N/A
	Production year	N/A
	Designation of the appliance:	N/A

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	IEC 60335_1X ATTACHMEN	IT		
Clause	Requirement + Test		Result - Remark	Verdict
7.12	Instructions provided with the appliance so that the appliance can be used safely			N/A
	The instructions contain at least the following inform	ation:		
	- the business name and full address of the manufacturer and, where applicable, his authorized representative			N/A
	 model or type reference of the appliance as marked on the appliance itself, except for the serial number 			N/A
	- the designation of the appliance together with its explanation in case it is given by a combination of letters and/or numbers			N/A
	- the general description of the appliance, when needed due to the complexity of the appliance			N/A
	 specific precautions required during installation, operation, adjusting, user maintenance, cleaning, repairing or moving 			N/A
	 when needed drawings, diagrams, descriptions and explanations necessary for the safe use and user maintenance of the appliance 			N/A
	- the possible reasonably foreseeable misuse and, whenever relevant, a warning against the effects it may have on the safe use of the appliance			N/A
	The words "Original instructions" appear on the language version(s) verified by the manufacturer or by the authorized representative			N/A
	When a translation of the original instructions has been provided by a person introducing the appliance on the market; the meaning of the sentence "Translation of the original instructions" appear in the relevant instructions delivered with the appliance			N/A
	The instructions for maintenance/service to be done by specialized personnel, mandated by the manufacturer or the authorized representative may be supplied in only one Community language which the specialized personnel understand			N/A
	The instructions indicate the type and frequency of inspections and maintenance required for safe operation including the preventive maintenance measures			N/A
7.12.ZE1	If needed for specific appliances, the following inform	mation to be	given:	
	- on use, transportation, assembly, dismantling when out of service, testing or foreseeable breakdowns, if these operations have consequences on stability of the appliance in order to avoid overturning, falling or uncontrolled movements of the appliance or of its component parts			N/A

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	IEC 60335_1X ATTACHMEN	ΙТ		
Clause	Requirement + Test		Result - Remark	Verdict
	- on how to maintain adequate mechanical stability when in use, during transportation, assembly, dismantling, scrapping and any other action involving the appliance			N/A
	- on the protective measures to be taken by the user, including, where appropriate, the personal protective equipment to be provided			N/A
	- on the operating method to be followed in the event of accident or breakdown; if a blockage is likely to occur the operating method to safely unblock the appliance			N/A
	- on the specifications on the spare parts to be used, when these affect the health and safety of the operator			N/A
	- on airborne noise emissions, determined and declared in accordance with the relevant Part 2, which includes:		dance with the	
	- the A-weighted emission sound pressure level at workstations, where this exceeds 70 dB(A);			N/A
	- where this level does not exceed 70 dB(A), this fact is indicated			N/A
	- the peak C-weighted instantaneous sound pressure value at workstations, where this exceeds 63 Pa (130 dB in relation to 20 μPa):			N/A
	- the A-weighted sound power level emitted by the machinery, where the A-weighted emission sound pressure level at workstations exceeds 80 dB(A)			N/A
7.12.ZE2	The instructions include a warning to disconnect the appliance from its power source during service and when replacing parts			N/A
	If the removal of the plug is foreseen, it is clearly indicated that the removal of the plug is such that an operator can check from any of the points to which he has access that the plug remains removed			N/A
	If this is not possible, due to the construction of the appliance or its installation, a disconnection with a locking system in the isolated position is provided			N/A
19.11.4.8	The appliance continues to operate, without causing any hazard to the user, from the same point in its operating cycle at which the voltage fluctuation occurred, or			N/A
	a manual operation is required to restart it			N/A
20.1	Appliances and their components and fittings have adequate mechanical stability during transportation, assembly, dismantling and any other action involving the appliance			N/A

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	IEC 60335_1X ATTACHMEN	١T	
Clause	Requirement + Test	Result - Remark	Verdict
20.2	Dangerous moving transmission parts safeguarded either by design or guards		N/A
	When guards are used, they are fixed guards, interlocking movable guards or protective devices		N/A
	Moving parts directly involved in the function of the made completely inaccessible fitted with:	appliance which cannot be	
	 fixed guards or interlocking movable guards preventing access to those sections of the parts that are not used in the work, and 		N/A
	 adjustable guards restricting access to those sections of the moving parts where access is necessary 		N/A
	Interlocking movable guards used where frequent access is required		N/A
21.1	Appliances and their components and fittings have adequate mechanical strength and is constructed to withstand such rough handling that may be expected in normal use, during transportation, assembly, dismantling, scrapping and any other action involving the appliance		N/A
22.ZE.1	For appliances provided with a seat, the seat gives adequate stability		N/A
	The distance between the seat and the control devices capable of being adapted to the operator		N/A
22.ZE.2	For appliances provided with separate devices for the start and the stop functions, the stop function is unambiguously identifiable and does always override the start function		N/A
	For appliances provided with one device performing the start and the stop function, the stop function is unambiguously identifiable and does always override the start function		N/A
22.ZE.3	Appliances designed in such a way that incorrect mounting is avoided, if this can lead to an unsafe situation		N/A
	If this is not possible, information on the correct mounting is given directly on the part and/or the enclosure		N/A
22.ZE.4	Where the weight, size or shape prevents appliances from being moved manually, they are fitted with attachments for lifting gear, or		N/A
	so designed that they can be fitted with such attachments, or		N/A
	be shaped in such a way that standard lifting gear can easily be used		N/A
	Appliances to be moved manually are constructed or equipped so that they can be moved easily and safely		N/A

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	IEC 60335_1X ATTACHMEN	лт		
Clause	Requirement + Test		Result - Remark	Verdict
22.ZE.5	The fixing systems of fixed guards which prevent access to dangerous moving transmission parts only removable with the use of tools			N/A
	If such guards have to be removed by the user for routine cleaning or maintenance their fixing systems remain attached to the fixed guards or to the machine after removal			N/A
	Where possible, guards are incapable of remaining in place without their fixings			N/A
	This does not apply if, after removal of the screws, or if the component is incorrectly repositioned, the appliance becomes inoperative			N/A
	Movable guards are interlocked			N/A
	The interlocking devices prevent the start of hazardous appliance functions until the guards are fixed in their position, and give a stop command whenever they are no longer closed			N/A
	Where it is possible for an operator to reach the dar hazardous appliance functions has ceased, movable guard locking device in addition to an interlocking de	reach the danger zone before the risk due to eased, movable guards associated with a interlocking device that:		
	- prevents the start of hazardous appliance functions until the guard is closed and locked, and			N/A
	- keeps the guard closed and locked until the risk of injury from the hazardous appliance functions has ceased			N/A
	Interlocking movable guards remain attached to the appliance when open, and			N/A
	they are designed and constructed in such a way that they can be adjusted only by means of an intentional action			N/A
22.ZE.6	Interlocking movable guards designed in such a way that the absence or failure of one of their components prevents starting or stops the hazardous appliance functions			N/A
	The guard is opened to the extent needed to cause the interlocking to operate and is then closed, the number of operations being defined in the specific Part 2			N/A
	After this test any defect that may be expected in normal use is applied to the interlock system, including interruption of the supply, only one defect being simulated at a time			N/A
	After these tests the interlock system is fit for further use			N/A
22.ZE.7	Adjustable guards restricting access to areas of the for the work are:	moving parts	strictly necessary	
	- adjustable manually or automatically, depending on the type of work involved, and			N/A

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	IEC 60335_1X ATTACHMEN	NT		
Clause	Requirement + Test		Result - Remark	Verdict
	- readily adjustable without the use of tools		·	N/A
22.ZE.8	In case of interruption, re-establishment after an interruption or fluctuation in whatever manner of the power supply, the appliance does not restart			N/A
	However, automatic restarting of the operation is allowed if the appliance may continue to operate, without causing any hazard to the user, from the same point in its operating cycle at which the voltage interruption or fluctuation occurred			N/A
22.ZE.9	Appliances fitted with means to isolate them from all energy sources			N/A
	Such isolators are clearly identified, and			N/A
	they are capable of being locked if reconnection endanger persons			N/A
	After the energy source is disconnected, it is possible to dissipate any energy remaining or stored in the circuits of the appliance without risk to persons			N/A
				N/A
ZF	ANNEX ZF (INFORMATIVE) CRITERIA APPLIED FOR THE ALLOCATION OF STANDARDS IN THE EN 60335 SERIES UNDER	PRODUCTS LVD OR MD	COVERED BY	
	List of standards under CENELEC/TC61 with the allocation under the LVD (Low Voltage Directive) or the MD (Machinery Directive):			Р
				N/A
ZG	ANNEX ZG (NORMATIVE) UV APPLIANCES			
	The following modifications to this standard apply to appliances having UV emitters			N/A
	This annex is not applicable to appliances covered by the scopes of IEC 60335-2-27, IEC 60335-2-59 or IEC 60335-2-109			N/A
7.12.ZG	The instructions for appliances incorporating UVC emitters include the substance of the following: WARNING — This appliance contains a UV emitter. Do not stare at the light source			N/A
32	For appliances incorporating UV emitters the manufacturer delivers a declaration providing evidence that the plastic material exposed to the radiation is UV resistant			N/A
				N/A
ZH	ANNEX ZH (INFORMATIVE) Common plug and socket-outlet types in CENEL	EC countrie	s	
	In general, supply cords of single-phase appliances exceeding 16 A are fitted with a plug complying with	having a rate the following	ed current not g standard sheets:	N/A

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	IEC 60335_1X ATTACHMEN	NT		
Clause	Requirement + Test		Result - Remark	Verdict
	- for class I appliances or class II appliances with functional earth, standard sheet EU2, EU3 or EU4:			N/A
	- for class II appliances, standard sheet EU5, EU6 or EU7:			N/A
	There are exemptions or differences in certain CENELEC countries			N/A
				N/A
ZI	ANNEX ZI (INFORMATIVE) Information on the application of A11:2014 to ENCENELEC CLC/TC 61(SEC)2096A	N 60335-1:20	112	
	Clarification of the application of parts 2 in conjunction with the 2002 or 2012 version of EN 60335-1			N/A
				N/A
ZZA	ANNEX ZZA (INFORMATIVE) RELATIONSHIP BETWEEN THIS EUROPEAN ST OBJECTIVES OF DIRECTIVE 2014/35/EU [2014 C COVERED	ANDARD AI DJ L96} AIMI	ND THE SAFETY ED TO BE	
	This standard provides one means of conforming to safety objectives of Directive 2014/35/EU			N/A
	When cited in the Official Journal under that Directive, compliance with the normative clauses of this standard given in Table ZZA.1 confers a presumption of conformity with the safety objectives of that Directive and associated EFTA regulations			N/A
	Compliance with this Part 1 when used together with the relevant Part 2 provides one means of conformity with the safety objectives			N/A
				N/A
ZZB	ANNEX ZZB (INFORMATIVE) RELATIONSHIP BETWEEN THIS EUROPEAN ST ESSENTIAL REQUIREMENTS OF DIRECTIVE 20 COVERED	ANDARD AI 06/42/EC AII	ND THE MED TO BE	
	This standard provides one means of conforming to essential requirements of EU Directive 2006/42/EC			N/A
	When cited in the Official Journal under that Directive, compliance with the normative clauses of this standard given in Table ZZB.1 confers a presumption of conformity with the essential requirements of that Directive and associated EFTA regulations			N/A
	Compliance with this Part 1 when used together with the relevant Part 2 provides one means of conformity with the essential health and safety requirements			N/A
				N/A

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IEC 60335_1X ATTACHMENT					
Clause	Requirement + Test		Result - Remark	Verdict	
	ANNEX EN 62233:2008 + AC:2008				
	EMF- ELECTROMAGNETICS FIELDS				
	The tested product also complies with the requirements of EN 62233:2008				
	Limit100%	Measured m	ax. :%	N/A	
				N/A	

Photographs



Top view



Bottom view

EC Declaration of Conformity

Seggi Century Co., Ltd.

We 94, Yeonam-gil, Chopyeong-myeon, Jincheon-gun, Chungcheongbuk-do, Republic of Korea declare under our sole responsibility that the products;

Product : HEATING FILM

Model No : APN

APN-410-RS

Derived models : HP-SPN-305, HP-SPN-308, HP-SPN-310, HP-ACN-405, HP-ACN-408, HP-ACN-410, HP-APN-405, HP-APN-410, HP-APH-410

The product identified above is tested by the requirements of the EU Directives of the following standards;

Low-Voltage Directives 2014/30/EU

EN 60335-1:2012 + AC:2014 + A11:2014 + A13:2017 + A1:2019 + A14:2019 + A2:2019	Safety of household and similar electrical appliances
EN 62233:2008 + AC:2008	Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure

Above described products are fully complying with the essential requirements of the EU directives. But, the test report in accordance with EMC directive and others are additionally required, if need.

Issued date: March 28, 2022

<u>Confirmed by:</u> Seggi Century Co.,Ltd.

Hoon Kyu Park/ CEO



TECHNICAL DATASHEET

HEAT PLUS Stripe coated heating film



SEGGI CENTURY CO., LTD

1. Product Description



HP-SPN-305 (50cm width)

HP-SPN-308 (80cm width)

HP-SPN-310 (100cm width)

• All coated film is 0.338 thickness and emits far infrared rays and anions from the surface of the film.

2. Features

- Quick warming-up of the heating film
- High heat resistance(Maximum over 80°C Celsius)
- Health-beneficial way of heating
- Semi-permanent life time
- Far infrared rays and anions emission
- Antibacterial effect

3. Main usage

- Underfloor heating
- Wall heating
- Ceiling heating
- Interior areas

4. Stripe coated heating film structure



5. Specification

HEAT PLUS Stripe coated heating film

TYPE	HP-SPN-305	HP-SPN-308	HP-SPN-310
Width	50cm	80cm	100cm
Thickness	0.338mm	0.338mm	0.338mm
Power Consumption	110W/m (±10%)	180W/m (±10%)	220W/m (±10%)
Maximal electric current (Per meter)	0.5A	0.82A	1A
Using Temperature	40~50° C	40~50℃	40~50° C
Heat Resistance	60~70°C	60~70℃	60~70°C
Purpose	Normal heating	Normal heating	Normal heating
Packing Dimension	240mmX240mm X530mm	240mmX240mmX 830mm	240mmX240mmX 1030mm

SEGGI CENTURY CO.,LTD. *Electric carbon heating film technologies*

TECHNICAL DATASHEET

HEAT PLUS New All coated heating film (ACN model)



SEGGI CENTURY CO., LTD

1. Product Description



HP-ACN-410 (100cm width) HP-ACN-408 (80cm width) HP-ACN-405 (50cm width)

• All coated film is 0.45mm thickness and emits far infrared rays and anions from the surface of the film.

2. Features

- Quick warming-up of the heating film
- High heat resistance(Maximum over 100°C Celsius)
- Health-beneficial way of heating
- Semi-permanent life time
- Far infrared rays and anions emission
- Antibacterial effect
- Possible to use the film after cutting as dotted line

3. Main usage

- Underfloor heating
- Wall heating
- Ceiling heating
- Interior areas

4. All coated heating film structure(ACN)



PET LOGO PRINTING PET CARBON SILVER BUSBAR COPPER BUSBAR ADHESIVE PET COLOR PRINTING PET



Optional new carbon printing type

SEGGI CENTURY CO., LTD

5. Specification

HEAT PLUS All coated heating film ACN

TYPE	HP-ACN-410	HP-ACN-408	HP-ACN-405
Width	100cm	80cm	50cm
Thickness	0.45mm	0.45mm	0.45mm
Power Consumption	220W/m (±10%)	180W/m (±10%)	110W/m (±10%)
Maximal electric current (Per meter)	1A	0.8A	0.5A
Using Temperature	40~50° C	40~50℃	40∼50° C
Heat Resistance	100°C	100°C	100°C
Purpose	Normal heating	Normal heating	Normal heating
Packing Dimension	240mmX240mm X1030mm (75m roll)	240mmX240mmX 830mm (75m roll)	290mmX290mmX 530mm (100m roll)
	·		

9. Storage

- Protect from long-term exposure to direct sunlight, from fire and chemicals
- Store in dry areas at temperature 20-25℃

10. Certificates

CE





ЕВРАЗИЙСКИЙ ЭКОНОМИЧЕСКИЙ СОЮЗ ДЕКЛАРАЦИЯ О СООТВЕТСТВИИ



тель Общество с ограниченной ответственностью "ТС-СЕРВИС"

Метет изхождения и адрее места оуществления деятельность Российская Федерация, Москва, 11246, преосу Цаунный, дом 10, этак 1 офис 692, основной государственный регистрационный помер: 1187746867109, помер телефона: – 7965297636, адрее экскронной почты: te-servic@rambter.ru

в лице Генерального директора Курдоковой Светланы Шиколаевны занислет, что Пряборы электропарткательные промыписнитого насначатии: нагревятельная гисника, ходани: НЕ-SYN-305, НЕ-SPN-308, НЕ-SPN-310, ИР-SDN-305, НЕ-SDN-310, НЕ-SPN-305, НЕ-SPP-308, ПР-SPE-310, ПР-APN-410, ПР-APN-405, ПР-APIL-410, ПР-ACN-405, ПР-ACN-408,

пр. ACN-410 инготовитель. Seggi Century Co., 14d. Место вазождения в адрос места осуществления деятельности по иготовлению продукции: 94, Yeonan-gå Chopyeong-nyeon, Jacheon-gu, Changcheon, Pecnyбина Корся.

корек. Продукция изуотовлена в соответствии с директивой 2014/35/EU (О низховольтном оборудовании Low Volage Directive LVD); лирективой 2014/30/EU (О электроманиитной совместимости Exectromagnetic compatibility EUC). Код ТП В/2) (EA/C SS 16779000. Серийный ныпуск соответст пуст гребованиям

ТР 210 04/2011 'Ю безопасности низовольтного оборудования", упержден Решением Комиссии Таможенного союза от 16 автуста 2011 года № 768, ТР ТС 020/2011 "Электроматнитная совместимость технических средств", упержден Решением Комиссии Таможенного союза от 09 эконбете 2011 след № 290. совые пластв технических средств , упвержден голь декабря 2011 года № 879 Декларации о соотнетствии принита на основании

Протокола испытаний № МРД/042020/0280 от 25.05.2020 года, выданного Испытательн ия лаборатория Общество с ограниченной ответственностью "МЕРИДИАН", аттестат аккредитации РОСС RU.32001.04ИБФ1.ИЛ16, сроком действия до 25.03.2021 года.

Con Currying

RU.32001.044/BФ1.J0I16, сроком действия до 25.03.2021 года. Скема декарарования Iд Дополнительная информация ГОСТ 12.2.007.0-75 "Система стан.артов безмаелости путка (ССБТ). Изделяя электроителичческие Общее требования безопасности", ГОСТ 30804.6-2.2013 (IEC 61000-6-22005) "Совместичность технических средств электроманитиная. Устойчность к электроманитиная помехам технических средств, применяемых в промагителных элика Требования и метода и попатаний"; ГОСТ 30804.6.4-2013 (IEC 61000-6-42050) "Совместичность технических средств, применяемых в промашленных элика. Нормы и метода исплатиний". Орок служба – 5.нет, Хримить в аритик эликалих в промашленных элика. Нормы и метода исплатиний". Срок служба – 5.нет, Хримить в аритик эликалькая в промашленных элика. Нормы и метода исплатиний". Срок служба – 5.нет, Хримить в аритик эликалькая в промашленных элика. Нормы и метода исплатиний". Срок служба – 5.нет, Хримить в аритик эликалькая в промашленных элика. Нормы и истованенных исключающих воздействие прямых содиенных лучей, атмосферных осаднов, при техниературс окружающието похружа от 25 до −35 °C, описонстваной влажаюсти воздука до 70%. В помещениях, исключающието воздука о 2.2 до −35 °C, описонстваной влажаюсти воздука до 70%. В помещениях – соотверствения эликетика изделий, не должно быты парая выслот, целочей. Срок кранения – 5.лет. Cpor

хранения 5 лет. гарания о срответствии действительна с даты регистрации по 24.05.2025 включительн Kild

М.П. Курдюкова Светлана Николаевна



Дата регистрации декларации о соответствии: 25.05.2020

TRCU RUSSIA



NTURY CO., LTD





SEGGI CENTURY CO.,LTD. *Electric carbon heating film technologies*



SEGGI CENTURY CO., LTD- Head office and factory

94, Yeonam-gil, Chopyeong-myeon, Jincheon-gun, Chungbuk, 27860 South Korea

www.heatplus.co.kr

kdbae@heatplus.co.kr

SEGGI CENTURY CO., LTD

ЕВРАЗИЙСКИЙ ЭКОНОМИЧЕСКИЙ СОЮЗ ДЕКЛАРАЦИЯ О СООТВЕТСТВИИ

EAC

Заявитель Общество с ограниченной ответственностью "ТС-СЕРВИС"

Место нахождения и адрес места осуществления деятельности: Российская Федерация, Москва, 117246, проезд Научный, дом 10, этаж 1 офис 692, основной государственный регистрационный номер: 1187746867109, номер телефона: +79652397636, адрес электронной почты: ts-servis@rambler.ru

в лице Генерального директора Курдюковой Светланы Николаевны

заявляет, что Приборы электронагревательные промышленного назначения: нагревательная пленка, модели: HP-SPN-305, HP-SPN-308, HP-SPN-310, HP-SDN-305, HP-SDN-308, HP-SDN-310, HP-SPP-305, HP-SPP-308, HP-SPP-310, HP-APN-410, HP-APN-405, HP-APH-410, HP-ACN-405, HP-ACN-408, HP-ACN-410

изготовитель Seggi Century Co., Ltd. Место нахождения и адрес места осуществления деятельности по изготовлению продукции: 94, Yeonam-gil, Chopyeong-myeon, Jincheon-gun, Chungcheon, Республика Корея.

Продукция изготовлена в соответствии с директивой 2014/35/EU (О низковольтном оборудовании - Low Voltage Directive LVD); директивой 2014/30/EU (О электромагнитной совместимости - Electromagnetic compatibility EMC).

Код ТН ВЭД ЕАЭС 8516797000. Серийный выпуск

соответствует требованиям

ТР ТС 004/2011 "О безопасности низковольтного оборудования", утвержден Решением Комиссии Таможенного союза от 16 августа 2011 года № 768, ТР ТС 020/2011 "Электромагнитная совместимость технических средств", утвержден Решением Комиссии Таможенного союза от 09 декабря 2011 года № 879

Декларация о соответствии принята на основании

Протокола испытаний № МРД/042020/0280 от 25.05.2020 года, выданного Испытательная лаборатория Общество с ограниченной ответственностью "МЕРИДИАН", аттестат аккредитации РОСС RU.32001.04ИБФ1.ИЛ16, сроком действия до 25.03.2021 года.

Схема декларирования 1д

Дополнительная информация

ГОСТ 12.2.007.0-75 "Система стандартов безопасности труда (ССБТ). Изделия электротехнические. Общие требования безопасности"; ГОСТ 30804.6.2-2013 (IEC 61000-6-2:2005) "Совместимость технических средств электромагнитная. Устойчивость к электромагнитным помехам технических средств, применяемых в промышленных зонах. Требования и методы испытаний"; ГОСТ 30804.6.4-2013 (IEC 61000-6-4:2006) "Совместимость технических средств электромагнитная.

Электромагнитные помехи от технических средств, применяемых в промышленных зонах. Нормы и методы испытаний". Срок службы – 5 лет. Хранить в крытых отапливаемых и вентилируемых помещениях, исключающих воздействие прямых солнечных лучей, атмосферных осадков, при температуре окружающего воздуха от -25 до +35 °C, относительной влажности воздуха до 70%. В помещениях, где хранятся продукция и элементы изделий, не должно быть паров кислот, щелочей. Срок хранения – 5 лет.

Декларация о соответствии действительна с даты регистрации по 24.05.2025 включительно



Курдюкова Светлана Николаевна

(Ф.И.О. заявителя)

Регистрационный номер декларации о соответствии: ЕАЭС N RU Д-KR.HX37.B.03277/20

Дата регистрации декларации о соответствии: 25.05.2020

ΜΠ



TECHNICKÝ SKÚŠOBNÝ ÚSTAV PIEŠŤANY, š.p. Certifikačný orgán certifikujúci výrobky Product Certification Body Krajinská cesta 2929/9, 921 01 Piešťany Slovenská republika/Slovak Republic



CERTIFIKÁT ZHODY CONFORMITY CERTIFICATE

č./No. 221299367

Výrobca/Manufacturer:

Eco system 12V, s. r. o. č. 127 930 39 Oľdza, Slovenská republika / Slovak Republic

Výrobok/Product:

Tesla vykurovací systém / Tesla heating system

Typ/Type:

- model S1	T8 - model S2	
- model S1	T10 - model S2	T10 - model S3
- model S2	T12 - model S3	T12 - model S4
- model S3	T14 - model S4	T14 - model S5
- model S4	T16 - model S5	T16 - model S6
	 model S1 model S1 model S2 model S3 model S4 	- model S1T8- model S2- model S1T10- model S2- model S2T12- model S3- model S3T14- model S4- model S4T16- model S5

Tento certifikát zhody potvrdzuje, že výrobok spĺňa základné požiadavky na bezpečnosť podľa nasledovných nariadení v ich platnom znení:

This conformity certificate confirms the conformity of the product with essential safety requirements of the following EC/EU New Approach Directives as amended:

Nariadenie vlády SR č. 148/2016 Z. z. LVD Nariadenie vlády SR č. 127/2016 Z. z. EMC Directive 2014/35/EU LVD Directive 2014/30/EU EMC

Harmonizované normy použité pre posúdenie zhody: Harmonized standards used for the conformity assessment:

EN 60335-1:2012/AC:2014/A11:2014/A13:2017/A1:2019/A2:2019/A14:2019/A2:2019/A15:2021 EN 60335-2-106:2007 EN 55014-1:2017/A11:2020 EN 61000-3-2:2014 EN 61000-3-3:2013

Iné normy použité pre posúdenie zhody: Other standards used for conformity assessment:

EN 55014-2:2015 EN IEC 55014-2:2021 EN IEC 61000-3-2:2019/A1:2021 EN 61000-3-3:2013/A1:2019/A2:2021

Certifikát je vydaný na základe skúšok vzorky typu výrobku. Výsledky sú uvedené v Správe o posúdení zhody č. 220500218 zo dňa 02.11.2022 The certificate has been issued on the basis of the tests of the product type sample. The results

are recorded in the Conformity assessment report No. 220500218 dated 02.11.2022

označenie môže byť použité iba v prípade posúdenia zhody so všetkými príslušnými nariadeniami mark can be used only in the case of conformity assessment according to all relevant EC/EU Directives

Dátum vydania/Issue date: 03.11.2022 Platnosť do/Expiry date: 02.11.2025 Vydanie //ssue:

