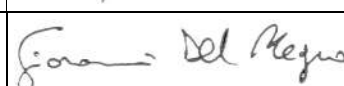




Test Report issued under the responsibility of:



TEST REPORT IEC 60335-2-41 Household and similar electrical appliances - safety - Part 1: General requirements Safety of household and similar electrical appliances Part-2-41: Particular requirements for pumps	
Report Number..... :	200043985UDI-CBS
Date of issue	27 May, 2026
Total number of pages	198
Name of Testing Laboratory preparing the Report..... :	INTERTEK ITALIA SPA Via Principe di Udine, 114 33030 CAMPOFORMIDO (UD) – ITALY
Applicant's name	ZENIT ITALIA SRL
Address	Via dell'Industria, 11 41018 San Cesario sul Panaro (MO) – ITALY
Test specification:	
Standard	IEC 60335-2-41:2024 in conjunction with IEC 60335-1:2020
Test procedure.....	CB Scheme
Non-standard test method.....	N/A
TRF template used	IECEE OD-2020-F1:2023, Ed.1.6
Test Report Form No.	IEC60335_2_41N
Test Report Form(s) Originator....	VDE Prüf- und Zertifizierungsinstitut GmbH
Master TRF	Dated 2024-07-08
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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 NCB. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.	

Test item description	Submersible wastewater pump	
Trademark(s)	ZENIT	
Manufacturer	ZENIT ITALIA SRL	
Model/Type reference	GREY SERIES – models APG*, DGG*, DRG*, GRG*, CTG* UNIQA SERIES – models ZUG HP*, ZUG V*, ZUG OC*, ZUG GR*, ZUG CP* (for details, see general product information)	
Ratings	GREY SERIES: 230V, 400V, 50/60Hz, three phases, 2.4A, 3A, 3.3A, 3.4A, 3.7A, 4.2A, 4.3A, 4.6A, 4.7A, 5.2A, 5.3A, 5.7A, 5.9A, 6.4A, 6.5A, 6.7A, 6.8A, 7.5A, 7.7A, 8A, 8.1A, 8.4A, 8.5A, 9A, 9.1A, 9.3A, 11A, 11.1A, 11.7A, 13.4A, 14.6A, 14.8A, 16.2A. UNIQA SERIES: 230V, 400V, 50/60Hz, three phases, 2.7A, 2.8A, 2.9A, 3.6A, 3.7A, 3.8A, 3.9A, 4.2A, 4.3A, 4.4A, 4.5A, 4.6A, 4.7A, 4.8A, 5A, 6A, 6.1A, 6.3A, 6.5A, 6.6A, 6.7A, 6.8A, 7.2A, 7.5A, 7.6A, 7.7A, 7.8A, 8.2A, 8.3A, 8.4A, 8.5A, 8.9A, 9.5A, 9.6A, 10.4A, 10.5A, 11.5A, 11.6A, 11.7A, 12.5A, 13.3A, 13.5A, 14.4A, 14.6A, 14.7A, 14.8A, 15.3A, 16.5A, 16.7A. (for details, see general product information)	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☒	CB Testing Laboratory:	
Testing location/ address		Registered Office: Via Principe di Udine, 114 33030 Campoformido (UD) – Italy
Tested by (name, function, signature)		Anna Baruzzi (Senior project engineer) 
Approved by (name, function, signature)		Giovanni Del Negro (Senior project engineer) 
Testing procedure: CTF Stage 1:		
Testing location/ address		
Tested by (name, function, signature)		
Approved by (name, function, signature)		
Testing procedure: CTF Stage 2:		
Testing location/ address		
Tested by (name + signature)		
Witnessed by (name, function, signature) ..		
Approved by (name, function, signature)		
Testing procedure: CTF Stage 3:		

☐	Testing procedure: CTF Stage 4:		
Testing location/ address.....:			
Tested by (name, function, signature).....:			
Witnessed by (name, function, signature) .:			
Approved by (name, function, signature)...:			
Supervised by (name, function, signature) :			

List of Attachments (including a total number of pages in each attachment):

This Report contains 198 Report Pages.

- IEC Report (pages 1 – 181)
- National deviations for Australia / New Zealand (pages 6)
- National deviations for Argentina (pages 2)
- National deviations for Saudi Arabia (page 1)
- National deviations for United Arab Emirates (pages 2)
- Photos of the appliances (pages 6)

Summary of testing:

Tests performed (name of test, test clause and date test performed):

- 7 - Marking and instructions
- 8 - Protection against access to live parts
- 10 - Power input and current
- 11 - Heating
- 13 - Leakage current and electric strength at operating temperature
- 15 - Moisture resistance
- 16 - Leakage current and electric strength
- 19 - Abnormal operation
- 20 - Stability and mechanical hazards
- 21 - Mechanical strength
- 22 - Construction
- 23 - Internal wiring
- 25 - Supply connection and external flexible cords
- 26 - Terminals for external conductors
- 27 - Provision for earthing
- 28 - Screws and connections
- 29 - Clearances, creepage distances and solid insulation
- 30 - Resistance to heat and fire

Test executed from March 16 to March 24, 2026

Models tested: DGG 150/4/65 H0AT5 TS 10230D, DRG 200/4/80 M0ET5 TS 10230Y, APG 400/2/G50H D0ET5 TS 10230Y, DRG 550/6/150 F0GT5 TS 10230Y, GRG 250/2/G40H A0AT6 TS 10230D, CTG 300/4/80 A0ET6 TS 10230Y, ZUG CP150G 4/6AD 265 PABB10230Y5, ZUG V080C 4/4AW 198 PABB10230Y5, ZUG OC065B 1.8/2BD 96 PABB10230Y6

They are representative of all models.

Testing location: (CBTL, SPTL, CTF, Subcontractor)

INTERTEK ITALIA

Via Principe di Udine, 114
33030 Campoformido (UD) - Italy

Summary of compliance with National Differences

- IECEE Member countries that are also CENELEC members
Compliance with Group Differences evaluated ☐ **yes** ☐ **No** ☒ N/A
- IECEE Member countries with published National Differences which were evaluated:
Australia, New Zealand, Argentina, Saudi Arabia, United Arab Emirates
- IECEE Member countries that did not publish any National Differences:
South Africa, Israel

To support compliance with published National Differences, attach a compilation of relevant ND and/or GD TRFs to the CB Test Report

Use of uncertainty of measurement for decisions on conformity (decision rule):

☒ No decision rule is specified by the IEC standard, when comparing the measurement result with the applicable limit according to the specification in that standard. The decisions on conformity are made without applying the measurement uncertainty ("simple acceptance" decision rule, previously known as "accuracy method").

☐ Other: ... (to be specified, for example when required by the standard or client, or if national accreditation requirements apply)

Information on uncertainty of measurement:

The uncertainties of measurement are calculated by the laboratory based on application of criteria given by OD-5014 for test equipment and application of test methods, decision sheets and operational procedures of IECEE.

IEC Guide 115 provides guidance on the application of measurement uncertainty principles and applying the decision rule when reporting test results within IECEE scheme, noting that the reporting of the measurement uncertainty for measurements is not necessary unless required by the test standard or customer.

Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

Copy of marking plate:

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

ZENIT

 Zenit Italia s.r.l. Via dell'Industria, 11 I-41018 S. Cesario s.P. - MO		zenit.com Made in Italy	☐
TYPE _____		S.N. _____	
VERS _____		YW _____ Kg _____	
V_{Δ} _____ V_Y _____ 3~ _____ Hz		P_2 _____ kW I.CL. H _____	
A_{Δ} _____ A_Y _____ $\cos \varphi$ _____ rpm _____		Class I	
H_{max} _____ m H_{min} _____ m $T_{amb\ max}$ = _____ °C			
Q_{min} _____ l/s Q_{max} _____ l/s IP68			
ROTATION ☐ Side view ☐ Top view		IEC/EN60034-1  	

GREY

 Zenit Italia s.r.l. Via dell'Industria, 11 I-41018 S. Cesario s.P. - MO		zenit.com Made in Italy	☐
TYPE _____		S.N. _____	
VERS _____		YW _____ Kg _____	
V_{Δ} _____ V_Y _____ 3~ _____ Hz		P_2 _____ kW I.CL. H _____	
A_{Δ} _____ A_Y _____ $\cos \varphi$ _____ rpm _____		Class I	
H_{max} _____ m H_{min} _____ m $0^{\circ} \leq T_{amb} \leq$ _____ °C		η_{mot} _____ %	
Q_{min} _____ l/s Q_{max} _____ l/s IP68			
$\emptyset$ imp. _____		S1 Continuous IEC/EN 60034-1	
ROTATION ☐ Side view ☐ Top view		 	

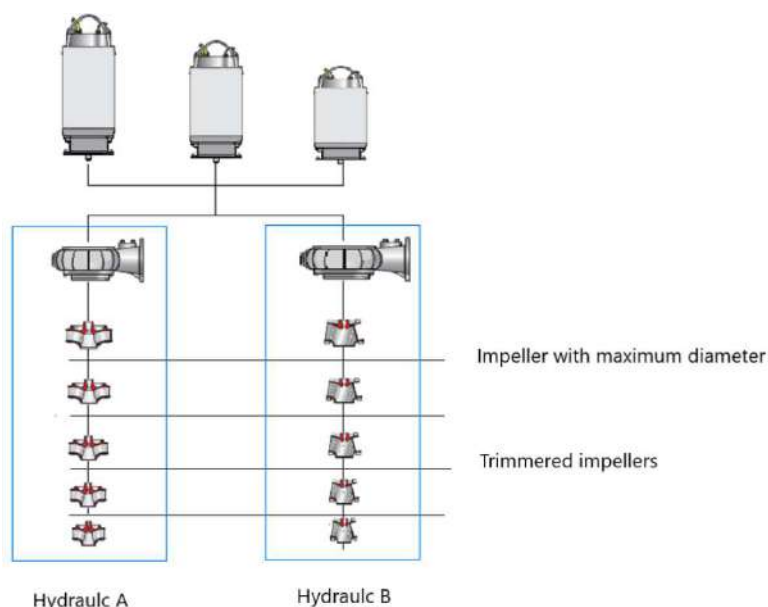
UNIQA

Test item particulars:

Supply connection	: Cord connected and permanently
Nature of supply	: a.c.
Class of protection against electric shock	: I
Degree of protection against moisture.....	: IPX8
Type of cord attachment	: Y and permanently connected
Portable appliances	: ☐
Fixed appliances.....	: ☒
Built-in appliances	: ☐
Indoor use	: ☐
Outdoor use.....	: ☒
Submersible pumps.....	: ☒
Maximum operating depth.....	: 2m to 20m
Vertical wet pit pumps	: ☐
Sludge pumps.....	: ☐
Pumps for cleaning and other maintenance of swimming pools	: ☐
Pumps for outdoor fountains, garden ponds and similar places	: ☐
Shower-boost pumps.....	: ☐
Table fountain pumps.....	: ☐
Switch.....	: ☐
Thermostat.....	: ☐
without an OFF position	: ☐
Self-resetting thermal cut-out.....	: ☒
Non-self-resetting thermal cut-out.....	: ☐
Voltage-maintained non-self-resetting thermal cut-out	: ☐
Contact opening > 3 mm in each pole	: ☐
Thermal link	: ☐
Electronic circuit.....	: ☐
with software class	: No
Protective electronic circuit	: ☐
with software class	: No
Programmer, timer, switching devices.....	: ☐
Remote operation	: ☐
Appliances - with supply cord	: ☒
- with supply cord fitted with a plug.....	: ☐
Motor with capacitor in auxiliary winding	: ☐
Series motors incorporated	: ☐
Three-phase motor	: ☒
with protective device	: ☒
Used in vehicles or on board ships or aircraft, additional requirements may be necessary.....	: ☐
Additional requirements are specified by the national health authorities	: ☐
the national authorities responsible for the protection of labour.....	: ☐
the national water supply authorities	: ☐
similar authorities.	: ☐
.....	: ☐
.....	: ☐

Classification of installation and use: Class I submersible wastewater pumps	
Supply Connection: Supply cord without plug, Type Y	
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: March 02, 2026	
Date (s) of performance of tests: 16 – 25 March, 2026	
General remarks:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. Throughout this report a ☐ comma / ☒ point is used as the decimal separator.	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60335-2-41:	
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 the General product information section.	
Name and address of factory (ies) : ZENIT ITALIA SRL Via dell'Industria, 11 41018 San Cesario sul Panaro (MO) – ITALY Zenit Pumps (China) Co.,Ltd 49 Pingsheng Road, Suzhou, Jiangsu Province, P.R.China	
General product information and other remarks: All appliances are submersible wastewater pumps intended for use in residential, industrial, and municipal sewage treatment plants and lifting stations. They are designed to lift and pump slurries, faecal material, clean water, wastewater, or water soiled with solid or fibrous materials. Pumps are provided in 2 series, GREY and UNIQA series. All pumps have similar shape and design. Only difference is size of motor, model, voltage, current, and size and type of impeller.	

Design and construction of GREY and UNIQA series submersible pumps is based on a modularity principle which permits to assemble on the same electric motor (drive unit) different hydraulic model (pump body and impeller with different morphology), according with the maximum mechanical power required on the shaft by the hydraulic assembly and to realize the performance defined by the Q-H curve of the pump (Q=Flow, H=Head).



UNIQA and GREY pumps are “fixed appliance” intended to be used while fastened to a support or while secured in a specific location. They are not intended to be held in the hand during normal use.

GREY and UNIQA submersible pumps are classified depending on the hydraulic model (defined for morphology and related field of application).

Explanation for *: Letter used in model name marks version of the pump

Hydraulic models			Application
Grey series	UNIQA series	Type of impeller	
APG	ZUG HP	High manometric head, multi-channel open impeller	Clean, rain and seepage water. Suitable for applications in industrial applications and car-washes, clean water in fountains and water features, irrigation and fish farming.
DGG	ZUG V	Set-back Vortex impeller	Soiled biological liquids and non-strained wastewater. Suitable for civil pumping stations and lifting wastewaters in livestock farms and industrial plants.
DRG	ZUG OC	Channel impeller	Liquids containing suspended solids. Suitable for sewage and drainage systems, recirculation of industrial and process waters, civil lifting, drainage and lifting of water from first rainfall tanks.
GRG	ZUG GR	Multi-channel open impeller and grinding system with rotary knife	Soiled liquids containing fibres and filaments. Suitable for professional and heavy-duty applications.
CTG	ZUG CP	Channels impeller and cutting system	Liquids containing solid parts and fibres. Suitable for sewage, lifting of not strained black water

The motors are squirrel cage induction motors (asynchronous type), three phases, frequency 50Hz or 60Hz and supply voltage 230V and/or 400V, protection degree IP68 up to 20m of maximum submergence depth, operating temperature: 0°C ÷ +40°C, class H insulation.

GREY and UNIQA series use the same type of motor enclosure. UNIQA motors are designed with an efficiency higher than GREY motors.

The range use n. 9 similar motor enclosure made of cast iron. The enclosures are identified with the letter G or M followed by a number depending on the diameter of the stator case and a letter depending on the height of the stator case.

The models use the same motor cover design, which accommodates the cable entry hardware. The power cable and the lift hoist assembly is an integral part of the submersible pump.

UNIQA models are available in two versions:

- W = WET version, suitable to operate in continuous duty service S1 only when it is completely submerged;
- D = DRY version, suitable to operate in continuous duty service S1, with the pump motor completely submerged or partially submerged or in dry chamber. Motor enclosure type M10S in DRY version are equipped with a cooling jacket system.

GREY models are suitable to operate:

- in continuous duty service S1 when completely submerged;
- in intermittent periodic service S3, in accordance with the S3% value marked on the nameplate, (see the ratings chart) with the pump body either partially submerged or completely filled with the pumped liquid (installation in dry chamber).

Liquid PH: 6-14

The following table shows the list of GREY and UNIQA motors grouped by type of enclosure and identified by power, poles and, dimensions of the magnetic core.

Motor enclosure	Rated power P2 (power on the shaft)	Poles	Electric motor (motor description according to the pump series)		Magnetic core (diameter x height)
	(kW)		(N°)	GREY Series	UNIQA Series
G05L	1.1	2	_ 150/2_AT_		110x110
	1.5		_ 200/2_AT_ (*)		110x130
	1.8		_ 250/2_AT_ (*)		
	1.1	4	_ 150/4_AT_		110x130
G06S	2.2	2	_ 300/2_ET_		135x100
	1.5	4	_ 200/4_ET_		135x100
G06L	1.8	2		_ 1,8/2BW_	135x130
				_ 1,8/2BD_	
	2.2			_ 2,2/2BW_	135x130
	3			_ 3/2BW_	135x150
			_ 400/2_ET_		135x120
	1.1	4		_ 1,1/4BW_	135x130
	1.5		_	_ 1,5/4BW_	135x150
	1.8		_ 250/4_ET_		135x130
	2.2		_ 300/4_ET_		135x130
	3		_ 400/4_ET_		135x150

	1.1	6		_1,1/6BW_	135x155
G07S	4	2		_4/2BW_	150x160
			_ 550/2_FT_		150x135
	1.8	4		_1,8/4BW_ (**)	150x160
	2.2			_2,2/4BW_ (**)	
	1.5	6		_1,5/6BW_	150x155
G07L	3	4		_3/4BW_	150x220
	4		_ 550/4_FT_		150x220
	1.8	6		_1,8/6BW_	150x180
M08S	4	2		_4/2AW_	173x110
	3	4		_3/4AW_	173x130
M08L	4	2		_4/2AD_	173x190
	4	4		_4/4AW_	173x210
	3	6		_3/6AW_	173x230
	4	6	_ 550/6_GT_		173x185
M10S	4	6		_4/6AW_	200x220
M10S DRY (with cooling jacket)	4	4		_4/4AD_	200x140
	4	6		_4/6AD_	200x220

Note:

(*) the motor _200/2_AT_ is constructionally identical to the motor _250/2_AT_;

(**) the motor _1,8/4BW_ is constructionally identical to the motor _2,2/4BW_

MODEL LIST

GREY SERIES – 50Hz

DGG - 50Hz
DGG 150/4/65 H0AT5
DGG 150/4/80 L0AT5
DGG 200/4/65 F0ET5
DGG 200/4/80 F0ET5
DGG 200/4/100 E0ET5
DGG 250/2/65 B0AT5
DGG 250/2/80 F0AT5
DGG 250/2/G65V B0AT5
DGG 250/4/65 F0ET5
DGG 250/4/80 E0ET5
DGG 250/4/100 E0ET5
DGG 300/2/65 C0ET5
DGG 300/2/80 G0ET5
DGG 300/2/G65V A0ET5
DGG 300/4/65 F0ET5
DGG 300/4/80 E0ET5
DGG 300/4/100 E0ET5
DGG 400/2/65 D0ET5
DGG 400/2/80 H0ET5
DGG 400/4/65 G0ET5
DGG 400/4/80 M0ET5
DGG 400/4/100 D0ET5
DGG 550/2/65 A0FT5
DGG 550/2/80 N0FT5
DGG 550/4/80 D0FT5
DGG 550/4/100 G0FT5

DRG - 50Hz
DRG 150/2/65 B0AT5
DRG 150/2/80 L0AT5
DRG 200/2/65 B0AT5
DRG 200/2/80 L0AT5
DRG 200/4/80 M0ET5
DRG 200/4/100 T0ET5
DRG 250/2/65 B0AT5
DRG 250/2/80 L0AT5
DRG 250/2/G65V B0AT5
DRG 300/2/65 A0ET5
DRG 300/2/80 E0ET5
DRG 300/2/G65V A0ET5
DRG 300/4/80 G0ET5
DRG 300/4/100 U0ET5
DRG 300/4/100 X0ET5
DRG 400/2/65 A0ET5
DRG 400/2/80 E0ET5
DRG 400/2/G65V A0ET5
DRG 400/4/80 H0ET5
DRG 400/4/100 U0ET5
DRG 400/4/100 Y0ET5
DRG 400/4/150 K0ET5
DRG 550/2/65 C0FT5
DRG 550/2/80 B0FT5
DRG 550/2/80 P0FT5

DRG - 50Hz
DRG 550/4/80 D0FT5
DRG 550/4/100 R0FT5
DRG 550/4/150 N0FT5
DRG 550/6/150 F0GT5

APG- 50Hz
APG 250/2/G40H A0AT5
APG 300/2/G50H C0ET5
APG 400/2/G50H D0ET5
APG 550/2/G50H D0FT5

GRG - 50Hz
GRG 250/2/G40H A0AT5
GRG 300/2/G50H C0ET5
GRG 300/2/G50H G0ET5
GRG 400/2/G50H D0ET5
GRG 550/2/G50H D0FT5

CTG - 50Hz
CTG 300/4/80 A0ET5
CTG 550/4/80 A0FT5

GREY SERIES – 60Hz

DGG - 60Hz
DGG 300/2/65 B0ET6
DGG 300/2/80 F0ET6
DGG 300/2/G65V A0ET6
DGG 400/2/65 B0ET6
DGG 400/2/80 F0ET6
DGG 400/4/65 F0ET6
DGG 400/4/80 E0ET6
DGG 400/4/100 E0ET6
DGG 550/2/80 H0FT6

DRG - 60Hz
DRG 300/2/65 A0ET6
DRG 300/2/65 B0ET6
DRG 300/2/80 E0ET6
DRG 300/2/G65V B0ET6
DRG 400/2/65 B0ET6
DRG 400/2/80 L0ET6
DRG 400/2/G65V B0ET6
DRG 400/4/80 N0ET6
DRG 550/2/65 A0FT6
DRG 550/2/80 E0FT6

GRG - 60Hz
GRG 250/2/G40H A0AT6
GRG 300/2/G50H C0ET6
GRG 400/2/G50H C0ET6
GRG 550/2/G50H C0FT6

CTG - 60Hz
CTG 300/4/80 A0ET6
CTG 550/4/80 A0FT6

DRG - 60Hz
DRG 250/2/65 B0AT6
DRG 250/2/80 L0AT6
DRG 250/2/G65V B0AT6

APG- 60Hz
APG 400/2/G50H C0ET6
APG 550/2/G50H C0FT6

UNIQA SERIES - 50Hz

ZUG V - 50Hz

ZUG V065A 4/2 AD
ZUG V065A 4/2 AW
ZUG V065A 4/2 BW
ZUG V080A 4/2 AD
ZUG V080A 4/2 AW
ZUG V080C 3/4 AW
ZUG V080C 4/4 AD
ZUG V080C 4/4 AW
ZUG V080D 4/4 AD
ZUG V080D 4/4 AW
ZUG V080H 3/2 BW
ZUG V100B 3/4 AW
ZUG V100B 4/4 AD
ZUG V100B 4/4 AW
ZUG V100G 1.1/6 BW
ZUG V100G 1.5/6 BW
ZUG V150C 1.5/6 BW
ZUG V150C 1.8/6 BW

ZUG OC - 50Hz

ZUG OC065A 1.8/2 BD
ZUG OC065A 1.8/2 BW
ZUG OC065A 2.2/2 BW
ZUG OC065A 3/2 BW
ZUG OC065B 1.8/2 BD
ZUG OC065B 1.8/2 BW
ZUG OC065B 2.2/2 BW
ZUG OC065C 3/2 BW
ZUG OC065C 4/2 BW
ZUG OC080A 1.1/4 BW
ZUG OC080A 1.5/4 BW
ZUG OC080A 4/2 BW

ZUG OC - 50Hz

ZUG OC080B 4/2 BW
ZUG OC080D 4/4 AD
ZUG OC080D 4/4 AW
ZUG OC080E 1.8/2 BD
ZUG OC080E 1.8/2 BW
ZUG OC080E 2.2/2 BW
ZUG OC080E 3/2 BW
ZUG OC080G 3/4 AW
ZUG OC080H 1.1/6 BW
ZUG OC080H 3/4 AW
ZUG OC080H 4/4 AW
ZUG OC080N 1.1/6 BW
ZUG OC080Z 4/4 AW
ZUG OC080Z 4/4 AD
ZUG OC080Z 3/4 AW
ZUG OC100E 4/4 AD
ZUG OC100E 4/4 AW
ZUG OC100F 3/4 AW
ZUG OC100F 4/4 AD
ZUG OC100F 4/4 AW
ZUG OC100J 3/4 AW
ZUG OC100J 4/4 AD
ZUG OC100J 4/4 AW
ZUG OC100K 1.1/4 BW
ZUG OC100K 1.5/4 BW
ZUG OC100K 4/2 BW
ZUG OC100L 4/4 AD
ZUG OC100L 4/4 AW
ZUG OC100U 1.1/6 BW
ZUG OC100Y 1.1/6 BW
ZUG OC101G 1.5/6 BW
ZUG OC101G 1.8/6 BW

ZUG OC - 50Hz

ZUG OC150D 3/4 AW
ZUG OC150D 3/6 AW
ZUG OC150D 4/4 AD
ZUG OC150D 4/4 AW
ZUG OC150G 4/6 AD
ZUG OC150G 4/6 AW
ZUG OC150N 4/4 AD
ZUG OC150N 4/4 AW
ZUG OC150R 1.5/6 BW
ZUG OC150R 1.8/6 BW

ZUG HP - 50Hz

ZUG HP050A 4/2 AD
ZUG HP050A 4/2 AW
ZUG HP050A 4/2 BW

ZUG GR - 50Hz

ZUG GR050A 4/2 AD
ZUG GR050A 4/2 AW
ZUG GR050A 4/2 BW

ZUG CP - 50Hz

ZUG CP080A 1.1/4 BW
ZUG CP080A 1.5/4 BW
ZUG CP080A 4/2 BW
ZUG CP100F 3/4 AW
ZUG CP100F 4/4 AD
ZUG CP100F 4/4 AW
ZUG CP150G 4/6 AD
ZUG CP150G 4/6 AW

UNIQA SERIES – 60Hz

ZUG V - 60Hz

ZUG V065A 4/2 AD
ZUG V065A 4/2 AW
ZUG V080C 3/4 AW
ZUG V080C 4/4 AD
ZUG V080C 4/4 AW
ZUG V100B 4/4 AD
ZUG V100B 4/4 AW

ZUG OC - 60Hz

ZUG OC065A 2.2/2 BW
ZUG OC065A 3/2 BW
ZUG OC065B 1.8/2 BD
ZUG OC065B 1.8/2 BW
ZUG OC065B 2.2/2 BW

ZUG OC - 60Hz

ZUG OC080G 3/4 AW
ZUG OC080G 4/4 AW
ZUG OC080H 4/4 AW
ZUG OC080Z 4/4 AW
ZUG OC080Z 4/4 AD
ZUG OC100F 4/4 AD
ZUG OC100F 4/4 AW
ZUG OC100J 3/4 AW
ZUG OC100J 4/4 AD
ZUG OC100J 4/4 AW
ZUG OC100K 1.1/4 BW
ZUG OC100K 1.5/4 BW
ZUG OC100K 2.2/4 BW

ZUG HP - 60Hz

ZUG HP050A 4/2 AD
ZUG HP050A 4/2 AW
ZUG HP050A 4/2 BW

ZUG GR - 60Hz

ZUG GR050A 4/2 AD
ZUG GR050A 4/2 AW
ZUG GR050A 4/2 BW

ZUG CP - 60Hz

ZUG CP080A 1.1/4 BW
ZUG CP080A 1.5/4 BW
ZUG CP080A 1.8/4 BW
ZUG CP080A 2.2/4 BW
ZUG CP080A 3/4 BW

MODEL NUMBER BREAKDOWN

The pump can be identified by the “type” and the “version” designations stated on the pump dataplate

Model number breakdown GREY Series

TYPE: a b / c d e f g h

VERSION: i j k l m n o

TYPE

*a = Type of Impeller (APG =High Head; DGG = Vortex; DRG = Open Channel; GRG= Grinder; CTG= Channel with cutting system)

b = Power in HPx100 / motor poles

*c = Discharge port diameter

*d = Hydraulic model

*e = Versioning number

f = Motor size code

g = Motor phases (M = single phase; T = three phase)

h = Frequency (5= 50 Hz; 6= 60 Hz)

VERSION

*i = Electrical option

*j = Cable length (m)

k = Rated voltage code

l = Starting mode options (D=Direct On Line, Y= Star/Delta)

*m = Certifications option

*n = Customization option

*o = Impeller material code

**these options are not related to the ratings of the motors*

Model number breakdown UNIQA Series

TYPE: a b c d e f g h

VERSION: i j k l m n o

TYPE

*a = Type of Impeller (ZUG HP=High Head, ZUG V = Vortex; ZUG OC = Open Channel; ZUG GR= Grinder; ZUG CP= Channel with cutting system)

*b = Discharge port diameter in mm

*c = Hydraulic variant

d = Power in kW / motor poles

e = Motor Variant (options A and B based on type of enclosure and calculation of power losses)

f = Operating mode (D = Dry; W = Wet)

*g = Nominal diameter of impeller (in mm)

*h = Type of installation and flanges drilling

VERSION

*i= Electrical option

*j = Cable length (m)

*k = Rated voltage code

l = Starting mode options (D=Direct On Line, Y= Star/Delta)

m = Frequency (5=50Hz, 6=60Hz)

*n = Certifications option;

*o = Customization option

**these options are not related to the ratings of the motors*

RATING CHARTS

GREY SERIES - 230 and/or 400 V @ 50 Hz						
Hydraulic model	Description	P2 (kW)	Poles	I (A) @400V	I (A) @230V	S3%
APG	APG 250/2/G40H A0AT5	1.8	2	3.7	6.4	20%
APG	APG 300/2/G50H C0ET5	2.2	2	4.6	8.0	20%
APG	APG 400/2/G50H D0ET5	3	2	6.4	11.0	20%
APG	APG 550/2/G50H D0FT5	4	2	7.7	13.4	20%
DGG	DGG 150/4/65 H0AT5	1.1	4	3.0	5.3	15%
DGG	DGG 150/4/80 L0AT5	1.1	4	3.0	5.3	15%
DGG	DGG 200/4/65 F0ET5	1.5	4	3.4	5.9	15%
DGG	DGG 200/4/80 F0ET5	1.5	4	3.4	5.9	15%
DGG	DGG 200/4/100 E0ET5	1.5	4	3.4	5.9	15%
DGG	DGG 250/2/65 B0AT5	1.8	2	3.7	6.4	20%
DGG	DGG 250/2/80 F0AT5	1.8	2	3.7	6.4	20%
DGG	DGG 250/2/G65V B0AT5	1.8	2	3.7	6.4	20%
DGG	DGG 250/4/65 F0ET5	1.8	4	4.3	7.5	20%
DGG	DGG 250/4/80 E0ET5	1.8	4	4.3	7.5	20%
DGG	DGG 250/4/100 E0ET5	1.8	4	4.3	7.5	20%
DGG	DGG 300/2/65 C0ET5	2.2	2	4.6	8.0	20%
DGG	DGG 300/2/80 G0ET5	2.2	2	4.6	8.0	20%
DGG	DGG 300/2/G65V A0ET5	2.2	2	4.6	8.0	20%
DGG	DGG 300/4/65 F0ET5	2.2	4	5.2	9.0	20%
DGG	DGG 300/4/80 E0ET5	2.2	4	5.2	9.0	20%
DGG	DGG 300/4/100 E0ET5	2.2	4	5.2	9.0	20%
DGG	DGG 400/2/65 D0ET5	3	2	6.4	11.0	20%

DGG	DGG 400/2/80 H0ET5	3	2	6.4	11.0	20%
DGG	DGG 400/4/65 G0ET5	3	4	6.7	11.7	15%
DGG	DGG 400/4/80 M0ET5	3	4	6.7	11.7	15%
DGG	DGG 400/4/100 D0ET5	3	4	6.7	11.7	15%
DGG	DGG 550/2/65 A0FT5	4	2	7.7	13.4	20%
DGG	DGG 550/2/80 N0FT5	4	2	7.7	13.4	20%
DGG	DGG 550/4/80 D0FT5	4	4	8.4	14.6	15%
DGG	DGG 550/4/100 G0FT5	4	4	8.4	14.6	15%
DRG	DRG 150/2/65 B0AT5	1.1	2	2.4	4.2	30%
DRG	DRG 150/2/80 L0AT5	1.1	2	2.4	4.2	30%
DRG	DRG 200/2/65 B0AT5	1.5	2	3.3	5.7	30%
DRG	DRG 200/2/80 L0AT5	1.5	2	3.3	5.7	30%
DRG	DRG 200/4/80 M0ET5	1.5	4	3.4	5.9	15%
DRG	DRG 200/4/100 T0ET5	1.5	4	3.4	5.9	15%
DRG	DRG 250/2/65 B0AT5	1.8	2	3.7	6.4	20%
DRG	DRG 250/2/80 L0AT5	1.8	2	3.7	6.4	20%
DRG	DRG 250/2/G65V B0AT5	1.8	2	3.7	6.4	20%
DRG	DRG 300/2/65 A0ET5	2.2	2	4.6	8.0	20%
DRG	DRG 300/2/80 E0ET5	2.2	2	4.6	8.0	20%
DRG	DRG 300/2/G65V A0ET5	2.2	2	4.6	8.0	20%
DRG	DRG 300/4/80 G0ET5	2.2	4	5.2	9.0	20%
DRG	DRG 300/4/100 U0ET5	2.2	4	5.2	9.0	20%
DRG	DRG 300/4/100 X0ET5	2.2	4	5.2	9.0	20%
DRG	DRG 400/2/65 A0ET5	3	2	6.4	11.0	20%
DRG	DRG 400/2/80 E0ET5	3	2	6.4	11.0	20%
DRG	DRG 400/2/G65V A0ET5	3	2	6.4	11.0	20%
DRG	DRG 400/4/80 H0ET5	3	4	6.7	11.7	15%
DRG	DRG 400/4/100 U0ET5	3	4	6.7	11.7	15%
DRG	DRG 400/4/100 Y0ET5	3	4	6.7	11.7	15%
DRG	DRG 400/4/150 K0ET5	3	4	6.7	11.7	15%
DRG	DRG 550/2/65 C0FT5	4	2	7.7	13.4	20%
DRG	DRG 550/2/80 B0FT5	4	2	7.7	13.4	20%
DRG	DRG 550/2/80 P0FT5	4	2	7.7	13.4	20%
DRG	DRG 550/4/80 D0FT5	4	4	8.4	14.6	15%
DRG	DRG 550/4/100 R0FT5	4	4	8.4	14.6	15%
DRG	DRG 550/4/150 N0FT5	4	4	8.4	14.6	15%
DRG	DRG 550/6/150 F0GT5	4	6	9.3	16.2	20%
GRG	GRG 250/2/G40H A0AT5	1.8	2	3.7	6.4	20%
GRG	GRG 300/2/G50H C0ET5	2.2	2	4.6	8.0	20%
GRG	GRG 300/2/G50H G0ET5	2.2	2	4.6	8.0	20%
GRG	GRG 400/2/G50H D0ET5	3	2	6.4	11.0	20%
GRG	GRG 550/2/G50H D0FT5	4	2	7.7	13.4	20%
CTG	CTG 300/4/80 A0ET5	2.2	4	5.2	9.0	20%
CTG	CTG 550/4/80 A0FT5	4	4	8.4	14.6	15%

GREY SERIES - 230 and/or 400 V @ 60 Hz						
Hydraulic Model	Description	P2 (kW)	Poles	I (A) @400V	I (A) @230V	S3%
APG	APG 400/2/G50H C0ET6	3	2	6.4	11.1	20%
APG	APG 550/2/G50H C0FT6	4	2	7.7	13.4	20%
DGG	DGG 300/2/65 B0ET6	2.2	2	4.7	8.1	20%
DGG	DGG 300/2/80 F0ET6	2.2	2	4.7	8.1	20%
DGG	DGG 300/2/G65V A0ET6	2.2	2	4.7	8.1	20%
DGG	DGG 400/2/65 B0ET6	3	2	6.4	11.1	20%
DGG	DGG 400/2/80 F0ET6	3	2	6.4	11.1	20%
DGG	DGG 400/4/65 F0ET6	3	4	6.8	11.7	15%
DGG	DGG 400/4/80 E0ET6	3	4	6.8	11.7	15%
DGG	DGG 400/4/100 E0ET6	3	4	6.8	11.7	15%
DGG	DGG 550/2/80 H0FT6	4	2	7.7	13.4	20%
DRG	DRG 250/2/65 B0AT6	1.8	2	3.7	6.5	20%
DRG	DRG 250/2/80 L0AT6	1.8	2	3.7	6.5	20%
DRG	DRG 250/2/G65V B0AT6	1.8	2	3.7	6.5	20%
DRG	DRG 300/2/65 A0ET6	2.2	2	4.7	8.1	20%
DRG	DRG 300/2/65 B0ET6	2.2	2	4.7	8.1	20%
DRG	DRG 300/2/80 E0ET6	2.2	2	4.7	8.1	20%
DRG	DRG 300/2/G65V B0ET6	2.2	2	4.7	8.1	20%
DRG	DRG 400/2/65 B0ET6	3	2	6.4	11.1	20%
DRG	DRG 400/2/80 L0ET6	3	2	6.4	11.1	20%
DRG	DRG 400/2/G65V B0ET6	3	2	6.4	11.1	20%
DRG	DRG 400/4/80 N0ET6	3	4	6.8	11.7	15%
DRG	DRG 550/2/65 A0FT6	4	2	7.7	13.4	20%
DRG	DRG 550/2/80 E0FT6	4	2	7.7	13.4	20%
GRG	GRG 250/2/G40H A0AT6	1.8	2	3.7	6.5	20%
GRG	GRG 300/2/G50H C0ET6	2.2	2	4.7	8.1	20%
GRG	GRG 400/2/G50H C0ET6	3	2	6.4	11.1	20%
GRG	GRG 550/2/G50H C0FT6	4	2	7.7	13.4	20%
CTG	CTG 300/4/80 A0ET6	2.2	4	5.2	9.1	20%
CTG	CTG 550/4/80 A0FT6	4	4	8.5	14.8	15%

UNIQA SERIES - 230 and/or 400 V @ 50 Hz					
Hydraulic model	Description	P2 (kW)	Poles	I (A) @400V	I (A) @230V
ZUG HP	ZUG HP050A 4/2 AD	4	2	9.5	16.5
ZUG HP	ZUG HP050A 4/2 AW	4	2	7.7	13.3
ZUG HP	ZUG HP050A 4/2 BW	4	2	8.3	14.4
ZUG V	ZUG V065A 4/2 AD	4	2	9.5	16.5
ZUG V	ZUG V065A 4/2 AW	4	2	7.7	13.3
ZUG V	ZUG V065A 4/2 BW	4	2	8.3	14.4
ZUG V	ZUG V080A 4/2 AD	4	2	9.5	16.5
ZUG V	ZUG V080A 4/2 AW	4	2	7.7	13.3
ZUG V	ZUG V080C 3/4 AW	3	4	6.6	11.5
ZUG V	ZUG V080C 4/4 AD	4	4	8.5	14.7
ZUG V	ZUG V080C 4/4 AW	4	4	8.5	14.7
ZUG V	ZUG V080D 4/4 AD	4	4	8.5	14.7
ZUG V	ZUG V080D 4/4 AW	4	4	8.5	14.7
ZUG V	ZUG V080H 3/2 BW	3	2	6.0	10.4
ZUG V	ZUG V100B 3/4 AW	3	4	6.6	11.5
ZUG V	ZUG V100B 4/4 AD	4	4	8.5	14.7
ZUG V	ZUG V100B 4/4 AW	4	4	8.5	14.7

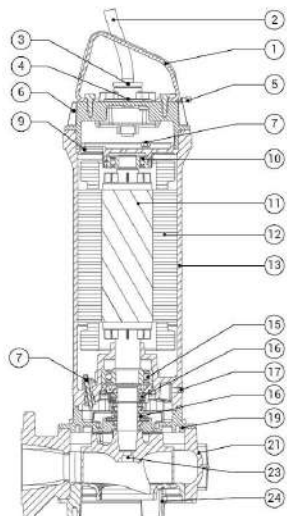
ZUG V	ZUG V100G 1.1/6 BW	1.1	6	2.9	5.0
ZUG V	ZUG V100G 1.5/6 BW	1.5	6	3.7	6.5
ZUG V	ZUG V150C 1.5/6 BW	1.5	6	3.7	6.5
ZUG V	ZUG V150C 1.8/6 BW	1.8	6	4.3	7.5
ZUG OC	ZUG OC065A 1.8/2 BD	1.8	2	3.8	6.6
ZUG OC	ZUG OC065A 1.8/2 BW	1.8	2	3.8	6.6
ZUG OC	ZUG OC065A 2.2/2 BW	2.2	2	4.4	7.6
ZUG OC	ZUG OC065A 3/2 BW	3	2	6.0	10.4
ZUG OC	ZUG OC065B 1.8/2 BD	1.8	2	3.8	6.6
ZUG OC	ZUG OC065B 1.8/2 BW	1.8	2	3.8	6.6
ZUG OC	ZUG OC065B 2.2/2 BW	2.2	2	4.4	7.6
ZUG OC	ZUG OC065C 3/2 BW	3	2	6.0	10.4
ZUG OC	ZUG OC065C 4/2 BW	4	2	8.3	14.4
ZUG OC	ZUG OC080A 1.1/4 BW	1.1	4	2.7	4.6
ZUG OC	ZUG OC080A 1.5/4 BW	1.5	4	3.6	6.3
ZUG OC	ZUG OC080A 4/2 BW	4	2	8.3	14.4
ZUG OC	ZUG OC080B 4/2 BW	4	2	8.3	14.4
ZUG OC	ZUG OC080D 4/4 AD	4	4	8.5	14.7
ZUG OC	ZUG OC080D 4/4 AW	4	4	8.5	14.7
ZUG OC	ZUG OC080E 1.8/2 BD	1.8	2	3.8	6.6
ZUG OC	ZUG OC080E 1.8/2 BW	1.8	2	3.8	6.6
ZUG OC	ZUG OC080E 2.2/2 BW	2.2	2	4.4	7.6
ZUG OC	ZUG OC080E 3/2 BW	3	2	6.0	10.4
ZUG OC	ZUG OC080G 3/4 AW	3	4	6.6	11.5
ZUG OC	ZUG OC080H 1.1/6 BW	1.1	6	2.9	5.0
ZUG OC	ZUG OC080H 3/4 AW	3	4	6.6	11.5
ZUG OC	ZUG OC080H 4/4 AW	4	4	8.5	14.7
ZUG OC	ZUG OC080N 1.1/6 BW	1.1	6	2.9	5.0
ZUG OC	ZUG OC080Z 4/4 AW	4	4	8.5	14.7
ZUG OC	ZUG OC080Z 4/4 AD	4	4	8.5	14.7
ZUG OC	ZUG OC080Z 3/4 AW	3	4	6.6	11.5
ZUG OC	ZUG OC100E 4/4 AD	4	4	8.5	14.7
ZUG OC	ZUG OC100E 4/4 AW	4	4	8.5	14.7
ZUG OC	ZUG OC100F 3/4 AW	3	4	6.6	11.5
ZUG OC	ZUG OC100F 4/4 AD	4	4	8.5	14.7
ZUG OC	ZUG OC100F 4/4 AW	4	4	8.5	14.7
ZUG OC	ZUG OC100J 3/4 AW	3	4	6.6	11.5
ZUG OC	ZUG OC100J 4/4 AD	4	4	8.5	14.7
ZUG OC	ZUG OC100J 4/4 AW	4	4	8.5	14.7
ZUG OC	ZUG OC100K 1.1/4 BW	1.1	4	2.7	4.6
ZUG OC	ZUG OC100K 1.5/4 BW	1.5	4	3.6	6.3
ZUG OC	ZUG OC100K 4/2 BW	4	2	8.3	14.4
ZUG OC	ZUG OC100L 4/4 AD	4	4	8.5	14.7
ZUG OC	ZUG OC100L 4/4 AW	4	4	8.5	14.7
ZUG OC	ZUG OC100U 1.1/6 BW	1.1	6	2.9	5.0
ZUG OC	ZUG OC100Y 1.1/6 BW	1.1	6	2.9	5.0
ZUG OC	ZUG OC101G 1.5/6 BW	1.5	6	3.7	6.5
ZUG OC	ZUG OC101G 1.8/6 BW	1.8	6	4.3	7.5
ZUG OC	ZUG OC150D 3/4 AW	3	4	6.6	11.5
ZUG OC	ZUG OC150D 3/6 AW	3	6	6.8	11.7
ZUG OC	ZUG OC150D 4/4 AD	4	4	8.5	14.7
ZUG OC	ZUG OC150D 4/4 AW	4	4	8.5	14.7
ZUG OC	ZUG OC150G 4/6 AD	4	6	8.9	15.3
ZUG OC	ZUG OC150G 4/6 AW	4	6	8.9	15.3
ZUG OC	ZUG OC150N 4/4 AD	4	4	8.5	14.7

ZUG OC	ZUG OC150N 4/4 AW	4	4	8.5	14.7
ZUG OC	ZUG OC150R 1.5/6 BW	1.5	6	3.7	6.5
ZUG OC	ZUG OC150R 1.8/6 BW	1.8	6	4.3	7.5
ZUG GR	ZUG GR050A 4/2 AD	4	2	9.5	16.5
ZUG GR	ZUG GR050A 4/2 AW	4	2	7.7	13.3
ZUG GR	ZUG GR050A 4/2 BW	4	2	8.3	14.4
ZUG CP	ZUG CP080A 1.1/4 BW	1.1	4	2.7	4.6
ZUG CP	ZUG CP080A 1.5/4 BW	1.5	4	3.6	6.3
ZUG CP	ZUG CP080A 4/2 BW	4	2	8.3	14.4
ZUG CP	ZUG CP100F 3/4 AW	3	4	6.6	11.5
ZUG CP	ZUG CP100F 4/4 AD	4	4	8.5	14.7
ZUG CP	ZUG CP100F 4/4 AW	4	4	8.5	14.7
ZUG CP	ZUG CP150G 4/6 AD	4	6	8.9	15.3
ZUG CP	ZUG CP150G 4/6 AW	4	6	8.9	15.3

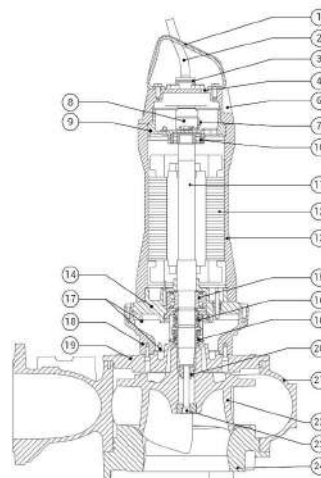
UNIQA SERIES - 230 and/or 400 V @ 60 Hz					
Hydraulic model	Description	P2 (kW)	Poles	I (A) @400V	I (A) @230V
ZUG HP	ZUG HP050A 4/2 AD	4	2	9.6	16.7
ZUG HP	ZUG HP050A 4/2 AW	4	2	7.8	13.5
ZUG HP	ZUG HP050A 4/2 BW	4	2	8.4	14.6
ZUG V	ZUG V065A 4/2 AD	4	2	9.6	16.7
ZUG V	ZUG V065A 4/2 AW	4	2	7.8	13.5
ZUG V	ZUG V080C 3/4 AW	3	4	6.7	11.6
ZUG V	ZUG V080C 4/4 AD	4	4	8.5	14.8
ZUG V	ZUG V080C 4/4 AW	4	4	8.5	14.8
ZUG V	ZUG V100B 4/4 AD	4	4	8.5	14.8
ZUG V	ZUG V100B 4/4 AW	4	4	8.5	14.8
ZUG OC	ZUG OC065A 2.2/2 BW	2.2	2	4.5	7.8
ZUG OC	ZUG OC065A 3/2 BW	3	2	6.1	10.5
ZUG OC	ZUG OC065B 1.8/2 BD	1.8	2	3.9	6.8
ZUG OC	ZUG OC065B 1.8/2 BW	1.8	2	3.9	6.8
ZUG OC	ZUG OC065B 2.2/2 BW	2.2	2	4.5	7.8
ZUG OC	ZUG OC080G 3/4 AW	3	4	6.7	11.6
ZUG OC	ZUG OC080G 4/4 AW	4	4	8.5	14.8
ZUG OC	ZUG OC080H 4/4 AW	4	4	8.5	14.8
ZUG OC	ZUG OC080Z 4/4 AW	4	4	8.5	14.8
ZUG OC	ZUG OC080Z 4/4 AD	4	4	8.5	14.8
ZUG OC	ZUG OC100F 4/4 AW	4	4	8.5	14.8
ZUG OC	ZUG OC100F 4/4 AD	4	4	8.5	14.8
ZUG OC	ZUG OC100J 3/4 AW	3	4	6.7	11.6
ZUG OC	ZUG OC100J 4/4 AD	4	4	8.5	14.8
ZUG OC	ZUG OC100J 4/4 AW	4	4	8.5	14.8
ZUG OC	ZUG OC100K 1.1/4 BW	1.1	4	2.8	4.8
ZUG OC	ZUG OC100K 1.5/4 BW	1.5	4	3.8	6.6
ZUG OC	ZUG OC100K 2.2/4 BW	2.2	4	4.7	8.2
ZUG GR	ZUG GR050A 4/2 AD	4	2	9.6	16.7
ZUG GR	ZUG GR050A 4/2 AW	4	2	7.8	13.5
ZUG GR	ZUG GR050A 4/2 BW	4	2	8.4	14.6
ZUG CP	ZUG CP080A 1.1/4 BW	1.1	4	2.8	4.8
ZUG CP	ZUG CP080A 1.5/4 BW	1.5	4	3.8	6.6
ZUG CP	ZUG CP080A 1.8/4 BW	1.8	4	4.2	7.2
ZUG CP	ZUG CP080A 2.2/4 BW	2.2	4	4.7	8.2
ZUG CP	ZUG CP080A 3/4 BW	3	4	7.2	12.5

COMPONENTS DESCRIPTION

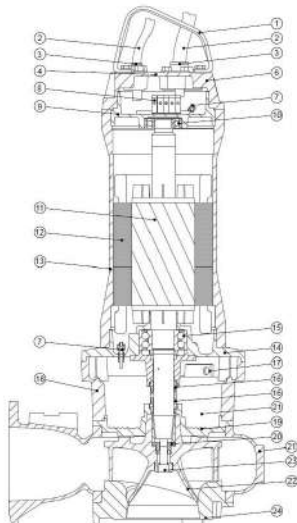
**Motor enclosure type
G05L - G06S/L - G07S/L**



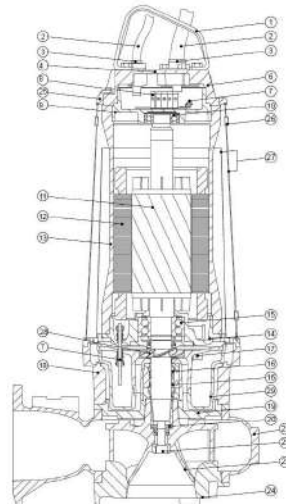
**Motor enclosure type
M08S/L**



**Motor enclosure type
M10S**



**Motor enclosure type
M10S DRY (with cooling jacket)**



1 Handle	11 Shaft with rotor	21 Pump body
2 Cable	12 Wound stator	22 Impeller
3 Cable gland	13 Motor case	23 Impeller fixing screw
4 1/8" NPT blanking element	14 Lower bearing support	24 Suction flange
5 Earth connection (screw)	15 Lower bearing	25 Cooling jacket fixing ring
6 Motor cover	16 Mechanical seal	26 Nut
7 Leakage detector	17 Oil plug	27 Cooling jacket
8 Terminal board	18 Intermediate support	28 Cooling system impeller
9 Upper bearing support	19 Pump plate	29 Oil chamber
10 Upper bearing	20 Bush	

IEC 60335-2-41			
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.		P
5.7	Temperature of liquid maintained between 0°C and –5°C of temperature marked on pump (IEC 60335-2-41)		P
5.8.2	Appliances having more than one rated voltage :	Upper value: 400 V Lower value: 230 V	P
5.8.3	Heating Appliances and combined appliances marked with a rated power input range :	Upper value: ... W Lower value: W	N/A
5.8.4	Appliances with a rated voltage range and with a rated power input corresponding to the mean value of the rated voltage range	Upper calculated input:W Lower calculated input:W	N/A
5.101	Pumps tested as portable appliances, unless (IEC 60335-2-41)		N/A
	they are fixed appliances (IEC 60335-2-41)		P
5.102	Stationary pumps having a three-phase motor that does not incorporate a protective device are installed with an appropriate device, in accordance with instructions (IEC 60335-2-41)	Pumps installed appropriate	P
6	CLASSIFICATION		
6.1	Protection against electric shock: Class 0, 0I, I, II, III :	Class I appliance	P
	Submersible pumps for use in swimming pools when persons in the pool be of class III with a rated voltage < 12 V (IEC 60335-2-41)	No such pump	N/A
	Other submersible pumps for use in water and other conducting liquids are class I or class III. (IEC 60335-2-41)	Class I	P
	Aquarium pumps are class II. (IEC 60335-2-41)	No aquarium pumps	N/A
	Table fountain pumps for indoor use are class II as long as their rated power input ≤ 25 W. (IEC 60335-2-41)	No table fountain pumps	N/A
	Portable pumps for cleaning and other maintenance of swimming pools are class I or class III. (IEC 60335-2-41)	No portable pumps for cleaning and other maintenance of swimming pools	N/A
	Other pumps are class I, class II or class III. (IEC 60335-2-41)	Class I	P
6.2	Protection against harmful ingress of water.	IP68	P
	Submersible pumps are IPX8. (IEC 60335-2-41)	IPX8	P

IEC 60335-2-41			
Clause	Requirement + Test	Result - Remark	Verdict
	Portable pumps for cleaning and other maintenance of swimming pools are at least IPX7. (IEC 60335-2-41)	No portable pumps for cleaning and other maintenance of swimming pools	N/A
	Shower-boost pumps intended for installation outside of zones 1 and 2, as specified in IEC 60364-7-701, are at least IPX2. (IEC 60335-2-41)	No shower-boost pumps	N/A
	Other pumps are at least IPX4. (IEC 60335-2-41)	IPX8	P
7	MARKING AND INSTRUCTIONS		
7.1	Appliances marked with		
	Rated voltage or voltage range (V)	230V or 400V See General Product Information	P
	Symbol for nature of supply, or	~	P
	Rated frequency (Hz).....	50Hz or 60Hz	P
	Rated power input (W), or	Rated power output given	N/A
	Rated current (A)	Current range (2.4A to 16.7A) depends on model, see table	P
	Manufacturer's or responsible vendor's name, trademark or identification mark	ZENIT	P
	Model or type reference	See General product information pages	P
	Symbol IEC 60417-5172, for class II appliances	Class I pumps	N/A
	IP number, other than IPX0.....	IPX8	P
	Symbol IEC 60417-5180, for class III appliances, unless.	Class I	N/A
	the appliance is operated by batteries only, or	No Batteries	N/A
	the appliance is powered by rechargeable batteries recharged in the appliance.	No rechargeable batteries	N/A
	Appliance outlets accessible to the user and socket-outlets accessible to the user:		
	- that are incorporated in appliances connected to the supply mains, and		N/A
	- that operate at rated voltage		N/A
	Marked with their outlet load (W or A).....		N/A
	Appliances intended to be supplied from a detachable power supply part to recharge the battery marked with:		
	- symbol ISO 7000-0790		N/A
	- symbol IEC 60417-6181		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- model or type reference of the detachable power supply part, or		N/A
	- the substance of the following: "Use only with <model or type reference> supply unit"		N/A
	Symbol IEC 60417-5018, for class II and class III appliances incorporating a functional earth	Class I appliance	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.	No water-valves, or external hose-set	N/A
	Pumps with rated power input exceeding 50 W marked with (IEC 60335-2-41):		
	- H_{min} in meters (m), if > 0 m (IEC 60335-2-41)	DGG: 0.3; 0.4; 0.8; 0.9; 1.1; 1.2; 1.3; 1.5; 1.6; 1.7; 1.8; 2; 2.1; 2.2; 2.3; 2.5; 2.7; 2.8; 3.1; 3.4; 3.5; 3.6; 4.9; 5 DRG: 0.2; 0.3; 0.4; 0.5; 0.6; 0.7; 1; 1.5; 1.6; 1.9; 2; 2.5; 2.7; 2.8; 3.1; 3.2; 3.3; 3.5; 3.7; 3.9; 4; 4.1; 4.2; 4.4; 4.7; 4.9; 5.3 APG: 10.9; 18.0; 18.2; 23.8; 24.9; 25.0 CTG: 1.8; 2; 3.9; 3.8 GRG: 6.3; 10; 12.7; 13.2; 18.8; 20.7; 26.3; 27.7; 35.4 ZUG V: 0.3; 0.4; 0.8; 0.9; 1.1; 1.2; 1.5; 1.6; 1.7; 1.8; 2.1; 2.2; 2.3; 2.6; 3.6; 3.8; 4.3; 5.4; 6; 7.4; 7.9 ZUG OC: 0.3; 0.4; 0.5; 0.6; 0.8; 1.2; 1.4; 1.5; 1.6; 1.7; 1.8; 1.9; 2; 2.1; 2.2; 2.3; 2.4; 2.6; 2.9; 3; 3.3; 3.4; 3.6; 4; 4.1; 5.2; 5.4; 5.5; 5.7; 5.8; 5.9; 6.1; 6.4; 6.9; 8.1; 8.7; 9.4; 10.4; 11.9; 12.3; 14.4 ZUG HP: 15.5; 15.8; 19.6; 20.1; 26.7; 27.2; 27.5; 29.4; 30.5; 37.4; 37.7; 39 ZUG CP: 0.5; 0.6; 1.1; 1.5; 1.8; 3.1; 3.3; 6; 6.5; 8.7; 8.9 ZUG GR: 14.3; 14.6; 18.8; 19.3; 23.7; 24.1; 26.2; 27.6; 35.3; 35.6; 37.1; 40.1; 42.4	P

IEC 60335-2-41			
Clause	Requirement + Test	Result - Remark	Verdict
	- direction of rotation (three-phase motor only) (IEC 60335-2-41)	Pumps marked	P
	The maximum operating depth, in metres, with a minimum of 1 m, marked using symbol IEC 60417-6444 (2020-12) for: (IEC 60335-2-41)		
	- submersible aquarium pumps; and (IEC 60335-2-41)		N/A
	- other submersible pumps having a rated power input > 50 W. (IEC 60335-2-41)	 Symbol provided where X is a value from 2m to 20m	P
	Pumps marked with maximum liquid temperature (°C) which not less than 35 °C (IEC 60335-2-41) ..	40°C	P
	If temperature exceeds 35 °C, they marked with maximum period of operation, unless (IEC 60335-2-41) ..	Marked S3 and %	P
	They intended for continuous operation. (IEC 60335-2-41)	Marked S1 continuous	P
	Pumps that are not intended for outdoor use be marked with symbol IEC 60417-5957 (2004-12) or with the substance of the following:		
	For indoor use only.		N/A
7.2	Stationary appliances for multiple supply:		
	Warning to disconnect all supply circuits.	No multiple 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.	Only one rated value	N/A
	Different rated values marked with the values separated by an oblique stroke.		N/A
	Requirement also applied to appliances for connection to both single phase and multiphase supplies.		N/A
7.4	Appliances adjustable for different rated voltages or rated frequencies, the voltage or the frequency setting is clearly discernible.	No adjustable appliance Voltage setting (230V or 400V) is clearly discernible	P
	Frequent changes in voltage or frequency setting not required, adjustment of rated voltage or rated frequency determined from wiring diagram.	Adjustment of rated voltage determined from wiring diagram.	P
	Wiring diagram may be on the inside of a cover that has to be removed to connect the supply conductors.	Wiring diagram inside of a cover that has to be removed to connect the supply conductors.	P

IEC 60335-2-41			
Clause	Requirement + Test	Result - Remark	Verdict
	Wiring diagram not on a label loosely attached to the appliance.	Wiring diagram not on a label loosely attached to the appliance.	P
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		P
	the power input or current are related to the arithmetic mean value of the rated voltage range.		N/A
	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.		P
	Symbol for nature of supply placed next to rated voltage.		P
	Symbol for class II appliances placed unlikely to be confused with other marking.	Class I	N/A
	Units of physical quantities and their symbols according to international standardized system.		P
	Additional symbols give no rise to misunderstanding.		P
	Symbols specified in IEC60417 and ISO7000 are used. (IEC 60335-1 and IEC 60335-2-41)		P
7.7	Connection diagram fixed to appliances to be connected to more than two supply conductors and appliances for multiple supply, unless	Connection diagram fixed to appliance	P
	Correct mode of connection is obvious		N/A
	For multi-phase appliances, correct mode of connection considered to be obvious if:		
	- indicated by arrows pointing towards the terminals, or		P
	- marked in words		N/A
	Connection diagram is the wiring diagram		P
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)	No neutral conductor	N/A
	- marking of protective earthing terminals (symbol IEC 60417-5019)		P
	- marking of functional earthing terminals (symbol IEC 60417-5018)	Not provided	N/A
	- marking not placed on removable parts		P

IEC 60335-2-41			
Clause	Requirement + Test	Result - Remark	Verdict
7.9	Marking or placing of switches which may cause a hazard.	No such switches	N/A
7.10	Indications of switches on stationary appliances and controls on all appliances by use of figures, letters or other visual means..... :	No such switches or controls	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
	The figure 0 is used on a digital programming keyboard		N/A
7.11	Indication for direction of adjustment of controls	No such controls	N/A
7.12	Instructions for safe use provided in hard copy form.		P
	Instructions marked on the appliance are visible in normal use.		P
	Details concerning precautions during user maintenance.		P
	The instructions the substance of the following:		
	- this appliance is not intended for use 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 concerning use of the appliance by a person responsible for their safety		P
	- children are supervised not to play with the appliance		P
	For a part of class III construction supplied from a detachable power supply part, the instructions state that the appliance is only to be used with the unit provided	Class I appliance	N/A
	Instructions for class III appliances state that it must only be supplied at SELV, unless	Class I appliance	N/A
	It is a battery-operated appliance, the battery being charged outside the appliance	No battery-operated appliance	N/A
	For appliances for altitudes exceeding 2 000 m, the maximum altitude is stated	No such appliance	N/A
	The instructions for appliances incorporating a functional earth state that the appliance incorporates an earth connection for functional purposes.	Not provided	N/A

IEC 60335-2-41			
Clause	Requirement + Test	Result - Remark	Verdict
	The instructions for appliances intended to be connected to a supply for battery recharging state a warning to only use an external supply with the described specifications.	No such appliance	N/A
	The instructions for appliances intended to be supplied from a detachable power supply part for battery recharging state the type reference of the supply part along with a warning to only use the unit provided with this appliance.	No such appliance	N/A
	The instructions for appliances intended for use with batteries using metal-ion chemistries state the normal temperature range for battery charging.	No such appliance	N/A
	Meaning of symbol for detachable power supply part explained, unless not used.	No such appliance	N/A
	If symbol IEC 60417-6444 (2020-12) or symbol 60417-5957(2004-12) is used the meaning are explained. (IEC 60335-2-41)	Not used	N/A
	The instructions for class I portable pumps for cleaning and other maintenance of swimming pools include the substance of the following: (IEC 60335-2-41)		
	- the pump must not be used when people are in the water; (IEC 60335-2-41)	No class I portable pumps for cleaning and other maintenance of swimming pools	N/A
	- the pump be supplied through a residual current device (RCD) having a rated residual operating current ≤ 30 mA. (IEC 60335-2-41)		N/A
	The instructions for pumps marked with a temperature exceeding 35 °C state the maximum period of operation and the minimum rest period, unless the pump is intended for continuous operation at this temperature. (IEC 60335-2-41)		P
	For vertical wet pit pumps, the instruction indicate the maximum density (in kg/m ³) of the media intended for use with the pump. (IEC 60335-2-41)		N/A
	The instructions for submersible pumps for use in swimming pools state the substance of the following: (IEC 60335-2-41)		
	Disconnect the pump from the supply mains before carrying out user maintenance such as cleaning the filter. (IEC 60335-2-41)	No submersible pumps for use in swimming pools	N/A
7.12.1	Sufficient details for installation supplied.		P
	For an appliance intended to be permanently connected to the water mains and not connected by a hose-set, this is stated	No such appliance	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

IEC 60335-2-41			
Clause	Requirement + Test	Result - Remark	Verdict
	Installation instruction provide information on requirements specified for electrical installation and include reference to national wiring rules (IEC 60335-2-41)		P
	If reference made to zones, corresponding be included (IEC 60335-2-41)		P
	Installation instructions include the following (IEC 60335-2-41):		
	- for pumps having a rated power input exceeding 50 W, the maximum total head, in metres; (IEC 60335-2-41)		P
	For submersible pumps and vertical wet pit pumps containing lubricants, the substance of the following: (IEC 60335-2-41)		
	Pollution of the liquid could occur due to leakage of lubricants. (IEC 60335-2-41)		P
	For stationary pumps having a three-phase motor not incorporating a protective device, the substance of the following: (IEC 60335-2-41)		
	- A protective device is to be installed in the fixed wiring and its characteristics are to be specified. (IEC 60335-2-41)		P
	Instructions for installation state that pumps for outdoor fountains, garden ponds and similar places have to be supplied through a RCD (operating current ≤ 30 mA) (IEC 60335-2-41)		P
	Installation instructions for class I pumps for swimming pools shall state that the pump is to be supplied by an isolating transformer or supplied through a RCD (operating current ≤ 30 mA) (IEC 60335-2-41)		N/A
	Installation instructions for class III pumps intended to be installed in zone 0 of a swimming pool, as defined in IEC 60364-7-702, state that the transformer is located outside zone 1 (IEC 60335-2-41)	Class I	N/A
	The installation instructions for class II pumps intended to be fixed: (IEC 60335-2-41)	Class I	N/A
	- in zone 1 of a swimming pool, as defined in IEC 60364-7-702; (IEC 60335-2-41)		N/A
	- in a sump without an adequate outlet for the liquid; or (IEC 60335-2-41)		N/A
	- close to a garden pond or similar place (IEC 60335-2-41)		N/A
	State that the pump is to be located where flooding cannot occur. (IEC 60335-2-41)		P

IEC 60335-2-41			
Clause	Requirement + Test	Result - Remark	Verdict
	For fixed pumps intended for permanent connection to fixed wiring, delivered with a separate connector to ease the installation and establish the supply connection, the instructions state the substance of the following: (IEC 60335-2-41)		
	Only use the supplied connector when installing the pump. (IEC 60335-2-41)	No such 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.		P
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.	No such parts	N/A
7.12.4	Instructions for built-in appliances:		
	- dimensions of space	No built-in appliance	N/A
	- dimensions and position of supporting and fixing		N/A
	- minimum distances between parts and surrounding structure		N/A
	- minimum dimensions of ventilating openings and arrangement		N/A
	- connection to supply mains and interconnection of separate components		N/A
	- 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.	Type Y	N/A
	Replacement cord instructions, type Y attachment.		P
	Replacement cord instructions, type Z attachment.	Type Y	N/A
	Replacement cord set instructions, if required according to 22.58.	Not required	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.	Self-resetting thermal cut out	N/A
7.12.7	Instructions for fixed appliances stating how the appliance is to be fixed.		P
7.12.8	Instructions for appliances connected to the water mains:		
	- max. inlet water pressure (Pa) :	No such appliance	N/A

IEC 60335-2-41			
Clause	Requirement + Test	Result - Remark	Verdict
	- 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 are in hard copy form and appear together before any other instructions supplied with the appliance.		P
	Alternatively, these instructions may be supplied with the appliance separately from any functional use booklet.		P
	They may follow the description of the appliance that identifies parts or follow the drawings/sketches common to the languages of the instructions.		P
	They may follow the description of the appliance that identifies parts or follow the drawings/sketches.		P
	In addition, instructions are also available in an alternative format such as on a website or on request in a format such as a DVD :		P
7.13	Instructions and other texts in an official language.		P
7.14	Markings clearly legible:		
	Signal words WARNING, CAUTION, DANGER in uppercase having a height as specified..... :	3.5 mm	P
	Uppercase letter of the text explaining the signal word not smaller than 1,6 mm :		P
	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.		P
	Markings checked by inspection, measurement and rubbing test as specified.		P
	Markings clearly durable, and on containers that are likely to be cleaned frequently they are not by means of paint or enamel, other than vitreous enamel.		P
7.15	Markings specified in 7.1 to 7.5 on a main part.		P
	Marking clearly discernible from the outside, if necessary, after removal of a cover.		P
	For portable appliances, cover can be removed or opened without a tool.	No portable appliances	N/A
	For stationary appliances, name, trademark or identification mark and model or type reference visible after installation.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	For fixed appliances, name, trademark or identification mark and model or type reference visible after installation according to the instructions.		P
	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.	No switches and controls	N/A
	The symbol IEC 60417-5018 placed next to the symbol IEC 60417-5172 or IEC 60417-5180.	Not in use	N/A
	Type reference of detachable power supply part placed next to symbol IEC 60417-6181.	Not in use	N/A
	Marking of outlet load close to appliance outlet or socket-outlet.		N/A
8	PROTECTION AGAINST ACCESS TO LIVE PARTS		
8.1	Adequate protection against accidental contact with live parts.		P
8.1.1	Requirement applies for all positions, detachable parts removed unless otherwise specified.		P
	Use of test probe B of IEC 61032:		
	- force not exceeding 1 N: no contact with live parts		P
	- force of 20 N: no contact with live parts		P
	- lamps behind a detachable cover not removed, if conditions met	No lamps	N/A
	- protection against contact with live parts of the lamp cap during lamp insertion or removal		N/A
	Use of test probe 18 of IEC 61032 for non-commercial appliances and commercial appliances intended for public access:		
	- force not exceeding 1 N: no contact with live parts		P
	- force of 10 N: no contact with live parts		P
	- appliance fully assembled as in normal use, no parts removed		P
	No contact with live parts protected by materials as specified		P
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.	Class I	N/A
	Test probe 13 also applied through openings in earthed metal enclosures having a non-conductive coating: no contact with live parts.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
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.	No such parts	N/A
	For a single switching action obtained by a switching device, requirements as specified.	No such switching devices	N/A
	For appliances with a supply cord and without a switching device, the single switching action may be obtained by the withdrawal of the plug.		P
8.1.4	Appliance supplied at rated voltage (V):	Test voltage = 230V or 400V	P
	Accessible part not considered live if:	No accessible live parts	N/A
	- safety extra-low AC voltage: peak value not exceeding 42,4 V		N/A
	- safety extra-low DC voltage: not exceeding 42,4 V		N/A
	- or separated from live parts by protective impedance		N/A
	If protective impedance: DC current not exceeding 2 mA, and		N/A
	AC 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 μ F		N/A
	- for peak values over 450 V up to and including 15 kV, discharge not exceeding 45 μ C		N/A
	- for peak values over 15 kV, the energy in the discharge not exceeding 350 mJ		N/A
8.1.5	Live parts protected at least by basic insulation before installation or assembly:		
	- built-in appliances	No such appliance	N/A
	- fixed appliances		P
	- appliances delivered in separate units	No such appliance	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.	Class I	N/A
	Only possible to touch parts separated from live parts by double or reinforced insulation.		N/A
8.3	For battery-operated appliances with a functional earth or supply connection, parts within a battery compartment only accessible if:		
	- class I, 0I and II appliances: separated from live parts by double and reinforced insulation	No battery-operated appliances	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- class 0 appliances: separated from live parts by basic insulation		N/A
	- battery compartment of class III construction, and basic insulation in addition to supply at SELV, if limits in 8.1.4 exceeded		N/A
9	STARTING OF MOTOR-OPERATED APPLIANCES		
	Requirements and tests are specified in part 2 when necessary.	Not applicable by Part 2	N/A
10	POWER INPUT AND CURRENT		
10.1	Appliance supplied at rated voltage (V) :	Test voltage = (See appended table) Frequency = (maybe relevant for moa, ca, smps type) Only P2-power on the shaft given	N/A
	Power input at normal operating temperature and normal operation not deviating from rated power input by more than shown in Table 1.	(See appended table)	N/A
	If the power input varies throughout the operating cycle and its maximum value exceeds twice its arithmetic mean value occurring during a representative period, the power input is the maximum value that is exceeded for more than 10 % of the representative period if this value is greater than the arithmetic mean value,		N/A
	Otherwise the power input is the arithmetic mean value.		N/A
	In case of doubt, the power input of the motors may be measured separately.	(See appended table)	N/A
	In case of measurement during a representative period, duration of the representative period.....:		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 power input is related to the arithmetic mean value of the relevant range.		N/A
	Appliance outlets accessible to the user and socket-outlets accessible to the user incorporated in appliances connected to the supply mains and operating at rated voltage are not loaded during test,		N/A
	however, their contribution to the power input is considered to be the marked outlet load per appliance outlet or socket-outlet.		N/A

IEC 60335-2-41			
Clause	Requirement + Test	Result - Remark	Verdict
10.2	Appliance supplied at rated voltage (V) :	(See appended table)	P
	Current at normal operating temperature and normal operation not deviating from rated current by more than shown in Table 2.	(See appended table)	P
	If the current varies throughout the operating cycle and its maximum value exceeds twice its arithmetic mean value occurring during a representative period, the current is the maximum value that is exceeded for more than 10 % of the representative period if this value is greater than the arithmetic mean value,	No operating cycle	N/A
	Otherwise, the current is the arithmetic mean value.		N/A
	In case of doubt, the current of the motors be measured separately.	(See appended table)	N/A
	In case of measurement during a representative period, duration of the representative period..... :	Until steady condition	N/A
	Test carried out at upper and lower limits of the ranges for appliances with one or more rated voltage ranges, unless	No voltage ranges	N/A
	the rated current is related to the arithmetic mean value of the relevant range.		N/A
	Appliance outlets and socket-outlets accessible to the user incorporated in appliances connected to the supply mains and operating at rated voltage are not loaded during test,		N/A
	However, their contribution to the current is considered to be the marked outlet load per appliance outlet or socket-outlet.		N/A
11	HEATING		
11.1	No excessive temperatures in normal use.	See appended table 11.8	P
11.2	The appliance is held, placed or fixed in position as described :		P
11.3	Temperature rises, other than of windings, determined by thermocouples.		P
	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.		P
11.4	Heating appliances operated under normal operation at 1,15 times rated power input (W) :	No such appliance	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
11.5	Motor operated appliances operated under normal operation at most unfavourable voltage between 0,94 and 1,06 times rated voltage (V)..... :	Test voltage = 216.2 VAC and 243.8 VAC for rated 230V 376 VAC and 424 VAC for rated 400 Frequency = 60Hz	P
11.6	Combined appliances operated under normal operation at most unfavourable voltage between 0,94 and 1,06 times rated voltage (V)..... :	No such appliance	N/A
11.7	Pumps operated with liquid maintained at temperature marked on pump (IEC 60335-2-41)	Marked 40°C	P
	They operated until steady conditions established unless (IEC 60335-2-41)	Until steady conditions	P
	they marked with a maximum period of operation. In this case, they operated for marked period followed by the rest period specified in instructions, test carried out for three cycles of operation (IEC 60335-2-41)		N/A
	Shower-boost pumps also supplied with cold water operated with cold water at 15 °C ± 2 °C (IEC 60335-2-41)	No Shower-boost pumps	N/A
	Pumps, other than shower-boost pumps, marked with a maximum period of operation are also operated with liquid maintained at 35 °C until steady conditions established (IEC 60335-2-41)	No marking period provided	N/A
	Appliance outlets and socket-outlets accessible to the user loaded with a resistive load that gives the marked outlet load.		N/A
	For appliances incorporating integral batteries or separable batteries not disconnected from the appliance during charging:		
	- the fully discharged battery is charged for 1 h, while the appliance is operated continuously performing its intended function		N/A
	- the fully discharged battery is charged for 24 h or until it is fully charged, without the appliance performing its intended function		N/A
11.8	Temperature rises monitored continuously and do not exceeding the values in Table 3 and Table 101 (IEC 60335-2-41)	(See appended table)	P
	If the temperature rise of a motor winding exceeds the value of Table 3, or	No exceeding	N/A
	If there is doubt with regard to classification of insulation.		N/A
	Tests of Annex C are carried out.		N/A
	Sealing compound does not flow out.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Protective devices do not operate, except		P
	Components in protective electronic circuits tested for the number of cycles specified in 24.1.4.	Not in use	N/A
	Pumps marked with liquid temperature > 35 °C, temperature rise of external enclosure not measured and Table 101 is not applicable. (IEC 60335-2-41)	Marked 40°C, temperature not measured.	P
12	CHARGING OF METAL-ION BATTERIES		
	Charging a battery that uses metal-ion chemistry does not cause any cell to exceed its operating region for charging.	No metal-ion batteries	N/A
	Fully discharged battery is charged with the charging system indicated in the instructions at an ambient temperature of 20 °C ± 5 °C.		N/A
	Test repeated at:		
	- minimum ambient temperature, if specified to be less than 10 °C by the manufacturer (°C).....		N/A
	- at maximum ambient temperature, if specified to be greater than 40 °C by the manufacturer (°C)... :		N/A
	For all individual cells, the voltage, temperature and charging current are monitored..... :	(See appended table)	N/A
	For parallel configuration, analysis used to avoid measuring the individual branch currents,		N/A
	The test result not exceeding the specified operating region for charging.		N/A
	Location of thermocouples for each cell temperature measurement on the outer surface, halfway along the longest dimension of the cell		N/A
	For each cell, the specified operating region for charging specified by the cell manufacturer is not exceeded at the temperature of the cell.		N/A
	For batteries where cells are configured in series, the test is repeated with the charge in one battery deliberately imbalanced, the imbalance being introduced into a fully discharged battery by charging one cell to:		
	- approximately 50 % of its full charge, or		N/A
	- less than 50 % of its full charge, if it is demonstrated as specified that this would occur in normal operation		N/A
13	LEAKAGE CURRENT AND ELECTRIC STRENGTH AT OPERATING TEMPERATURE		
13.1	Leakage current not excessive and electric strength adequate.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Heating appliances operated at 1,15 times the rated power input (W)	No Heating appliances	N/A
	Motor-operated appliances and combined appliances supplied at 1,06 times the rated voltage (V)	Test voltage = 243.8 VAC for rated 230V 424 VAC for rated 400 Frequency = 60Hz	P
	Protective impedance and radio interference filters disconnected before carrying out the tests.	Not in use	N/A
13.2	The leakage current is measured by means of the circuit described in Figure 4 of IEC 60990:2016	Class I	N/A
	For class 0I appliances and class I appliances, except parts of class II construction, C replaced by a low impedance ammeter.		P
	Leakage current measurements	(See appended table)	P
13.3	The appliance is disconnected from the supply.		P
	Electric strength tests according to Table 4.....	(See appended table)	P
	No breakdown during the tests.		P
14	TRANSIENT OVERVOLTAGES		
	Appliances withstand the transient over-voltages to which they may be subjected.	Clearances values provided as specified in table 16	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.		P
	Compliance checked as specified in 15.1.1, taking into account 15.1.2, followed by the electric strength test of 16.3.	IPX8	P
	No trace of water on insulation which can result in a reduction of clearances or creepage distances below values specified in clause 29.		P
	No water in the enclosure of appliances and parts of appliances with pins for insertion into socket-outlets.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
15.1.1	Appliances, other than IPX0, subjected to tests as specified in IEC 60529:1989 including IEC 60529:1989/AMD1:1999 and IEC 60529:1989/AMD2:2013	IPX8	P
	Water valves containing live parts in external hoses for connection of an appliance to the water mains tested as specified for IPX7 appliances.	Not provided	N/A
	Shower-boost pumps are subjected to the appropriate test of IEC 60529:1989 including IEC 60529:1989/AMD1:1999 and IEC 60529:1989/AMD2:2013 both at rest and in operation while supplied at rated voltage. (IEC 60335-2-41)	No Shower boost pumps	N/A
15.1.2	Hand-held appliances turned continuously through the most unfavourable positions during the test.	No such appliances	N/A
	Appliances with an automatic cord reel are tested according to 15.1.1 with the supply cord unreel, coiled and reeled again as specified, and		N/A
	for fixed appliances mounted on the wall or ceiling, the cord is dropped from the minimum height as specified in the instructions before being coiled.		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 are mounted on a wooden board.		N/A
	Appliances and parts of appliances with integral pins for insertion into socket-outlets are held by the pins in the most unfavourable position without being mounted in a socket-outlet.		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 with the distance to the floor stated in the instructions are tested with a board placed accordingly under the appliance.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	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, unless		N/A
	having a specially prepared cord.		N/A
	Detachable parts removed and subjected to the relevant treatment with the main part, however not removed if the instructions state that the part must be removed for user maintenance and a tool is needed.		N/A
	IPX4 pumps tested as specified (IEC 60335-2-41)		N/A
	Submersible pumps immersed for 24 h in water as specified (IEC 60335-2-41)	See table 16.2 and 16.3	P
	Water pressure on enclosure (IEC 60335-2-41):		
	- 1,5 times pressure occurring at maximum operation depth, when this depth ≤ 10 m (IEC 60335-2-41)		N/A
	- 1,3 times pressure occurring at (IEC 60335-2-41)		N/A
	- maximum operating depth, or (IEC 60335-2-41)		N/A
	- 15 m, if higher (IEC 60335-2-41)	Water pressure on enclosure: 1.3 x 1.5bar=1.95 bar	P
15.2	Spillage of liquid does not affect the electrical insulation.	No such appliance	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, unless		N/A
	having a specially prepared cord.		N/A
	Appliances incorporating an appliance inlet tested with or without a connector, whichever is most unfavourable.		N/A
	Detachable parts are removed.		N/A
	Overfilling test with additional amount of the solution, over a period of 1 min (I) :		N/A
	Non-ionic rinsing agent complies with the specified properties.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	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.	Excluded by part 2 (15.3): Submersible pumps are not subjected to the test	N/A
	Checked by test Cab: Damp heat steady state in IEC 60068-2-78.		N/A
	Cable entries, if any, left open.		N/A
	If knock-outs provided, one of them opened.		N/A
	Detachable parts removed and subjected, if necessary, to the humidity test with the main part.		N/A
	Humidity test for 48 h in a humidity cabinet.		N/A
	Reassembly of those parts that may have been removed.		N/A
	The appliance withstands the tests of clause 16.		N/A
	Submersible pumps are not subjected to the test. (IEC 60335-2-41)		P
16	LEAKAGE CURRENT AND ELECTRIC STRENGTH		
16.1	Leakage current not excessive and electric strength adequate.	See tables 16.2 and 16.3	P
	Protective impedance disconnected from live parts before carrying out the tests.	No protective impedance in use	N/A
	Tests carried out at room temperature and not connected to the supply.		P
16.2	Single-phase appliances: test voltage 1,06 times rated voltage (V)		N/A
	Three-phase appliances: test voltage 1,06 times rated voltage divided by $\sqrt{3}$ (V)	Test voltage = 140.8Vac or 244.8Vac Frequency = 60Hz	P
	Leakage current measurements	(See appended table)	P
	Limit values doubled if:		
	- all controls have an off position in all poles, or	Not provided	N/A
	- the appliance has no control other than a thermal cut-out, or	Not provided	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

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Clause	Requirement + Test	Result - Remark	Verdict
	With the radio interference filters disconnected, the leakage current does not exceed limits specified . :	(See appended table)	P
16.3	Electric strength tests according to Table 7.....:	(See appended table)	P
	No breakdown during the tests.		P
17	OVERLOAD PROTECTION OF TRANSFORMERS AND ASSOCIATED CIRCUITS		
	No excessive temperatures in transformer or associated circuits in event of short-circuits likely to occur in normal use.....:	(See appended table) No transformer provided	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):	Test voltage = Frequency =	N/A
	Basic insulation is not short-circuited.		
	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 subclause 15.5 of IEC 61558-1:2017.		N/A
18	ENDURANCE		
	This clause of Part 1 is not applicable.		—
19	ABNORMAL OPERATION		
19.1	The risk of fire, mechanical damage or electric shock under abnormal or careless operation obviated.		P
	Electronic circuits so designed and applied that a fault will not render the appliance unsafe :	(See appended table) No electronic circuit	N/A
	Appliances incorporating heating elements subjected to the tests of 19.2 and 19.3, and	No heating elements	N/A
	if the appliance also has a control that limits the temperature during clause 11 it is subjected to the test of 19.4, and	No such control	N/A
	if applicable, to the test of 19.5.	No such control	N/A
	Appliances incorporating PTC heating elements are also subjected to the test of 19.6.	No PTC heating elements	N/A
	Appliances incorporating motors subjected to the tests of 19.7 to 19.10, as applicable.	See table 19.7	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Appliances incorporating electronic circuits subjected to the tests of 19.11 and 19.12, as applicable.	No electronic circuit	N/A
	Appliances incorporating contactors or relays subjected to the test of 19.14, being carried out before the tests of 19.11.	No contactors or relays	N/A
	Appliances incorporating voltage selector switches subjected to the test of 19.15.	No voltage selector switches	N/A
	Appliances having a mains connection and replaceable batteries subjected to the test of 19.16.	No replaceable batteries	N/A
	Appliances incorporating rechargeable batteries that use metal-ion chemistries subjected to the test of 19.17.	No rechargeable batteries	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.		N/A
	If a heating element or an intentionally weak part becomes open-circuited, the relevant test is repeated on a second sample, and	No heating element	N/A
	that same part on the second sample does also become permanently open-circuited in the second test.		N/A
	unless a non-self-resetting thermal cut-out operates or steady conditions are established.		N/A
	Pumps also subjected to tests of clause 19.101 and 19.102. (IEC 60335-2-41)		P
19.2	Test of appliances with heating elements with restricted heat dissipation; test voltage (V), power input of 0,85 times rated power input or if marked with a voltage range 0,85 times the calculated power input at the lower limit of the range (W) : See 5.8.4 $\text{Power input} = 0,85 \times (V_L/V_m)^2$ See clause 10	No heating element	N/A
19.3	Test of 19.2 repeated; test voltage (V), power input of 1,24 times rated power input or if marked with a voltage range 1,24 times the calculated power input at the upper limit of the range (W) : See 5.8.4 $\text{Power input} = 1,24 \times (V_u/V_m)^2$ See clause 10	No heating element	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
19.4	Test conditions as in clause 11, any control limiting the temperature during tests of clause 11 short circuited.	No such control	N/A
19.5	Test of 19.4 repeated on class 0I and I appliances with tubular sheathed or embedded heating elements. No short-circuiting, but one end of the element connected to the sheath.	No heating element	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, on appliances where an all-pole disconnection occurs during the test of 19.4, or on appliances used in a system with polarized plugs intended for connection to polarized socket outlets.		N/A
19.6	Appliances with PTC heating elements tested at rated voltage, establishing steady conditions.	No PTC heating elements	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 Note: See DSH 543AA (also applicable to iron cored transformers)	(see appended table)	P
	locking moving parts of other appliances.	(see appended table)	P
	Locked rotor, capacitors open-circuited one at a time.	No capacitor	N/A
	Test repeated with capacitors short-circuited one at a time, unless	No capacitor	N/A
	the capacitor is of class S2 or S3 of IEC 60252-1:2010 including IEC 60252-1:2010/AMD1:2013.	No capacitor	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 :	No timer or programmer	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.	No electronic timer or programmer	N/A
	Other appliances supplied with rated voltage for a period as specified :	Until steady conditions	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Winding temperatures not exceeding values specified in Table 8	(See appended table)	P
19.8	Multi-phase motors operated at rated voltage with one phase disconnected (V)	(See appended table)	P
19.10	Series motor operated at 1,3 times rated voltage for 1 min (V)	No series motor	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	No electronic circuits	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 does 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-circuited, the appliance is considered to have withstood the particular test, provided both of the following conditions are met:		
	- the base material of the printed circuit board withstands the test of normative Annex E	No printed board	N/A
	- 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 circuits or parts of circuits meeting both of the following conditions:		

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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 with the appliance supplied at rated voltage (V) :	No electronic circuits	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 operating under conditions specified in clause 11, but supplied at rated voltage duration of the tests as specified:		
	Appliance supplied at rated voltage (V):	Test voltage = Frequency =	N/A
	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 60384-14:2013 including IEC 60384-14:2013/AMD:2016.		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
	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
	Any cord between a battery-operated appliance consuming more than 15 W and the detachable power supply part short-circuited as specified.		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.	No protective electronic circuit	N/A
19.11.4	Appliances having a device with an off position obtained by electronic disconnection, or	No such device	N/A
	a device that can be placed in the stand-by mode,		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	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 with the appliance supplied at rated voltage (V)..... : Note: In general, the result is not affected by the test frequency if a frequency range is marked.	Test voltage =	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 as specified, however		N/A
	tests of electromagnetic phenomena not applied to protective electronic circuits operating during 19.7 in appliances that are used while attended.		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 as 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 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 mode.		N/A
	Earthed heating elements in class I appliances disconnected.		N/A
	For appliances having surge arresters incorporating spark gaps, tests repeated at 95 % of the flashover voltage.		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 61000-4-11:2020.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
19.11.4.7	The appliance is subjected to mains signals in accordance with IEC 61000-4-13:2002 including IEC 61000-4-13:2002/AMD1:2009 and IEC 61000-4-13:2002/AMD2:2015, test level class 2.		N/A
19.11.4.8	The appliance is operated under normal operation and supplied at rated voltage (V).....	Test voltage =	N/A
	After 60 s 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); current rating of the fuse-link (A) :	No fuse-link	N/A
19.13	During the tests the appliance does not emit flames, molten metal, poisonous or ignitable gas in hazardous amounts.		P
	Temperature rises not exceeding the values shown in table 9 :	(See appended table)	P
	Compliance with clause 8 not impaired.		P
	If the appliance can still be operated, it complies with 20.2.		P
	Insulation, other than of class III appliances or class III constructions that do not contain live parts, withstands the electric strength test of 16.3, the test voltage as specified in Table 4:		
	basic insulation (V)..... :	1250V	P
	- supplementary insulation (V) :	1750V	N/A
	- reinforced insulation (V) :	3000V	P
	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.		P
	The appliance does not undergo a dangerous malfunction, and		P
	no failure of protective electronic circuits, if the appliance is still operable.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	For accessible safety extra-low voltage outlets, connectors, or USB outlets, no increase of the no-load output voltage by more than 3 V or 10 % of the voltage in normal use, whichever higher, with a maximum/peak of 42,4 VDC/VAC.		N/A
	Appliances tested with an electronic switch in the off position, or in the stand-by mode:		
	- 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 controlled by one or more interlocks, one of the interlocks may be released provided that both:		
	- 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.	No contactor or relay	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
	If the appliance has several modes of operation, the tests are carried out with the appliance operating in each mode, if necessary.		N/A
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.	No mains voltage selector switch	N/A
19.16	Appliances having mains connection and replaceable batteries supplied at rated voltage and operated under normal operation but with batteries removed or in any position allowed by construction.	No replaceable batteries	N/A
19.17	For battery-operated appliances incorporating a battery using metal-ion chemistry, the battery system is operated according to the instructions and tested under the following conditions, duration as specified		
	a) series configured battery:	No battery-operated appliances	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- imbalance introduced into fully discharged battery by charging one cell to the percentage of being fully charged applied during the test of Clause 12;		N/A
	- single cell or parallel only configured battery: fully discharged		N/A
	b) series configured battery: imbalance introduced as specified and fully charged, if the test of clause 12 was conducted with an imbalance of less than 50 % and if a single fault in the circuitry results in the loss of maintaining balance		N/A
	c) series configured battery: cells at 50 % of full charge, except one which is shortened, battery then fully charged		N/A
	d) fully charged battery connected to the charging system: short circuit introduced to the charging system as specified to produce the most unfavourable results, and for a charging system with a cord connecting to the battery, short circuit introduced at a point producing the most adverse effects; resistance of short circuit not exceeding 10 mΩ		N/A
	No explosion or ignition of the battery during or after the test.		N/A
	Voltage on any cell not exceeding upper limit charging voltage by more than 150 mV, unless		N/A
	charging system permanently disabled from recharging battery, checked as specified.		N/A
	Recharging considered to be permanently disabled, if:		
	- battery discharged to approximately 50 % of full charge, by using the battery-operated appliance tested (in case of an integral battery), or		N/A
	by using a new sample of the battery-operated appliance (in case of a detachable and separable battery)		N/A
	- attempt made to recharge battery normally		N/A
	- no charging current after 10 min or after 25 % of the nominal capacity has been delivered, whichever occurs first		N/A
19.101	Pump supplied at rated voltage and operated at approximately half at maximum total head for 5 min (IEC 60335-2-41),		P
	after which inlet is removed from liquid and operation continued for 7 h. (IEC 60335-2-41)		P
	Pumps operated again for 5 min at approximately half maximum total head. (IEC 60335-2-41)		P

IEC 60335-2-41			
Clause	Requirement + Test	Result - Remark	Verdict
	If the pump becomes inoperable during test, it is disconnected from supply and filled with water. (IEC 60335-2-41)		N/A
19.102	Pumps marked with maximum period of operation supplied at rated voltage and operated under normal operation until steady conditions established. (IEC 60335-2-41)		P
20	STABILITY AND MECHANICAL HAZARDS		
20.1	Appliances having adequate stability.	Excluded by part 2 (20.1): Submersible pumps are not subjected to the test.	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
	Submersible pumps not subjected to test. (IEC 60335-2-41)		P
20.2	Moving parts adequately arranged or enclosed as to provide protection against personal injury.	Note 1 can be used: moving parts of some pumps are accessible to perform working function	P
	Protective enclosures, guards and similar parts are non-detachable, and		P
	have adequate mechanical strength.		P
	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.		P
	The requirement concerning moving parts of appliances does not apply to moving parts of pumps that are necessarily exposed to perform the working function, including moving parts of pumps, which are also intended for moving water containing fibrous materials or solids and pumps intended for moving liquids with higher viscosity than water. (IEC 60335-2-41)	Note 1 can be used: moving parts of some pumps are accessible to perform working function	P
	Compliance is checked by:		
	- inspection		P

IEC 60335-2-41			
Clause	Requirement + Test	Result - Remark	Verdict
	- test of 21.1		N/A
	- applying a force not exceeding 5 N by means of a test probe similar to test probe B of IEC 61032 but having a circular stop face with a diameter of 50 mm, instead of the noncircular face		N/A
	- applying test probe 18 of IEC 61032 with a force not exceeding 2,5 N		N/A
	Probe 18 of IEC 61032 is not applied to: (IEC 60335-2-41)		
	– sludge pumps (IEC 60335-2-41)		N/A
	– vertical wet pit pumps (IEC 60335-2-41)		N/A
	– submersible pumps, other than aquarium pumps, table fountain pumps and garden pond pumps (IEC 60335-2-41)		P
	– shower-boost pumps, swimming pool pumps and other pumps, if they have instructions that indicate that the pump is not to be installed or used in areas accessible to children. (IEC 60335-2-41)		N/A
	For appliances provided with movable devices such as those intended for varying the tension of belts, the test with the test probe is carried out with these devices adjusted to the most unfavourable position within their range of adjustment. If necessary, belts are removed.		N/A
	It is not possible to touch dangerous moving parts with the test probes.	Note 1 can be used: moving parts of some pumps are accessible to perform working function	P
21	MECHANICAL STRENGTH		
21.1	Appliance has adequate mechanical strength and is constructed as to withstand rough handling.		P
	Checked by applying 3 blows to every point of the enclosure likely 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) 1.0J	P
	Pumps, other than shower-boost pumps, impact energy is increased to 1,0 J. (IEC 60335-2-41)		P
	Appliances and parts of appliances having pins for insertion into mains socket-outlets subjected to the test, Free fall repeated, procedure 2, of IEC 60068-2-31, under the specified conditions.		N/A
	The appliance shows no damage impairing compliance with this standard, and		P
	compliance with 8.1, 15.1 and clause 29 not impaired.		P

IEC 60335-2-41			
Clause	Requirement + Test	Result - Remark	Verdict
	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
	For pumps, other than shower-boost pumps, the impact energy is increased to 1,0 J. (IEC 60335-2-41)		P
21.2	Accessible parts of solid insulation having strength to prevent penetration by sharp implements.		P
	Test not applicable if the thickness of supplementary insulation is at least 1 mm and reinforced insulation at least 2 mm.	Supplementary >1mm Reinforced>2mm	P
	The insulation is tested as specified, and does withstand the electric strength test of 16.3.		N/A
21.3	Appliances with pins for insertion into socket-outlets with a rotating plug part are provided with a mechanical stop to prevent rotation having adequate mechanical strength and constructed to withstand rough handling.		N/A
	Application of a torque of 2 Nm for 1 min does not result in rotation of the plug part after rotating it until the mechanical stop prevents further rotation, both directions checked.		N/A
22	CONSTRUCTION		
22.1	Appliance marked with the first numeral or any of the additional letters of the IP system.	IP68	P
22.2	Stationary appliance: means to ensure disconnection from the supply being provided:		
	- a supply cord fitted with a plug, or		N/A
	- a switch providing all-pole disconnection complying with 24.3, or	A statement in the instruction sheet that a disconnection incorporated in the fixed wiring is to be provided	N/A
	- an appliance inlet		N/A
	Single-pole switches and single-pole protective devices for the disconnection of heating elements in single-phase, permanently connected class 0I and class I appliances, connected to the line conductor.	No heating elements	N/A
22.3	Appliance provided with pins: no undue strain on socket-outlets.	No pins	N/A
	Means for retaining pins withstand the forces to which the pins are like to be subjected in normal use.		N/A

IEC 60335-2-41			
Clause	Requirement + Test	Result - Remark	Verdict
	Applied torque not exceeding 0,25 Nm, torque to keep the socket-outlet itself in the vertical plane not included in this value.		N/A
	Pull force of 50 N for 1 min 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 1 mm.		N/A
	Each pin subjected to a torque of 0,4 Nm; 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.	No such appliances	N/A
22.5	No risk of electric shock from charged capacitors resulting in a capacitance equal or greater than 0,1 μ F when touching pins, the appliance being disconnected from the supply at the instant of voltage peak.	No capacitor	N/A
	Appliance supplied at rated voltage (V) :	Test voltage =	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	No electronic circuits	N/A
	The test for measuring the voltage between the pins of the plug 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.		P
	Electrical insulation of class II appliances not affected if a hose ruptures or seal leaks.	Class I	N/A
	In case of doubt, test as described.		N/A
	Class II pumps seal is removed from shaft. Pump is supplied at rated voltage and operated for 10 min with maximum head. (IEC 60335-2-41)	Class I	N/A
	If static pressure can occur, test repeated at a pressure corresponding to maximum total head. (IEC 60335-2-41)		N/A
	Pump withstand electric strength test of clause 16.3. (IEC 60335-2-41)		N/A

IEC 60335-2-41			
Clause	Requirement + Test	Result - Remark	Verdict
	Shower-boost pumps with separate enclosure have a drain hole in the enclosure positioned so that water can drain out without impairing electrical insulation, unless water cannot accumulate within enclosure in normal use. (IEC 60335-2-41)	No Shower-boost pumps	N/A
	Hole be at least 5 mm in diameter or (IEC 60335-2-41)		N/A
	20 mm ² in area with a width of least 3 mm. (IEC 60335-2-41)		N/A
	Holes that do not meet these dimensions are considered blocked when determining compliance. (IEC 60335-2-41)		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.	No such compartments	N/A
22.9	Insulation, internal wiring, windings, commutators and slip rings not exposed to oil, grease or similar substances, unless		P
	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:	No automatic switching device	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.	No parts provided	N/A
	Obvious locked position of snap-in devices used for fixing such parts.	No snap in devices	N/A

IEC 60335-2-41			
Clause	Requirement + Test	Result - Remark	Verdict
	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 could result in a hazard, including a choking hazard.		P
	Requirement concerning the choking hazard does not apply to commercial appliances.		P
	Removing or fixing in wrong position of handles, knobs, etc. indicating position of switches or similar components not possible, if resulting in a hazard.		P
	No use of sealing compound and similar materials, other than self-hardening resins, to prevent loosening.		P
	Axial force of 15 N applied for 1 min to parts unlikely to be subjected to axial pull in normal use.		N/A
	Axial force of 30 N applied for 1 min to parts likely to be subjected to axial pull in normal use		N/A
	Loosening of removed parts not resulting in a choking hazard, checked with small parts cylinder.		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.		P
	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.		P
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 conductor strands and no undue wear of contacts.	No automatic cord reels	N/A
	Cord reel tested with 6 000 operations, as specified.		N/A
	Electric strength test of 16.3, voltage of 1 000 V applied.		N/A
22.17	Spacers not removable from the outside by hand or by means of a screwdriver or a spanner.	No removable spacers	N/A
22.18	Current-carrying parts and other metal parts resistant to corrosion, unless		P

IEC 60335-2-41			
Clause	Requirement + Test	Result - Remark	Verdict
	made from stainless steel, plated steel or similar corrosion-resistant alloys.		P
22.19	Driving belts not relied upon to provide the required level of insulation, unless	No such parts provided	N/A
	constructed to prevent inappropriate replacement.		N/A
22.20	Direct contact between live parts and thermal insulation effectively prevented, unless	No thermal insulation	N/A
	material used is non-corrosive, non-hygroscopic and non-combustible, or thermal insulation is glass-wool.		N/A
22.21	Wood, cotton, silk, ordinary paper and fibrous or hygroscopic material not used as insulation, unless	No such parts provided	P
	Impregnated.		N/A
	Requirement not applicable to magnesium oxide and mineral ceramic fibres electrically insulating heating elements and insulating material where fibre interstices are filled with a suitable insulant.		N/A
22.22	Appliances not containing asbestos.		P
22.23	Oils containing polychlorinated biphenyl (PCB) not used.		P
22.24	Bare heating elements, except in class III appliances or class III constructions that do not contain live parts, adequately supported.	No Bare heating elements	N/A
	In case of rupture, the heating conductor is unlikely to come into contact with accessible metal parts.		N/A
22.25	Sagging heating conductors cannot come into contact with accessible metal parts.	No Sagging heating conductors	N/A
	Requirement not applicable to class III appliances or class III constructions without live parts, appliances where a core effectively prevents sagging, or where supplementary insulation prevents contact.		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.	Class I	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.	Class I	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
22.29	Class II appliances permanently connected to fixed wiring constructed so that the required degree of access to live parts is maintained after installation.	Class I	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
	constructed so that they cannot be replaced in an incorrect position and if 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 in clause 29 as a result of wear.		P
	Neither clearances nor creepage distances between live parts and accessible parts reduced below values for supplementary insulation if wires, screws, etc. become loose.		P
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.		P
	Supplementary insulation of natural or synthetic rubber resistant to ageing, or arranged and dimensioned so that creepage distances are not reduced below values specified in 29.2.		P
	Ceramic material not tightly sintered, similar materials or beads alone not used as supplementary or reinforced insulation.	No ceramic	P
	Ceramic and similar porous material in which heating conductors are embedded is considered to be basic insulation, not reinforced insulation.	No ceramic	N/A
	No visible cracks after oxygen bomb test at 70 °C for 96 h and 16 h at room temperature.		N/A
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		P
	unearthed metal parts separated from live parts by basic insulation only.	No such metal parts	N/A
	Electrodes not used for heating liquids.	No electrodes	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 are not in direct contact with basic or reinforced insulation, unless	Class I	N/A

IEC 60335-2-41			
Clause	Requirement + Test	Result - Remark	Verdict
	the reinforced insulation consists of at least 3 layers.		N/A
	For class II constructions, conductive liquids which are in contact with live parts are 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	No such shafts	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.	No such parts provided. Stationary appliances.	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	Earthing in use	P
	Insulating material covering metal handles, levers and knobs withstands the electric strength test of 16.3 for supplementary insulation.		N/A
22.36	For appliances other than class III appliances, handles continuously held in the hand in normal use so constructed that when gripped as in normal use, the operator's hand is not likely to touch metal parts, unless	No such appliances	N/A
	they are separated from live parts by double or reinforced insulation.		N/A
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	Class I	N/A
	the capacitors comply with 22.42.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
22.38	Capacitors not connected between the contacts of a thermal cut-out.	No capacitors	N/A
22.39	Lamp holders used only for the connection of lamps.	No lamp holder	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.	Excluded by part 2 (22.40): the requirement is not applicable to submersible pumps	N/A
	If the appliance can 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
	Submersible pumps for cleaning and other maintenance of swimming pools are not controlled by remote operation unless they are class III pumps with a rated voltage not exceeding 12 V. (IEC 60335-2-41)		N/A
	A switch to control the motor and a switch for stopping the operation of pumps for remote operation are not required for: (IEC 60335-2-41)		
	– pumps without accessible moving parts that are intended to be used in a closed hydraulic system; (IEC 60335-2-41)		N/A
	– table fountain pumps; (IEC 60335-2-41)		N/A
	– vertical wet pit pumps; (IEC 60335-2-41)		N/A
	– submersible pumps or (IEC 60335-2-41)		P
	– other pumps that can operate continuously without giving rise to a hazard. (IEC 60335-2-41)		N/A
22.41	No components, other than lamps, containing mercury.	No such components	N/A
22.42	Protective impedance consisting of at least two separate components.	No protective impedance	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 14.2 a) in IEC 60065:2014.		N/A
	Capacitors checked by the tests for class Y capacitors in IEC 60384-14:2013 including IEC 60384-14:2013/AMD1:2016 for rated voltage of the appliance (V).....:	Test voltage =	N/A

IEC 60335-2-41			
Clause	Requirement + Test	Result - Remark	Verdict
22.43	Appliances adjustable for different voltages, accidental changing of the setting of the voltage unlikely to occur.	No Appliances adjustable for different voltages	N/A
22.44	Appliances not having an enclosure that is shaped or decorated like a toy, unless		P
	a toy is shaped like the appliance.		N/A
22.45	When air is used as reinforced insulation, clearances not reduced below the values in 29.1.3 due to deformation of the enclosure, applying a force of 30 N to accessible surfaces.	No air used as reinforced insulation	N/A
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.	No electronic circuits or software	N/A
	These requirements are not applicable to software used for functional purpose or compliance with clause 11.		N/A
	Compliance checked by evaluating the software in accordance with the relevant requirements of normative Annex R.		N/A
	If the software is modified, the evaluation and relevant tests are repeated if the modification influences the results of the test involving protective electronic circuits.		N/A
22.47	Appliances connected to the water mains withstand the water pressure expected in normal use.	No such appliance	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 back-siphonage of non-potable water.	No such appliance	N/A
22.49	For remote operation, the duration of operation is to be set before the appliance can be started, unless	No remote operation	N/A
	the appliance switches off automatically or can operate continuously without hazard.		N/A
	The duration of operation is not required to be set before remote operation of: (IEC 60335-2-41)		
	– pumps without accessible moving parts that are intended to be used in a closed hydraulic system (IEC 60335-2-41)		N/A
	– table fountain pumps (IEC 60335-2-41)		N/A
	– vertical wet pit pumps (IEC 60335-2-41)		N/A
	– submersible pumps (IEC 60335-2-41)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	– other pumps that can operate continuously without giving rise to a hazard. (IEC 60335-2-41)		N/A
22.50	Controls incorporated in the appliance take priority over controls actuated by remote operation.	No 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.	No remote operation	N/A
	There is a visual indication showing that the appliance is adjusted for remote operation.		N/A
	These requirements are not necessary on appliances that can operate as follows, without giving rise to a hazard:		
	- continuously, or		N/A
	- automatically, or		N/A
	- be operated remotely		N/A
	A control on the pump for manually setting the pump for remote operation is not required for: (IEC 60335-2-41)		
	– pumps without accessible moving parts that are intended to be used in a closed hydraulic system (IEC 60335-2-41)		N/A
	– table fountain pumps (IEC 60335-2-41)		N/A
	– vertical wet pit pumps (IEC 60335-2-41)		N/A
	– submersible pumps or (IEC 60335-2-41)		N/A
	– other pumps that can operate continuously without giving rise to a hazard (IEC 60335-2-41)		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.	No Socket-outlets	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.	Class I	N/A
22.54	Button cells and batteries designated R1 not accessible without the aid of a tool, unless	No Button cells and batteries	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 being distinguished from other manual devices by means of shape, size, surface texture, or position	No such devices provided	N/A
	The requirement concerning position does not preclude use of a push on push off switch.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	An indication when the device has been operated is 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		N/A
22.56	Detachable power supply part provided with the part of class III construction.	No detachable power supply in use, class I	N/A
22.57	The properties of non-metallic materials do not degrade from exposure to UV-C radiation, as specified in normative Annex T.		N/A
	This requirement does not apply to glass, ceramics or similar materials.		N/A
22.58	Appliances connected to the supply mains by an appliance inlet are provided with a cord set or a connector for attachment to a suitable flexible cord, except from	No appliance inlet	N/A
	- appliances complying with IEC 60320-3, or		N/A
	- single phase appliances having a rated current exceeding 16 A, connected to mains by an appliance inlet complying with IEC 60309-2, or		N/A
	- multi-phase appliances connected to mains by an appliance inlet complying with IEC 60309-2		N/A
22.59	Protective extra-low voltage circuits separated by at least supplementary insulation from circuits operating at safety extra-low voltage.	No Protective extra-low voltage circuits	N/A
22.60	Functional earthing terminals and functional earthing contacts not connected to the neutral terminal.	No neutral terminal	N/A
22.61	Appliance outlets complying with the standard sheets in IEC 60320-3 accessible to the user and socket outlets accessible to the user are single phase, if:		
	- they are incorporated in appliances connected to the supply mains, and		N/A
	- they operate at rated voltage		N/A
	Current rating not exceeding 16 A (A):		N/A
	Appliance outlets accessible to the user, other than those supplying accessories, and socket-outlets accessible to the user are protected by one of the following:		
	- a circuit breaker for equipment complying with IEC 60934, or		N/A
	- a non-user replaceable fuse-link		N/A
	Current rating of protective device not exceeding current rating of the appliance outlet or socket-outlet (A):		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Protective device placed behind a non-detachable cover.		N/A
	Current rating of appliance outlets and socket-outlets marked with the outlet load in watts, obtained from the market outlet load divided by the rated voltage (A)		N/A
22.62	Remote communication through public networks does not impair compliance with this standard.		N/A
	The requirement does only apply to remote communication where the download of software or the transmission of data:		
	a) includes measures according to normative Annex R necessary for compliance with 22.46, or		N/A
	Includes means necessary for compliance with Clauses 8 to 32.		N/A
	b) only affects the software part that is not covered by a), but where compliance might be impaired due to improper separation of partitioning from the software or data in a)		N/A
	The requirement does not apply to appliances:		
	- where all measures to comply with this standards are independent of software,		N/A
	- using remote communication through public networks for the send-only transmission of data, or		N/A
	- that only provide event driven messages or push remote monitoring		N/A
	Compliance checked by inspection of the product and the technical documentation, and by the requirements and tests in normative Annex U		N/A
22.101	Pumps withstand the static pressure occurring in normal use (IEC 60335-2-41)	Submersible pump Test excluded by part 2	N/A
	Pump filled with water, ensuring that all air is removed. Pressure raised hydraulically to 1,2 times pressure occurring at maximum total head and is maintained for 1 min (submersible pumps and vertical wet pit pumps not subjected to this test). (IEC 60335-2-41)		N/A
	No trace of water on insulation that could result in a reduction of clearances and creepage distances below values specified in clause 29. (IEC 60335-2-41)		N/A
22.102	Material of pump is not affected by liquid for which pump is intended if a hazard could result. (IEC 60335-2-41)		P

IEC 60335-2-41			
Clause	Requirement + Test	Result - Remark	Verdict
22.103	Submersible pumps and vertical wet pit pumps be so constructed that pollution of liquid by lubricants prevented as far as possible. (IEC 60335-2-41)		P
22.104	Submersible pumps and vertical wet pit pumps having a mass > 3 kg so constructed that means for hoisting can be attached. (IEC 60335-2-41)		P
22.105	Class I submersible pumps with plastic enclosure so constructed that leakage of liquid into motor does not result in a hazard. (IEC 60335-2-41)	No plastic enclosure, only metal	N/A
	After specified test accumulating water come in contact with earthed metal before it reaches live parts. (IEC 60335-2-41)		N/A
22.106	Shower-boost pumps constructed so that they can be permanently connected to water supply. (IEC 60335-2-41)	No such appliance, submersible pump	N/A
	Shower-boost pumps for wall mounting constructed so that they can be securely fixed independently of connection to water supply. (IEC 60335-2-41)		N/A
	Keyhole slots, hooks and similar means, without any further means to prevent the pump from being inadvertently lifted off the wall, are not considered to be adequate means for fixing the pump securely. (IEC 60335-2-41)		N/A
22.107	Pumps intended for permanent connection to fixed wiring, be delivered with a separate connector, to ease the installation and establish the supply connection. Such a connector become a non-detachable part once engaged. (IEC 60335-2-41)		N/A
	Such a connector is not interchangeable with plugs and socket-outlets listed in IEC TR 60083 or IEC 60906-1 or with appliance couplers complying with the standard sheets of IEC 60320-3. (IEC 60335-2-41)		N/A
23	INTERNAL WIRING		
23.1	Wireways smooth and free from sharp edges.		P
	Wires protected against contact with burrs, cooling fins, etc.		P
	Wire holes in metal well-rounded or provided with bushings.		P
	Wiring effectively prevented from coming into contact with moving parts.		P
23.2	Beads etc. on live wires cannot change their position, and are not resting on sharp edges.	No such parts provided	N/A
	Beads inside flexible metal conduits contained within an insulating sleeve.		N/A

IEC 60335-2-41			
Clause	Requirement + Test	Result - Remark	Verdict
23.3	Electrical connections and internal conductors movable relatively to each other not exposed to undue stress.		P
	Flexible metallic tubes not causing damage to insulation of conductors.	No parts provided	N/A
	Open-coil springs not used.		P
	Adequate insulating lining provided inside a coiled spring, the turns of which touch one another.		N/A
	Appliance supplied at rated voltage: Test voltage =		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, 1 000 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 15 W.		N/A
23.4	Bare internal wiring sufficiently rigid and fixed.		N/A
23.5	No use of a single layer of internal wiring insulation to provide reinforced insulation.		P
	For class II construction, the sheath of a cord complying with IEC 60227 or IEC 60245 or IEC 62821 may provide supplementary insulation.	Class I	N/A
	Insulation of single layer internal wiring subjected to the supply mains voltage withstands the electrical stress likely to occur in normal use, if:		
	- insulation of single layer internal wiring electrically equivalent to the basic insulation of cords complying with IEC 60227 or IEC 60245 or IEC 62821, or		N/A
	- no breakdown when a voltage of 2 000 V is applied for 15 min between the conductor and metal foil wrapped around the insulation		P
23.6	Sleeving used as supplementary insulation on internal wiring retained in position by clamping at both ends, or		P
	be such that it can only be removed by breaking or cutting.		P
23.7	The colour combination green/yellow only used for earthing conductors.		P
23.8	Aluminium wires not used for internal wiring.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The requirement does not apply to windings.		P
23.9	Stranded conductors not consolidated by soldering where they are subjected to contact pressure, unless	No contact pressure	N/A
	the contact pressure is provided by spring terminals.		N/A
	The requirement does not apply to the soldered tip of a stranded conductor.		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), checked as specified.	No such appliance provided	N/A
24	COMPONENTS		
24.1	Components comply with safety requirements in relevant IEC standards.		P
	List of components..... :	(See appended table)	P
	Motors not required to comply with IEC 60034-1, they are tested as part of the appliance.		P
	Relays tested as part of the appliance, or	No relay	N/A
	alternatively, acc. to IEC 60730-1:2013 including IEC 60730-1:2013/AMD1:2015, 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.		P
	Components can comply with the requirements for clearances and creepage distances for functional insulation in the relevant component standard.		P
	30.2 of this standard applies to parts of non-metallic material in components including parts of non-metallic material supporting current-carrying connections.		N/A
	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 that the specified conditions are met.		N/A
	If these conditions are not satisfied, the component is tested as part of the appliance.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Power electronic converter circuits not required to comply with IEC 62477-1, they are tested as part of the appliance.	No Power electronic converter circuits	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.		N/A
	Components not tested and found to comply with relevant IEC standard and components not marked or not used according to their marking, tested under the conditions occurring in the appliance.		N/A
	Lampholders and starterholders not being previously tested and found to comply with the relevant IEC standard, tested as a part of the appliance and additionally complying with the gauging and interchangeability requirements of the relevant IEC standard under the conditions occurring in the appliance.	No Lampholders and starterholders	N/A
	No additional tests specified for nationally standardized plugs such as those detailed in IEC TR 60083 or connectors or plug connectors complying with the standard sheets of IEC 60320-3 or connectors complying with the standard sheets of IEC 60309-2.		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 60384-14:2013 including IEC 60384-14:2013/AMD1:2016.	No capacitor	N/A
	If the capacitors have to be tested, they are tested according to normative Annex F.		N/A
24.1.2	Transformers in associated switch mode power supplies comply with Annex BB of IEC 61558-2-16:2009 including IEC 61558-2-16:2009/AMD1:2013.	No Transformers	N/A
	Safety isolating transformers comply with IEC 61558-2-6:2009.		N/A
	If they have to be tested, they are tested according to normative Annex G.		N/A
24.1.3	Switches comply with IEC 61058-1:2016, number of cycles of operation being at least 10 000, unless	No switch	N/A
	Level switches subjected to 50 000 cycles of operation. (IEC 60335-2-41)		N/A

IEC 60335-2-41			
Clause	Requirement + Test		Verdict
	the appliance meets the requirements of this standard when they are rendered inoperative, then the number of cycles need not to be declared for 7.4 of IEC 61058-1:2016.		N/A
	If they have to be tested, they are tested according to normative Annex H.		N/A
	If the switch operates a relay or contactor, the complete switching system is subjected to the test.		N/A
	If the switch only operates a motor starting relay complying with IEC 60730-2-10 with the number of cycles of a least 10 000 as specified, the complete switching system need not be tested.		N/A
24.1.4	Automatic controls comply with IEC 60730-1:2013 including IEC 60730-1:2013/AMD1:2015 together with the relevant part 2. The number of cycles of operation being at least:		
	- thermostats:	10 000	N/A
	- temperature limiters:	1 000	N/A
	- self-resetting thermal cut-outs:	300	Self-resetting thermal cut-out approved P
	- 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 during clause 11 need not be declared, if the appliance meets the requirements of this standard when they are short-circuited or rendered inoperative.		N/A
	If automatic controls have to be tested, additionally tested in accordance with 11.3.5 to 11.3.8 and Clause 17 of IEC 60730-1:2013 including IEC 60730-1:2013/AMD1:2015 as type 1 controls, tests of Clauses 12, 13 and 14 not carried out before the test of Clause 17.		N/A
	Thermal motor protectors are tested in combination with their motor under the conditions specified in normative Annex D.		Thermal motor protectors approved N/A
	For water valves containing live parts and that are incorporated in external hoses for connection of an appliance to the water mains, degree of protection declared for 6.5.2 of IEC 60730-2-8:2018 is IPX7.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Thermal cut-outs of the capillary type comply with the requirements for type 2.K controls in IEC 60730-2-9:2015 including 60730-2-9:2015/AMD1:2018.		N/A
24.1.5	Appliance couplers comply with IEC 60320-1.	No Appliance couplers	N/A
	However, for appliances classified higher than IPX0, the appliance couplers comply with IEC 60320-2-3.		N/A
24.1.6	Small lampholders similar to E10 lampholders comply with IEC 60238, the requirements for E10 lampholders being applicable.	No Small lamp holders	N/A
24.1.7	For remote operation of the appliance via a telecommunication network, the relevant standard for the telecommunication interface circuitry in the appliance is IEC 62151.	No remote operation	N/A
24.1.8	Thermal links comply with IEC 60691.	No thermal links	N/A
24.1.9	Contactors and relays, other than motor starting relays, tested as part of the appliance.	No Contactors and relays	N/A
	They are also tested in accordance with Clause 17 of IEC 60730-1:2013 including IEC 60730-1:2013/AMD:2015, the number of cycles of operations in 24.1.4 selected according to the contactor or relay function in the appliance		N/A
24.1.10	Lamps and lamp systems that have not been previously tested and found to comply with the exempt group classification of IEC 62471:2006 GLS regarding E_s and E_{UVA} :		
	- tested as part of the appliance	No Lamps and lamp systems	N/A
	- comply with the requirements of Clause 32 under the conditions occurring in the appliance		N/A
	Unless otherwise specified, the following components are considered to comply with the specified GLS classification:		
	- visible light indicators		N/A
	- infrared sources used for signalling or communication		N/A
	- seven-segment indicators		N/A
	- liquid crystal displays		N/A
	- organic LED displays (OLED)		N/A
	- plasma displays		N/A
24.1.11	Cord sets required to be provided with the appliance comply with IEC 60799.		N/A
	Cord sets with cords complying to IEC 62821-3 allowed.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
24.1.101	The relevant standard for a connector as referenced in 22.107 is IEC 61984:2008.		N/A
	Classification and ratings used for the tests of IEC 61984:2008 correspond to the ratings of the pump and its intended use.		N/A
24.2	Appliances not fitted with:		
	- switches, automatic controls, power supplies and the like in flexible cords		P
	- devices causing the protective device in the fixed wiring to operate in the event of a fault in the appliance		P
	- thermal cut-outs that can be reset by soldering, unless		P
	the solder has a melting point of at least 230 °C.		N/A
	Level switches incorporated in interconnection cords. (IEC 60335-2-41)		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.	No such switches	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, appliance inlets, plug connectors and appliance outlets complying with the standard sheets of IEC 60320-3.	No extra-low voltage circuits or heating elements	N/A
24.5	Capacitors in auxiliary windings of motors marked with their voltage rating and their rated capacitance, and used accordingly.	No capacitors	N/A
	Voltage across capacitors in series with a motor winding does not exceed 1,1 times its voltage rating, when the appliance is supplied at 1,1 times rated voltage under minimum load (V).....:	Test voltage = Frequency =	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 (V)	No such motors	N/A
	In addition, the motors comply with the requirements of normative Annex I.		N/A
24.7	Detachable hose-sets for connection of appliances to the water mains comply with IEC 61770.	No such appliances	N/A
	They are supplied with the appliance.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Appliances intended to be permanently connected to the water mains not connected by a detachable hose-set		N/A
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.	No capacitors	N/A
	One or more of the following conditions are met:		
	- the capacitors are of class S2 or S3 according to IEC 60252-1:2010 including IEC 60252-1:2010/AMD1:2013		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 normative 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
	For capacitors complying with IEC 60252-1:2010 including IEC 60252-1:2010/AMD1:2013, damp heat test for 5.14 of that standard with severity parameters as specified.		N/A
25	SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS		
25.1	Appliance not intended for permanent connection to fixed wiring, means for connection to the supply:		
	- supply cord fitted with a plug, the current rating and voltage rating of the plug being not less than the corresponding ratings of its associated appliance		P
	- 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
	Submersible pumps, other than class III, provided with a supply cord fitted with a plug. (IEC 60335-2-41)		N/A
25.2	Appliance not provided with more than one means of connection to the supply mains.		P

IEC 60335-2-41			
Clause	Requirement + Test	Result - Remark	Verdict
	Stationary appliance for multiple supply may be provided with more than one means of connection, provided electric strength test of 1 250 V for 1 min between each means of connection causes no breakdown.	No multiple supply	N/A
25.3	Appliance intended to be permanently connected to fixed wiring provided with one of the following means for connection to the supply mains		
	- cord anchorage and a set of terminals allowing the connection of a flexible cord	No such appliances	N/A
	- a fitted supply cord	Cord provided	P
	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
	- 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
	Submersible pumps, other than class III pumps, provided with a flexible cord. (IEC 60335-2-41)	Cord provided	P
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		P
	- 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.	Three phases appliances: the supply cord is assembled to the appliance by type Y attachment	P
	Type X attachment is not allowed for submersible pumps. (IEC 60335-2-41)		N/A

IEC 60335-2-41			
Clause	Requirement + Test	Result - Remark	Verdict
	Type Z attachment is allowed for (IEC 60335-2-41)		
	- pumps having a rated power input ≤ 100 W; (IEC 60335-2-41)		N/A
	- garden pond pumps. (IEC 60335-2-41)		N/A
25.6	Plugs fitted with only one flexible cord.		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), unless		N/A
	The appliance is intended to be used outdoors or is liable to being exposed to ultraviolet radiation.		P
	- polychloroprene sheathed (at least 60245 IEC 57),	H07RNF, S1RN8-F	P
	Supply cords being allowed to be connected to appliances intended for use in low temperature.		N/A
	- polyvinyl chloride sheathed. Not used if they are likely to touch metal parts having a temperature rise exceeding 75 K during the test of clause 11		
	• 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 X attachment other than specially prepared cords		
	• heat-resistant light polyvinyl chloride sheathed cord (60227 IEC 56), for appliances not exceeding 3 kg 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		
	• 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
	Pumps intended for outdoor use and pumps intended for use in swimming pools, other than class III pumps, supply cord be (IEC 60335-2-41):		
	- polychloroprene sheathed or equivalent synthetic elastomer and not lighter than heavy polychloroprene sheathed cord (code designation 60245 IEC 66). (IEC 60335-2-41),		N/A

IEC 60335-2-41			
Clause	Requirement + Test	Result - Remark	Verdict
	- fixed pumps having a rated power input ≤ 1 kW and portable pumps having a mass ≤ 5 kg fitted with ordinary polychloroprene sheathed cord (code designation 60245 IEC 57) (IEC 60335-2-41)		N/A
	The mass of the portable pump is determined without water and without the supply cord.		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)	Rated current $>6A$ and $\leq 10A$ → min cross-sectional: 1mm ² Rated current $>10A$ and $\leq 16A$ → min cross-sectional: 1.5mm ² Rated current $>16A$ and $\leq 25A$ → min cross-sectional: 4mm ²	P
	Supply cord of submersible pumps intended for outdoor use, other than class III pumps, has a length of 10 m or at least 3 m in excess of the maximum operating depth marked on the pump, whichever is greater. (IEC 60335-2-41)	Supply cord length minimal 5m and 10 m	P
	Supply cord of submersible pumps, other than class III pumps, aquarium pumps and table fountain pumps, has a length of at least 3 m in excess of the maximum operating depth marked on the pump. (IEC 60335-2-41)		N/A
	The supply cord of aquarium pumps has a length of at least 0,5 m in excess of the maximum operating depth marked on the pump, with a minimum length of 1,5 m. (IEC 60335-2-41)		N/A
	The supply cord of deep well pumps has a length of at least 3 m in excess of the maximum well depth, unless the deep well pump is provided with a coupling device having at least the same degree of protection as required for the pump. (IEC 60335-2-41)		N/A
25.9	Supply cords for class III appliances adequately insulated.		N/A
25.10	Supply cord of class I appliances have a green/yellow core for earthing.		P
	In multi-phase appliances, the colour of the neutral conductor of the supply cord is blue	No neutral conductor	N/A
	Where additional neutral conductors are provided in the supply cord:		
	- other colours may be used for these additional neutral conductors;		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- all of the neutral conductors and line conductors are identified by marking using the alphanumeric notation specified in IEC 60445		N/A
	- the supply cord is fitted to the appliance		P
25.11	Conductors of supply cords not consolidated by soldering where they are subject to contact pressure, unless	No soldering	N/A
	the contact pressure is provided by spring terminals.		N/A
	The requirement does not apply to the soldered tip of a stranded conductor.		N/A
25.12	Insulation of the supply cord not damaged when moulding the cord to part of the enclosure.		P
25.13	Inlet openings so constructed as to prevent damage to the supply cord.		P
	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:		
	- a class 0 appliance, 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, unless		N/A
	appliance is fitted with automatic cord reels complying with the requirement and test of 22.16.		N/A
	Flexing test, as described:		
	Conductors supplied at rated voltage (V):	Test voltage =	N/A
	Conductors loaded with rated current (A):.....:	Test current =	N/A
	- applied force (N):		N/A
	- 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

IEC 60335-2-41			
Clause	Requirement + Test	Result - Remark	Verdict
	- broken strands piercing the insulation and becoming accessible		N/A
	The requirement applies to portable pumps, except table fountain pumps and aquarium pumps. (IEC 60335-2-41)		N/A
	The number of flexings for type Z attachments be 2 000 and for other attachments 1 000.....: (IEC 60335-2-41)		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.		P
	The cord cannot be pushed into the appliance to such an extent that the cord or internal parts of the appliance can be damaged		P
	Pull and torque test of supply cord:		
	- fixed appliances: pull 100 N; torque (not on automatic cord reel) (Nm):		P
	- other appliances: values shown in Table 12: mass (kg); pull (N); torque (not on automatic cord reel) (Nm):	All pumps have a mass more than 4kg Pull force 100N Torque force 0.35nm	P
	Cord not damaged and max. 2 mm displacement of the cord.		P
25.16	Cord anchorages for type X attachments constructed and located so that:		
	- replacement of the cord is easily possible	Type Y	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
	Not applicable if the cord anchorage comprises one or more clamping members subjected to pressure by means of nuts engaging with securely attached studs, even if removal possible, or if		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	One clamping member is fixed to the appliance or obviously shaped insulating material is used as the surface of the appliance.		N/A
	- screws which have to be operated when replacing the cord do not fix any other component, unless		N/A
	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
	Compliance checked by inspection and by the test of 25.15 under the following conditions:		
	- carried out with lightest permissible type of cord of the smallest cross-sectional area specified in Table 13, then with next heavier type cord having the largest cross-sectional area specified, however	(See appended table)	N/A
	if the appliance is fitted with a specially prepared cord, test carried out with this cord.		N/A
	- conductors placed in the terminals and any terminal screws tightened to prevent the conductors from easily changing their position		N/A
	- clamping screws of the cord anchorage tightened with two-thirds of the torque specified in 28.1		N/A
	- screws of insulating material bearing directly on the cord fastened with two-thirds of the torque specified in column I of Table 14, the length of the slot in the screw head being taken as the nominal diameter of the screw		N/A
	After the test, 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.	Attachment Type = cable gland	P
	For Type Z attachment compliance checked by the test of 25.15 with the cord supplied with the appliance.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	For Type Y attachment compliance checked by the test of 25.15 with the cord supplied with the appliance and designated alternative types (if any)	(see appended table)	P
25.18	Cord anchorages only accessible with the aid of a tool, or		P
	constructed so that the cord can only be fitted with the aid of a tool.		P
25.19	Type X attachment, glands not used as cord anchorage in portable appliances.	Type Y	N/A
	Tying the cord into a knot or tying the cord with string not used.		N/A
	The conductors of the supply cord for type Y and Z attachment insulated from accessible metal parts.		P
25.21	Space for supply cord for type X attachment or for connection of fixed wiring constructed:		
	- 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	No appliance inlets	N/A
	Requirement not applicable to appliance inlets complying with IEC 60320-1.		N/A
	- 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 flexible cord of the cord set is unlikely to touch such metal parts.		N/A
25.23	Interconnection cords comply with the requirements for the supply cord, except that:		
	- the cross-sectional area of the conductors is determined based on the maximum current during clause 10, and	No interconnection cords	N/A
	- the thickness of the insulation may be reduced		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	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.	No interconnection cords	N/A
25.25	Dimensions of pins that are inserted into socket-outlets compatible with the dimensions of the relevant socket-outlet.	No pins	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, such as male tabs of flat quick-connect terminations (IEC 61210), screw type terminals (IEC 60998-2-1), screwless terminals (IEC 60998-2-2) and clamping units (IEC 60999-1:1999), for connection of external conductors	Supply cord is connected directly to motor	P
	Terminals only accessible after removal of a non-detachable cover, except		P
	for class III appliances that do not contain live parts.	Class I	N/A
	Earthing terminals and functional 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	Type Y: connections are made by means of screws	P
	the connections are soldered.		N/A
	Screws and nuts not used to fix any other component, except		P
	internal conductors, if so arranged that they are unlikely to be displaced when fitting the supply conductors.		N/A
	If soldered connections used, the conductor so positioned or fixed that reliance is not placed on soldering alone, unless		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	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 constructed so that the conductor is clamped between metal surfaces with sufficient contact pressure but without damaging the conductor.	Type Y: conductor is clamped between metal surfaces with sufficient contact pressure but without damaging the conductor	P
	Terminals fixed so that when the clamping means is tightened or loosened:		
	- the terminal does not become loose		P
	- internal wiring is not subjected to stress		P
	- neither clearances nor creepage distances are reduced below the values in clause 29		P
	Compliance checked by inspection and by the test of subclause 9.6 of IEC 60999-1:1999, the torque applied being equal to two-thirds of the torque specified (Nm)..... :	Torque: 2/3 2Nm = 1.33Nm	P
	No deep or sharp indentations of the conductors.		P
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	Type Y: no special preparation of conductors such as by soldering, use of cable lugs, eyelets or similar	P
	Reshaping of the conductor before its introduction into the terminal or twisting a stranded conductor to consolidate the end is not considered special preparation.		P
	Terminals constructed or placed so that conductors prevented from slipping out when clamping screws or nuts are tightened.		P
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.	Type Y	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

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Clause	Requirement + Test	Result - Remark	Verdict
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)	Type Y Rated current >6A and ≤10A → min cross-sectional: 1mm ² Rated current >10A and ≤16A → min cross-sectional: 1.5mm ² Rated current >16A and ≤25A → min cross-sectional: 4mm ²	P
	If a specially prepared cord is used, terminals need only be suitable for that cord.		N/A
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.	Type Y	N/A
26.8	Terminals for the connection of fixed wiring, including the earthing terminal, located close to each other.		P
26.9	Terminals of the pillar type constructed and located as specified.	No such terminal	N/A
26.10	Terminals with screw clamping and screwless terminals not used for flat twin tinsel cords, unless	No such terminal	N/A
	ends of conductors 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.		P
	For class II appliances, the conductor so positioned or fixed that reliance is not placed on soldering, welding or crimping alone.	Class I	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, including metal parts behind a decorative cover that does not withstand the test of 21.1, of class 0I and I appliances permanently and reliably connected to an earthing terminal or earthing contact of the appliance inlet.		P
	Earthing terminals and earthing contacts not connected to the neutral terminal.		P
	Class 0, II and III appliances have no provision for protective earthing.	Class I	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	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.		P
	Terminals for the connection of external equipotential bonding conductors allow connection of conductors of 2,5 mm ² 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
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.	No detachable 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
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.		P
	Parts providing earthing continuity, other than parts of a metal frame or enclosure, have adequate resistance to corrosion.		P
	If of steel, these parts provided with an electroplated coating, thickness of at least 5 µm.		P
	Adequate protection against rusting of parts of coated or uncoated steel, only intended to provide or transmit contact pressure.		P
	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
	In case of doubt, thickness of coating measured as described in ISO 2178 or in ISO 1463.		N/A
27.5	Low resistance of connection between earthing terminal and earthed metal parts.		P
	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(V)	Voltage for clearances =	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Resistance not exceeding 0,1 Ω at the specified low-resistance test (Ω)	0.05 Ω	P
	The printed conductors of printed circuit boards not used to provide earthing continuity in hand-held appliances.	No PCB	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
28	SCREWS AND CONNECTIONS		
28.1	Fixings, electrical connections and connections providing earthing continuity withstand mechanical stresses.		P
	Screws not of soft metal liable to creep, such as zinc or aluminium.		P
	Diameter of screws of insulating material min. 3 mm.		N/A
	Screws of insulating material not used for any electrical connections or connections providing earthing continuity.	No such screws	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.	No such screws	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.	Type Y	N/A
	For screws and nuts; torque-test as specified in Table 14	(See appended table)	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		P
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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.		P
	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
	- 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 by means such as spring washer, lock washers and crown type locks, if they also make electrical connections or connections providing earthing continuity.	No such screws	N/A
	For screw connections not subjected to torsion, sealing compound that softens on heating allowed to be used to provide security against loosening.		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
	If connections subjected to torsion, a rivet having a non-circular shank or an appropriate notch allowed to be used to secure against loosening.		N/A
29	CLEARANCES, CREEPAGE DISTANCES AND SOLID INSULATION		

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Clause	Requirement + Test	Result - Remark	Verdict
	Clearances, creepage distances and solid insulation withstand electrical stress.		P
	For coatings used on printed circuits boards to protect the microenvironment (type 1) or to provide basic insulation (type 2), normative Annex J applies..... :	No PCB	N/A
	The microenvironment is pollution degree 1 under type 1 protection.	No such 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 60664-3:2016.	No such protection	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)	P
	for basic insulation and functional insulation, they comply with the impulse voltage test of clause 14.		N/A
	For appliances intended for use at altitudes exceeding 2 000 m, the clearances in Table 16 are increased according to the altitude correction factor in Table A.2 of IEC 60664-1:2007.	No such appliance	N/A
	However, the impulse voltage test is not applicable if the construction is such that the distances could be affected by any of the following:		
	- distortion		N/A
	- movement of parts		N/A
	- assembly of parts		N/A
	- wear of basic insulation		N/A
	- wear of functional insulation		N/A
	In this case, the clearances for rated impulse voltages of 1 500 V and above specified in Table 16 are increased by 0,5 mm.		N/A
	Impulse voltage test is not applicable:		
	- when the microenvironment is pollution degree 3, or		N/A
	- for basic insulation of class 0 and class 0I appliances, or		N/A
	- to appliances intended for use at altitudes exceeding 2 000 m		N/A
	Appliances are in overvoltage category II.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	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.		N/A
29.1.1	Clearances of basic insulation withstand the overvoltages, taking into account the rated impulse voltage.		P
	The values of Table 16 or the impulse voltage test of clause 14 are applicable	(See appended table)	P
	Clearance at the terminals of tubular sheathed heating elements may be reduced to 1,0 mm, if the microenvironment is pollution degree 1.	No such terminals	N/A
	Lacquered conductors of windings considered to be bare conductors.		P
29.1.2	Clearances of supplementary insulation not less than those spec. for basic insulation in Table 16..:	(See appended table)	N/A
29.1.3	Clearances of reinforced insulation not less than those specified in Table 16, using the next higher step for rated impulse voltage.....:	(See appended table)	P
	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)	P
	- Table F.7a in IEC 60664-1:2007, frequency not exceeding 30 kHz		N/A
	- clause 4 of IEC 60664-4:2005, 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		P
	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
	Lacquered conductors of windings considered to be bare conductors.		P
	However, clearances at crossover points are not measured.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Clearance between surfaces of PTC heating elements may be reduced to 1 mm.		N/A
29.1.5	Appliances having higher working voltages than rated voltage, clearances for basic insulation are the largest values determined from: Working voltage >.....V		
	- Table 16 based on the rated impulse voltage :		N/A
	- Table F.7a in IEC 60664-1:2007, frequency not exceeding 30 kHz		N/A
	- clause 4 of IEC 60664-4:2005, frequency exceeding 30 kHz		N/A
	If clearances for basic insulation are selected from Table F.7a of IEC 60664-1:2007 or Clause 4 of IEC 60664-4:2005, 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 60664-1:2007, 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 60664-4:2005, 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.	Rated voltage = Upper voltage limit = Working voltage =	N/A
29.2	Creepage distances not less than those appropriate for the working voltage, taking into account the material group and the pollution degree	(See appended table)	P
	Pollution degree 2 applies, unless	Pollution degree 1	N/A
	- precautions taken to protect the insulation; pollution degree 1	Completely closed	P
	- 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

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Clause	Requirement + Test	Result - Remark	Verdict
	A force of 30 N is applied to accessible surfaces.		N/A
	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.		N/A
29.2.1	Creepage distances of basic insulation not less than specified in Table 17	(See appended table)	P
	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 60664-4:2005, 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, excluding NOTE 1 and NOTE 2, or	(See appended table)	N/A
	Table 2 of IEC 60664-4:2005, as applicable :		N/A
29.2.3	Creepage distances of reinforced insulation at least double those specified for basic insulation in Table 17, excluding NOTE 1 and NOTE 2, or	(See appended table)	P
	Table 2 of IEC 60664-4:2005, as applicable		N/A
29.2.4	Creepage distances of functional insulation not less than specified in Table 18	(See appended table)	P
	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 60664-4:2005, 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.		P
	Compliance checked:		
	- by measurement, in accordance with 29.3.1, or	Insulation 2.5mm	P
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	for accessible parts of reinforced insulation consisting of a single layer, by measurement in accordance with 29.3.4, or		N/A
	- 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 60664-4:2005 for insulation that is subjected to any periodic voltage having a frequency exceeding 30 kHz		N/A
29.3.1	Supplementary insulation; thickness at least 1 mm		N/A
	Reinforced insulation; thickness of at least 2 mm	Insulation 2.5mm	P
29.3.2	Each layer of material withstands the electric strength test of 16.3 for supplementary insulation.		N/A
	Supplementary insulation consists of at least 2 layers.		N/A
	Reinforced insulation consists 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,	No External parts of non metallic material	N/A
	parts supporting live parts, and	Connectors	P
	parts of thermoplastic material providing supplementary or reinforced insulation.		N/A
	sufficiently resistant to heat.		P
	This requirement does not apply to:		
	- the insulation or sheath of flexible cords or internal wiring		N/A
	- those parts of coil formers that do not support or retain terminals in position		N/A
	- parts of ceramic material		N/A
	Ball-pressure test according to IEC 60695-10-2.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	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 30.1)	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 30.1)	N/A
30.2	Parts of non-metallic material resistant to ignition and spread of fire.	Connectors	P
	This requirement does not apply to:		
	- parts of 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
	- for pumps, other than submersible pumps with their live parts completely contained within an enclosure of metal or porcelain and instructions stating that the pump shall be supplied through a residual current device (RCD) having a rated residual operating current ≤ 30 mA, 30.2.3 is applicable. (IEC 60335-2-41)		N/A
	Compliance checked by the test of 30.2.1, and in addition:		N/A
	- for attended appliances, 30.2.2 applies	Modified by part 2	N/A
	- for unattended appliances, 30.2.3 applies	Modified by part 2	N/A
	For appliances for remote operation, 30.2.3 applies.	No remote operation	N/A
	For parts of appliances connected to the supply mains during charging, 30.2.3 applies.		N/A
	For base material of printed circuit boards, 30.2.4 applies.	No PCB	N/A
	For submersible pumps if their live parts are completely contained within an enclosure of metal or porcelain and the instructions state that the pump shall be supplied through a residual current device (RCD) having a rated residual operating current not exceeding 30 mA, 30.2.1 is applicable. (IEC 60335-2-41)		P
	For other pumps 30.2.3 is applicable. (IEC 60335-2-41)		P

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Clause	Requirement + Test	Result - Remark	Verdict
30.2.1	Parts of non-metallic material subjected to the glow-wire test of IEC 60695-2-11:2014 at 550 °C.	(See appended table 30.2)	P
	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, such as switch contacts and the like in other components, and	Excluded by part 2	N/A
	parts of non-metallic material within a distance of 3 mm of such connections,		N/A
	subjected to the glow-wire test of IEC 60695-2-11:2014 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 Note: Appliance supplied at rated voltage (V)	Test voltage = Frequency = (maybe relevant for moa ca and smps)	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 material classified as having a glow-wire flammability index according to IEC 60695-2-12 of at least:		
	- 750 °C, for connections carrying a current exceeding 0,5 A during normal operation Note: Appliance supplied at rated voltage (V)	Test voltage = Frequency = (maybe relevant for moa ca and smps)	N/A
	- 650 °C, for other connections		N/A
	The glow-wire test is also not carried out on small parts. These parts		
	- 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 normative Annex E, or	(See appended table 30.2/30.2.4)	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.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The tests are not applicable to conditions as specified		P
30.2.3.1	Parts of non-metallic material supporting connections, such as switch contacts and the like in other components, carrying a current exceeding 0,2 A during normal operation, Note: Appliance supplied at rated voltage (V) : and	Connectors	P
	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 60695-2-11:2014 with a test severity of 850 °C.	(See appended table 30.2)	P
	Glow-wire applied to an interposed shielding material, if relevant		P
	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, such as switch contacts and the like in other components, and	Connectors	P
	parts of non-metallic material within a distance of 3 mm,		N/A
	subjected to the glow-wire test of IEC 60695-2-11:2014 with appropriate severity level:	(See appended table 30.2)	P
	- 750 °C, for connections carrying a current exceeding 0,2 A during normal operation Note: Appliance supplied at rated voltage (V) :		P
	- 650 °C, for other connections		N/A
	Glow-wire applied to an interposed shielding material, if relevant		P
	However, the glow-wire test of 750 °C or 650 °C as appropriate, is not carried out on parts of material fulfilling both or either of the following 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 Note: Appliance supplied at rated voltage (V) :	Test voltage = Frequency = (maybe relevant for moa ca and smps)	N/A
	675 °C, for other connections.		N/A
	- a glow-wire flammability index according to IEC 60695-2-12 of at least:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	750 °C, for connections carrying a current exceeding 0,2 A during normal operation Note: Appliance supplied at rated voltage (V):	Test voltage = Frequency = (maybe relevant for moa ca and smps)	N/A
	650 °C, for other connections.		N/A
	The glow-wire test is also not carried out on small parts. 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 normative 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 applied to non-metallic parts that encroach within the vertical cylinder placed above the centre of the connection zone and on top of the non-metallic parts supporting current-carrying connections, and parts of non-metallic material within a distance of 3 mm of such connections if these parts are those:		
	- parts that withstood the glow-wire test of IEC 60695-2-11:2014 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 normative 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 carried out on non-metallic parts, including small parts, within the cylinder that are:		
	- 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 normative Annex E or that comprises material classified as V-0 or V-1 according to IEC 60695-11-10		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	No battery in the area of the vertical cylinder used for the consequential needle flame test, unless		N/A
	battery shielded by a barrier that meets the needle flame test of normative 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 normative Annex E.	(See appended table 30.2/30.2.4)	N/A
	Test not applicable to conditions as specified :		N/A
31	RESISTANCE TO RUSTING		
	Relevant ferrous parts adequately protected against rusting.		P
	Tests specified in part 2 when necessary.		N/A
32	RADIATION, TOXICITY AND SIMILAR HAZARDS		
32.1	Appliance does not emit harmful radiation or present a toxic or similar hazard due to their operation in normal use.		P
	Compliance is checked by the limits or tests specified in part 2, if relevant.		N/A
32.2	Appliance do not present an optical radiation hazard due to their operation in normal use.		P
	Requirement does not apply to lamps and lamp systems that comply with 24.1.10.		N/A
	Compliance checked as follows:		
	appliance supplied at rated voltage (V) : Note: Generally 50 Hz is the most unfavourable frequency.	Test voltage = Frequency =	N/A
	- Radiation assessment at or recalculated to 200 mm distance or at fixed use distance, measurement as described in IEC 62471:2006		N/A
	- For lamps or lamp systems intended to illuminate objects, tested at the GLS assessment distance producing 500 lux as described in IEC 62471:2006		N/A
	- Appliance complies with exempt group classification requirements of IEC 62471:2006 regarding actinic ultraviolet hazard (E _s) and near-UV hazard (E _{UVA})		N/A
A	ANNEX A (INFORMATIVE) ROUTINE TESTS		
	Description of routine tests to be carried out by the manufacturer.		P

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Clause	Requirement + Test	Result - Remark	Verdict
B	ANNEX B (NORMATIVE) BATTERY-OPERATED APPLIANCES, SEPARABLE BATTERIES AND DETACHABLE BATTERIES FOR BATTERY-OPERATED APPLIANCES		
	The following modifications to this standard are applicable to:		
	- battery-operated appliances and remote controls employing non-rechargeable batteries (primary batteries)	No appliances powered by batteries	N/A
	- battery-operated appliances and remote controls employing rechargeable batteries (secondary batteries)		N/A
	- detachable and separable batteries for battery-operated appliances		N/A
B.3.1.1	Battery-operated appliance operated under the following conditions:		
	- for appliances operated with detachable or separable batteries disconnected from the appliance for charging, appliance operated to perform its intended function with a fully charged battery, the battery being the model or type reference of the battery provided or indicated in the instructions		N/A
	- for appliances operated with integral or separable batteries not disconnected from the appliance for charging, and that cannot perform their intended function while batteries are being charged, appliance operated to perform its intended function with a fully charged battery		N/A
	- for appliances operated with replaceable batteries, including integral replaceable batteries, or non-rechargeable batteries, appliance operated to perform its intended function with the artificial source described in B5.3, upper limit short circuit current capacity specified in Table B.1		N/A
B.3.6.1	Non-rechargeable battery: battery is supplied in a fully charged state and cannot be recharged after		N/A
5.2	tests of B.19.1 to B.19.6 carried out on separate samples.		N/A
B.5.1	Before starting a test requiring a fully charged battery, battery fully charged, disconnected from source and allowed to rest between 2 h and 6 h.		N/A
B.5.2	Specification of a rated voltage implies the use of a fully charged battery.		N/A
	For battery-operated appliances, where the supply terminal connecting the battery have no indication of polarity, the more unfavourably polarity applied, unless		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	such a connection unlikely to occur due to the construction of the appliance.		N/A
B.5.3	When specified that a battery provided with or intended for the appliance may be replaced by an artificial source, that source consists of a DC power supply or a specially constructed battery, output of each as described in Table B.1 for the relevant battery type.		N/A
6.1	Battery-operated appliances without a supply connection or a functional earth connection not classified with respect to protection against electric shock.		N/A
7.1	Battery-operated appliances and remote controls containing batteries marked with the:		
	- name, trademark 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 the battery, if battery either not recharged in the appliance or non-rechargeable		N/A
	Appliances incorporating replaceable batteries marked with:		
	- battery type reference		N/A
	- battery voltage (V):		N/A
	- polarity of the terminals, unless		N/A
	incorrect insertion of battery by the user unlikely to occur due to the construction of the appliance		N/A
	If more than one battery type can be used with the appliance, appliance marked with the type reference of at least one of the battery types that can be used, together with:		
	- symbol ISO 7000-0790 (2004-01), or		N/A
	- the substance of the following:		
	See instruction manual for additional battery types.		N/A
	If appliances use more than one battery, appliance marked to indicate correct polarity connection of the batteries.		N/A
	If relevant, positive terminal indicated by symbol IEC 60417-5005 (2002-10), and		N/A
	negative terminal indicated by symbol IEC 60417-5006 (2002-10).		N/A
	Detachable and separable batteries marked with:		

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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
	Detachable and separable batteries disconnected from the appliance for charging the battery marked with:		
	- symbol ISO 7000-0790 (2004-01)		N/A
	- symbol IEC 60417-6413 (2019-05)		N/A
	- model or type reference of the battery charger, or the substance of the following:		N/A
	Use only with <model or type reference> battery charger..... :		N/A
	If more than one battery charger can be used to charge a detachable and separable battery disconnected from the appliance for charging, battery marked with the type reference of at least one of the battery charges that can be used, together with		N/A
	either symbol ISO 7000-0790 (2004-01), or the substance of the following:		N/A
	See instruction manual for additional battery chargers.		N/A
	Batteries that are user replaceable, other than general purpose batteries, marked with the:		
	- name, trademark or identification mark of the manufacturer or responsible vendor		N/A
	- model or type reference		N/A
	- nominal voltage (V)..... :		N/A
7.6	Additional symbols		N/A
7.12	Instructions provided with the appliance		N/A
	For appliances intended for use at altitudes exceeding 2 000 m, maximum altitude stated		N/A
	If necessary, appropriate details on precautions during user maintenance stated.		N/A
	The instructions state the substance of the following:		

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Clause	Requirement + Test	Result - Remark	Verdict
	This appliance is not intended for use 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 concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.		N/A
	For appliances incorporating batteries intended to be removed for charging or intended to be replaced by the user and that can be contained in the small parts cylinder, the instructions state the substance of the following:		
	WARNING: Keep out of reach of children. Swallowing can lead to chemical burns, perforation of soft tissue, and death. Severe burns can occur within 2 h of ingestion. Seek medical attention immediately.		N/A
	For appliances intended for use with batteries that use metal-ion chemistries, the instructions state the normal temperature range for charging.		N/A
	For battery-operated appliances, the instructions contain the following information, as applicable:		
	- battery type		N/A
	- details regarding safe disposal of used batteries		N/A
	- how to deal with leaking batteries		N/A
	For battery-operated appliances, the instructions contain the substance of the following:		
	- do not expose the appliance or battery to excessive temperatures		N/A
	- be aware of the risk of terminals of the battery-operated appliance or battery being short-circuited by metal objects		N/A
	For battery-operated appliances containing non-rechargeable batteries, the instructions state the substance of the following:		
	This appliance contains non-rechargeable batteries, these batteries are not to be recharged.		N/A
	For battery-operated appliances containing non-user-replaceable batteries, the instructions state the substance of the following:		
	This appliance contains batteries that are only replaceable by skilled persons.		N/A
	For battery-operated appliances containing non-replaceable batteries, the instructions state the substance of the following:		
	This appliance contains batteries that are non-replaceable. When the battery is at end of life, the appliance shall be properly disposed of.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	For battery-operated appliances incorporating batteries intended to be removed for charging or replaced by the user, the instructions include, as applicable, the substance of the following:		
	- rechargeable batteries are to be removed from the appliance before being charged		N/A
	- different types of batteries or new and used batteries are not to be mixed		N/A
	- exhausted batteries are to be removed from the appliance and safely disposed of		N/A
	- if the appliance is to be stored unused for a long period, the batteries should be removed		N/A
	- do not use non-rechargeable batteries in place of rechargeable batteries		N/A
	- do not use modified or damaged batteries		N/A
	For battery-operated appliances incorporating batteries intended to be removed for charging or replaced by the user, the instructions include, as applicable, the following information:		
	Battery type reference		N/A
	- orientation of the battery with regard to polarity		N/A
	- method of replacing batteries including maintaining correct polarity		N/A
	For battery-operated appliances incorporating batteries intended to be removed prior to disposal of the appliance, the instructions include details regarding their safe removal and disposal		N/A
	For battery-operated appliances that use detachable and separable batteries disconnected from the appliance for charging, the instructions include the model or type reference of the battery charger to be used, along with the substance of the following:		N/A
	WARNING: Use only with <model or type reference> battery charger.		N/A
	If the symbol for battery charger is used, its meaning is explained.		N/A
7.15	Markings specified for batteries intended to be replaced by the user are in or adjacent to the battery compartment.		N/A
	Marking to indicate correct polarity connection of the batteries specified for appliances using more than one general purpose battery is in or adjacent to the battery compartment.		N/A
	Type reference of battery charger placed next to symbol IEC 60417-6413 (2019-05).		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
8	This clause is not applicable to the appliance functional part of a battery-operated appliance and its batteries, providing the battery circuits do not have an earth or mains connection		N/A
11.1	Battery operated appliances, their surroundings, and batteries not attaining excessive temperatures in normal use		N/A
	Compliance tested under the conditions specified in B.11.1, 11.2, 11.3, 11.7 and 11.8		N/A
B.11.1	Battery-operated appliances tested under the conditions of normal operation.		N/A
	For appliances operated with detachable or separable batteries disconnected for charging, appliance operated until depletion of battery and test repeated with fully charged battery until it depletes or until temperature rises have stabilized as specified, whichever occurs first.		N/A
	For appliances incorporating integral or separable batteries not disconnected for charging, and that cannot perform while batteries are being charged, appliance operated until depletion of batteries.		N/A
	For appliances operated with replaceable or non-rechargeable batteries, appliance operated until the minimum capacity of the battery as specified in Table B.1 has been delivered or until steady conditions are established, whichever occurs first.		N/A
	For appliances incorporating integral batteries or separable batteries not disconnected from the appliance for charging purposes, and that cannot perform their intended function while the batteries are being charged, the appliance is operated as specified until it cannot perform its intended function due to the depletion of the batteries. (IEC60335-2-41)		N/A
	If marked with a maximum period of operation, battery-operated pumps are tested under the conditions of normal operation with the pump operated for the marked period followed by the rest period specified in the instructions, the test being carried out for three cycles of operation. Pumps, other than shower-boost pumps, marked with a maximum period of operation are also operated with the liquid maintained at 35 °C until steady conditions are established. (IEC60335-2-41)		N/A
19.1	For battery-operated appliances, instead of the tests specified, tests of 19.2, 19.4, 19.7, 19.9, 19.11, 19.12, 19.14, 19.15, B.19.1 to B.19.5.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Detachable and separable batteries also subjected to the test of B.19.6.		N/A
	For battery-operated appliances, tests carried out under normal operation.		N/A
19.2	Appliances with heating elements tested under the conditions specified in Clause 11 but with restricted heat dissipation.		N/A
19.7	Battery-operated appliance switched on and operated under stalled conditions by:		
	- locking the rotor of appliances for which the locked rotor torque is smaller than the full load torque		N/A
	- locking moving parts of other appliances		N/A
	If an appliance has more than one motor, test carried out for each motor separately		N/A
	Test conducted at both I_{sc} (high) and I_{sc} (low), if testing with the artificial source described in B.5.3.		N/A
	Test conducted:		
	- until the test sample achieves a steady condition, including returning to room temperature, or		N/A
	- until at a time period of at least 3 h has elapsed		N/A
19.11	Electronic circuits checked by evaluation of the fault conditions specified in 19.11.2 for all circuits or parts of circuits, unless they comply with the conditions specified in 19.11.1.		N/A
	Appliances having a device with an off position obtained by electronic disconnection, or a device that can place the appliance in a stand-by mode, 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, test of 19.12 carried out, and		N/A
	the appliance complies with the conditions specified in 19.13.		N/A
	If a conductor of a printed circuit board becomes open-circuited, the appliance is considered to have withstood the particular test, provided that the base material of the printed circuit board withstands the test of normative Annex E.		N/A
19.11.2	When any of the fault conditions simulated, duration of test until steady conditions.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
19.11.4	Appliances having a device with an off position obtained by electronic disconnection, or a device that can be placed in the stand-by mode, subjected to the tests of 19.11.4.1 and 19.11.4.2.		N/A
	Tests carried out with the appliance supplied by a fully charged battery, 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 and 19.11.4.2.		N/A
	Tests carried out after the protective electronic circuit has operated during the relevant tests of Clause 19 except 19.2 and 19.11.3.		N/A
19.11.4.8	Battery operated appliances are supplied with a fully charged battery, operated under normal operation for 60 s, and then subjected to a 60 s interruption of the battery current.		N/A
	When battery current restored, the appliance:		
	- continues to operate normally from the same operation cycle point reached before the battery supply was interrupted, or		N/A
	- does not continue operating without requiring manual intervention to restart from the same operating cycle point reached before the battery supply was interrupted, or		N/A
	- does not continue operating without requiring manual intervention to restart from the part of the cycle selected by the user		N/A
19.13	During tests, no flames, molten metal or poisonous or ignitable gas in hazardous amounts and temperature rises not exceeding the values shown in Table 9		N/A
	No explosion or ignition of the battery during or after the test.		N/A
	Venting of cells permitted through their vents.		N/A
	After the tests, and when the appliance has cooled to room temperature, compliance with B.22.3 and B.22.5 not impaired and the appliance complies with 20.2 and Clause 29, if still operable.		N/A
	For appliances immersed in or filled with conducting liquid in normal use, appliance immersed in or filled with water for 24 h before the test of B.22.5.		N/A
	No dangerous malfunction and no failure of protective electronic circuits, if still operable.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Appliances tested with an electronic switch in the off position:		
	- do not become operational, or		N/A
	- do not result in a dangerous malfunction during or after the tests of 19.11.4, if they become operational		N/A
	In an appliance containing lids or doors controlled by one or more interlocks, one of the interlocks may be released if both of the following conditions are fulfilled:		
	- no movement to an open position when released		N/A
	- no restart after the cycle in which it was released		N/A
19.15	For battery-operated appliances incorporating a manual voltage selector switch intended to select battery voltage, switch set to lowest voltage position and highest voltage applied.		N/A
B.19.1	Supply terminals of a battery-operated appliance having an indication of polarity connected to the battery terminals of opposite polarity, unless		N/A
	connection by the user unlikely to occur.		N/A
B.19.2	For battery-operated appliances with provision for multiple batteries, one or more of the batteries reversed and appliance operated, if reversal by the user of battery polarity allowed by the construction.		N/A
B.19.3	For battery-operated appliances with motor(s), terminals of each motor short circuited one at a time, where the resistance of the short-circuit does not exceed 10 mΩ and while operated under the conditions of Clause 11.		N/A
	Test conducted until steady conditions are achieved, including returning to room temperature or until a time period of at least 3 h.		N/A
B.19.4	Test conducted with all the cells of the battery fully charged and, for batteries consisting of more than one cell, one cell fully discharged on a detachable or separable battery connected to the appliance or on an appliance containing an integral battery.		N/A
	Main discharge connections of the battery shorted with a resistance not to exceed 10 mΩ, conducted until a non-self-resetting protection device operates or an intentionally weak part becomes permanently open-circuited or until the test sample returns to room temperature.		N/A
B.19.5	Battery-operated appliance and any cords except supply cords, as appropriate, tested with the battery connected, under the following fault conditions applied one at a time:		

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Clause	Requirement + Test	Result - Remark	Verdict
	- any cord provided between the battery-operated appliance and a separable battery is short-circuited at the point along its length likely to produce the most adverse effects		N/A
	- for appliances having replaceable batteries that are replaceable and that can be removed without the aid of a tool, and having terminals that can be short-circuited by a thin straight bar, the terminals of the battery are short-circuited		N/A
	- charging terminals of the battery-operated appliance that are simultaneously accessible with the test probe 13 of IEC 61032 are short circuited so as to produce the most unfavourable result		N/A
	Battery-operated appliance switched on and no additional mechanical load applied.		N/A
	Tests conducted until the test sample achieves a steady condition, including returning to room temperature or, until a time period of at least 3 h.		N/A
	Resistance of short circuit not exceeding 10 mΩ.		N/A
B.19.6	For detachable and separable batteries, combinations of terminals simultaneously accessible by applying the test probe 13 of IEC 61032 short circuited so as to produce the most unfavourable result.		N/A
B.20.1	The enclosure of a battery-operated appliance incorporating an integral battery that uses metal-ion chemistry withstands the pressure generated when a cell vents during failure.		N/A
	Compliance checked by inspection after the tests of Clause 19 for batteries with a capacity less than 0,2 Ah, and measurement or test as specified.		N/A
B.20.2	The enclosure of detachable and separable batteries that use metal-ion chemistries withstands the pressure generated when a cell vents during failure; tests as specified.		N/A
	Compliance checked by inspection after the tests of Clause 19 for batteries with a capacity less than 0,2 Ah, and measurement or test as specified.		N/A
21.1	Battery-operated appliances have adequate mechanical strength and are constructed to withstand rough handling expected in normal use.		N/A
	Appliance fitted with fully charged batteries and rigidly supported subjected to test Ehb of IEC 60068-2-75, three blows of 0,5 J applied to every point of the appliance enclosure likely to be weak.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	If necessary, blows also applied to handles, levers, knobs and similar parts and to signal lamps and their covers, but only if the lamps or covers protrude from the enclosure by more than 10 mm or if their surface area exceeds 4 cm ² .		N/A
	Lamps within the appliance and their covers only tested if likely to be damaged in normal use.		N/A
	When applying the release cone to the guard of a visibly glowing heating element, the hammer head passing through the guard does not strike the heating element.		N/A
	In case of doubt, defect neglected and the group of three blows applied to the same place on a new sample which then withstands the test.		N/A
	Hand-held battery-operated appliances also subjected to test free-fall - procedure 1, of IEC 60068-2-31, under the specified conditions.		N/A
	Free-fall test does not cause the appliance to catch fire, leak fluid visible from the outside or explode and meets the requirements of Clause 20, Clause 29, B.22.3 and B.22.5 where short circuit of functional insulation will impair compliance with this standard.		N/A
B.21.1	Separable and detachable batteries, when not connected to the appliance, have adequate mechanical strength and are constructed to withstand rough handling expected in normal use.		N/A
	Fully charged battery, rigidly supported, subject to test Ehb of IEC 60068-2-75, three blows of 0,5 J applied to every point of the battery enclosure likely to be weak.		N/A
	In case of doubt, defect neglected and the group of three blows applied to the same place on a new sample which then withstands the test.		N/A
	Detachable and separable batteries subjected to the test free-fall - procedure 1, of IEC 60068-2-31, under the conditions as specified.		N/A
	Free-fall test does not damage the battery or cause it to catch fire, leak fluid visible from the outside or explode and meets the requirements of Clause 20, Clause 29, B.22.4 and B.22.5 where short circuit of functional insulation will impair compliance with this standard.		N/A
	For batteries using metal-ion chemistry:		
	- open circuit voltage of the battery 24 h after the tests not less than 90 % of the voltage measured immediately prior to the tests		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- cells only vented through their vents		N/A
22.11	Non-detachable parts that protect against electric shock, moisture or contact with moving parts reliably are fixed and withstand the mechanical stress occurring during normal use.		N/A
	Snap-in devices used for fixing such parts have an obvious locked position.		N/A
	Fixing properties of snap-in devices used in parts that are likely to be removed during installation or servicing reliable.		N/A
22.20	Direct contact between current carrying parts and thermal insulation that would impair compliance with this standard effectively prevented, unless		N/A
	such material is noncorrosive, non-hygroscopic and non-combustible.		N/A
	Not applicable to glass-wool thermal insulation.		N/A
22.24	Not applicable to battery-operated appliances that do not contain parts requiring protection against simultaneous contact according to B.22.3.		N/A
22.25	Not applicable to battery-operated appliances that do not contain parts requiring protection against simultaneous contact according to B.22.3.		N/A
22.33	Conductive liquids that are or may become accessible in normal use and conductive liquids that are in contact with accessible metal parts are not in direct contact with current carrying parts or unearthed metal parts that are separated from current carrying parts by basic insulation only or with other current carrying parts such that compliance with B.22.3 and B.22.4 would be impaired.		N/A
B.22.1	User accessible interfaces between elements of a battery system (not mains connections) do not employ appliance couplers according to IEC 60320 (all parts) or IEC 60309-2.		N/A
	User accessible interfaces between elements of a battery system (not mains connections) do not employ connectors of the following types unless the battery system is adequately protected against the use of an incorrect supply:		
	- barrel connectors with outside diameters of 6,5 mm or less		N/A
	- concentric connectors with a diameter of 3,5 mm or less according to IEC 60603-11		N/A
	Compliance checked by inspection, measurement and for determining adequacy of protection against use of an incorrect supply, by the test as specified.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Source selected such that its current capability does not limit the charging of the battery.		N/A
	During the application of incremental voltages, the appliance is either operating normally or, if not, does not emit flames, molten metal, or poisonous or ignitable gas in hazardous amounts and temperature rises do not exceed the values shown in Table 9.		N/A
	No explosion or ignition of the battery during or after the test.		N/A
	Venting of cells permitted through their vents.		N/A
B.22.2	External surfaces of detachable and separable batteries protected against excessive heat from heat sources (directly or via heated discharge air) present during operation of the appliance.		N/A
B.22.3	Battery-operated appliances so constructed and enclosed that there is adequate protection against simultaneous contact with two or more conductive parts where the:		
	- voltage between them exceeds 42,4 V		N/A
	- current between the conductive parts exceeds 2 mA for DC or 0,7 mA peak for when ripple exceeds 10 %		N/A
	Compliance checked with test probe B and test probe 18 of IEC 61032 as described.		N/A
	Detachable parts except lamps behind a detachable cover removed during the tests with test probe B, however		N/A
	during insertion or removal of lamps located behind a detachable cover, protection against simultaneous contact with parts having a voltage between them exceeding 42,4 V ensured.		N/A
	During the tests with test probe 18, appliance fully assembled as in normal use, no parts removed.		N/A
	However, test probe 18 not applied to appliances for commercial use, unless		N/A
	intended to be installed in an area open to the public.		N/A
	Not possible to touch two or more conductive parts of opposite polarity with the probes if the voltage between them exceeds 42,4 V and the current between them exceeds 2 mA for DC or 0,7 mA peak for when ripple exceeds 10 %.		N/A
	Current measured using the circuit in Figure 4 of IEC 60990:2016.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
B.22.4	Separable and detachable batteries so constructed and enclosed that there is adequate protection against simultaneous contact with two or more conductive parts where the:		
	- voltage between them exceeds 42,4 V		N/A
	- current between the conductive parts exceeds 2 mA		N/A
	Compliance checked with test probe B and test probe 18 of IEC 61032 as described		N/A
	During the tests with:		
	- test probe B, all detachable parts removed		N/A
	- test probe 18, no parts removed		N/A
	However, test probe 18 not applied to appliances for commercial use, unless		N/A
	intended to be installed in an area open to the public		N/A
	Not possible to touch two or more conductive parts of opposite polarity with the probes if the voltage between them exceeds 42,4 V and the current between them exceeds 2 mA		N/A
	Current measured using the circuit in Figure 4 of IEC 60990:2016		N/A
B.22.5	Insulating materials providing protection against simultaneous contact with two or more conductive parts are adequate when:		
	- they are within 1,0 mm of the conductive parts		N/A
	- the voltage between the conductive parts exceeds 42,4 V peak		N/A
	- the current between the conductive parts exceeds 2 mA for DC or 0,7 mA peak for when ripple exceeds 10 %		N/A
	Insulating material subjected to voltage test as specified at 750 V or 1,2 times the working voltage plus 700 V, whichever greater, in accordance with IEC 61180 (V)		N/A
	No breakdown during the test.		N/A
	Current measured using the circuit in Figure 4 of IEC 60990:2016.		N/A
B.22.6	Vents of cells not obstructed such that their operation is defeated if venting is relied upon compliance with this standard.		N/A
23.3	Instead of the electric strength test of 16.3, battery-operated appliances comply with B.22.3.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
23.5	For battery-operated appliances compliance is checked by the test of B.22.5.		N/A
24.1	Batteries are not required to comply with IEC 62133-1:2017 or IEC 62133-2:2017, they are tested as part of the appliance according to this standard.		N/A
24.1.3	Switches in battery-operated appliances have adequate breaking capacity and withstand, without excessive wear or other harmful effect, the mechanical, electrical, and thermal stresses occurring in the battery-operated appliance		N/A
	Tests as described and according to the relevant standard for switches, IEC 61058-1-1:2016 for mechanical switches and IEC 61058-1-2:2016 for electronic switches		N/A
	Required cycles of operation completed, no electrical or mechanical failure		N/A
	At the end of the tests:		
	- switch contacts operating properly in the "on" and "off" positions		N/A
	- temperature rise of the switch terminals not increased by more than 30 K above the temperature rise measured in Clause 11		N/A
B.24.1	The relevant standards for non-acid based electrolyte cells employed in batteries are IEC 62133-1:2017 for nickel systems and IEC 62133-2:2017 for lithium systems.		N/A
	A battery that uses metal-ion chemistry is additionally subjected to the tests of subclauses 7.3.8.1 (vibration) and 7.3.8.2 (mechanical shock) of IEC 62133-2:2017.		N/A
25.9	The requirement also applies to interconnection cords of battery-operated appliances.		N/A
25.14	The requirement also applies to interconnection cords of battery-operated appliances.		N/A
25.15	The requirement also applies to interconnection cords of battery-operated appliances.		N/A
B.25.1	Insulated conductors of interconnection cords of battery-operated appliances comply with the requirements for internal wiring and are provided with at least 0,5 mm thick outer sheath made of insulating material equivalent to that of supply cords described in 25.7.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
B.26.1	Terminal devices in an appliance for the connection of the flexible leads or flexible cord connecting a separable battery so located or shielded that there is no risk of incorrect connection.		N/A
27.1	The battery-operated appliance does not have a provision for a protective earth but may incorporate a functional earth.		N/A
29.1	Clearances not less than the values specified in Table 16, taking into account the rated impulse voltage.		N/A
	For battery-operated appliances, the rated impulse voltage is 500 V for working voltages less than 50 V and 1 500 V for all other working voltages.		N/A
	However, if the construction, including between parts of opposite polarity for connecting the battery, is such that the distances could be affected by wear, by distortion, by movement of the parts or during assembly, the clearances for rated impulse voltages of 1 500 V are increased by 0,5 mm and the impulse voltage test is not applicable.		N/A
B.29.1.1	For parts requiring protection against simultaneous contact according to B.22.3 and B.22.4, the sum total of the clearances between each of these parts and their nearest accessible surface is not less than two times the Table 16 clearance taking into account the rated impulse voltage.		N/A
	For the purpose of this determination, at least one of the clearances is not less than 1,0 mm.		N/A
B.29.2.1	For parts requiring protection against simultaneous contact according to B.22.3 and B.22.4, the sum total of the creepage distances between each of these parts and their nearest accessible surface is not less than two times the Table 17 creepage distances.		N/A
	For the purpose of this determination, at least one of the creepage distances is not less than 1,0 mm.		N/A
30.1	External parts of non-metallic material, the deterioration of which might cause the battery-operated appliance, separable battery or detachable battery to fail to comply with this annex, are sufficiently resistant to heat.		N/A
C	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.	No such motors	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	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.	Thermal motor protector approved	N/A
	Test conditions as specified with appliance supplied at rated voltage (V).....: Induction motors See DSH 543AA	Test voltage = Frequency =	N/A
E	ANNEX E (NORMATIVE) NEEDLE-FLAME TEST		
	Needle-flame test carried out in accordance with IEC 60695-11-5:2016, with the following modifications:		
7	Flame application times		
	The duration of application of the test flame is 30 s ± 1 s.		N/A
9	Test procedure		
9.2	The specimen so arranged that the flame can be applied to a vertical or horizontal edge as shown in the examples of Figure 2.		N/A
9.3	The first paragraph does not apply.		N/A
	If possible, the flame is applied at least 10 mm from a corner.		N/A
9.4	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 60384-14:2013 including IEC 60384-14:2013/AMD1:2016, with the following modifications:		
1.5	Terms and definitions		
1.5.3	Class X capacitors tested according to subclass X2.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
1.5.4	Class Y capacitors tested according to subclass Y2.		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		
4.2	Electrical tests		
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 applicable for safety isolating transformers:		
7	Marking and instructions		
7.1	Transformers for specific use marked with the:		
	- name, trademark or identification mark of the manufacturer or responsible vendor		N/A
	- model or type reference.....		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
17	Overload protection of transformers and associated circuits		
	Fail-safe transformers comply with subclause 15.5 of IEC 61558-1:2017		N/A
22	Construction		
	Subclauses 19.1 and 19.1.2 of IEC 61558-2-6:2009 are applicable.		N/A
29	Clearances, creepage distances and solid insulation		
29.1, 29.2, 29.3	The distances specified in Table 20, Table 21 and Table 22 of IEC 61558-1:2017 apply.		N/A
	For insulated winding wires complying with subclause 19.12.3 of IEC 61558-1:2017 there are no requirements for clearances or creepage distances.		N/A
	For windings providing reinforced insulation, the distances specified in Table 20 and Table 21 of IEC 61558-1:2017 are 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 60664-4:2005 are applicable, if greater than the values specified in Table 20, Table 21 and Table 22 of IEC 61558-1:2017.		N/A
H	ANNEX H (NORMATIVE) SWITCHES		
	Switches comply with the following clauses of IEC 61058-1:2016 and IEC 61058-1-1:2016, as modified below:		
	The tests 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 trademark and the type reference.		N/A
13	Mechanism		
	The tests can be carried out on a separate sample.		N/A
15	Insulation resistance and dielectric strength		
15.3	Applicable for full disconnection and micro-disconnection, test carried out immediately after the humidity test of subclause 15.3 of IEC 60335-1		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
17	Endurance		
	Compliance is checked on three separate appliances or switches.		N/A
	For 17.5.4 of IEC 61058-1-1:2016, the number of cycles of actuation declared according to 7.4 is 10 000, unless		N/A
	otherwise specified in 24.1.3 of IEC 60335-1 :		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
	However, switches without this interlock are subjected to the test of 17.5.4 of IEC 61058-1-1:2016 for 100 cycles of operation.		N/A
	Subclauses 17.3 and 17.6.2 of IEC 61058-1-1:2016 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		
	Clause 20 of IEC 61058-1:2016 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 14.		N/A
I	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

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Clause	Requirement + Test	Result - Remark	Verdict
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
I.19.1	Appliance operated at rated voltage with each of the following fault conditions:		
	Rated voltage (V)	Test voltage =	N/A
	- 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
	Only one fault simulated at a time, the tests carried out consecutively.		N/A
22	Construction		
I.22.1	For class I appliances incorporating a motor supplied by a rectifier circuit, the DC 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		
	Protective coatings of printed circuit boards comply with IEC 60664-3:2016 with the following modifications:		
5.1	General		
	When production samples are used, three samples of the printed circuit board are tested.		N/A
5.7.2	Cold conditioning		
	The test is carried out at -25 °C.		N/A
5.7.4	Rapid change of temperature		
	Severity 1 is specified, the number of cycles is 5.		N/A
5.7.5.2	Additional conditioning with respect to electromigration		
	The test duration is 10 days.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
5.9	Additional tests		
K	ANNEX K (INFORMATIVE) OVERVOLTAGE CATEGORIES		
	The information on overvoltage categories is extracted from IEC 60664-1:2007.		P
	Overvoltage category is a numeral defining a transient overvoltage condition.		P
	Equipment of overvoltage category IV is for use at the origin of the installation.	Overvoltage category II	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.	Overvoltage category II	N/A
	Equipment of overvoltage category II is energy consuming equipment to be supplied from the fixed installation.		P
	If such equipment is subjected to special requirements with regard to reliability and availability, overvoltage category III applies.	Overvoltage category II	N/A
	Equipment of overvoltage category I is equipment for connection to circuits in which measures are taken to limit transient overvoltages to an appropriately low level.	Overvoltage category II	N/A
L	ANNEX L (INFORMATIVE) GUIDANCE FOR THE MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES		
	Information for the determination of clearances and creepage distances.		P
M	ANNEX M (INFORMATIVE) POLLUTION DEGREE		
	The information on pollution degrees is extracted from IEC 60664-1:2007.		P
	Pollution		
	The microenvironment determines the effect of pollution on the insulation, taking into account the macroenvironment.		P
	Means may be provided to reduce pollution at the insulation by effective enclosures or similar.		P
	Minimum clearances specified where pollution may be present in the microenvironment.		P
	Degrees of pollution in the microenvironment		
	For evaluating creepage distances, the following degrees of pollution in the microenvironment are established:		

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Clause	Requirement + Test	Result - Remark	Verdict
	- pollution degree 1: no pollution or only dry, non-conductive pollution occurs. The pollution has no influence		P
	- pollution degree 2: only non-conductive pollution occurs, except that occasionally a temporary conductivity caused by condensation is to be expected		N/A
	- 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		
7	Test apparatus		
7.3	Test solutions		
	Test solution A is used.		
10	Determination of proof tracking index (PTI)		
10.1	Procedure		
	Proof voltage of 100 V, 175 V, 400 V or 600 V.....:		N/A
	The test is carried out on five specimens		N/A
	In case of doubt, additional test with proof voltage reduced by 25 V, 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
O	ANNEX O (INFORMATIVE) SELECTION AND SEQUENCE OF THE TESTS OF CLAUSE 30		
	Description of tests for determination of resistance to heat and fire.		P
P	ANNEX P (INFORMATIVE) GUIDANCE FOR THE APPLICATION OF THIS STANDARD TO APPLIANCES USED IN TROPICAL CLIMATES		
	Modifications applicable for class 0 and 0I appliances having a rated voltage exceeding 150 V, intended to be used in countries having a tropical climate and that are marked with symbol IEC 60417-6332 (2015-06).		
	Modifications may also be applied to class I appliances having a rated voltage exceeding 150 V, intended to be used in countries having a tropical climate and that are marked with symbol IEC 60417-6332 (2015-06), if liable to be connected to a supply mains that excludes the protective earthing conductor.		

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Clause	Requirement + Test	Result - Remark	Verdict
5.7	The ambient temperature for the tests of clauses 11 and 13 is 40 +3/0 °C.	Class I	N/A
7.1	The appliance marked with symbol IEC 60417-6332 (2015-06).		N/A
7.6	Symbol IEC 60417-6332 (2015-06).		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 (2015-06) 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.		P
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		
R.2.1	General		

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Clause	Requirement + Test	Result - Remark	Verdict
R.2.1.1	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.2.1.2	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in Table R.2 have one of the following structures:		N/A
	- 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
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

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Clause	Requirement + Test	Result - Remark	Verdict
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 occurs before compliance with clause 19 is impaired.		N/A
	For appliances intended for remote communication through public networks, where normative Annex U is applicable as determined by 22.62, detection of a fault/error occurs before compliance with normative Annex U 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
	For appliances intended for remote communication through public networks where normative Annex U is applicable as determined by 22.62, the software and safety-related hardware under its control is initialized and terminates before compliance with normative Annex U is impaired.		N/A
R.3	Measures to avoid errors		
R.3.1	General		
	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 following measures to avoid systematic faults in the software 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 - 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		N/A
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
	The module design specifies:		
	- function(s)		N/A
	- interfaces to other modules		N/A
	- data		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	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
R.3.4	Management items		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
R.3.4.1	Management of software versions		N/A
	A software version management system at the module level is put in place.		N/A
R.3.4.2	Software modification		N/A
R.3.4.2.1	Software modifications are based on a modification request which details the following:		
	- the hazards which may be affected		N/A
	- the proposed change		N/A
	- the reasons for change		N/A
R.3.4.2.2	An analysis is carried out to determine the impact of the proposed modification on functional safety.		N/A
R.3.4.2.3	A detailed specification for the modification is generated including the necessary activities for verification and validation, such as a definition of suitable test cases.		N/A
R.3.4.2.4	The modification is carried out as planned.		N/A
R.3.4.2.5	The assessment of the modification is carried out based on the specified verification and validation activities, which may include:		
	- a reverification of changed software modules		N/A
	- a reverification of affected software modules		N/A
	- a revalidation of the complete system		N/A
	All details of modification activities are documented.		N/A
R.3.4.2.6	- a reverification of changed software modules		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	Verdict
1 CPU						N/A
1.1 Registers	Stuck at	Functional test, or periodic self-test using either: – static memory test, or – word protection with single bit redundancy	H.2.16.5 H.2.16.6 H.2.19.6 H.2.19.8.2			
1.2 VOID						
1.3 Programme counter	Stuck at	Functional test, or periodic self-test, or independent time-slot monitoring, or logical monitoring of the programme sequence	H.2.16.5 H.2.16.6 H.2.18.10.4 H.2.18.10.2			N/A
2 Interrupt handling and execution	No interrupt or too frequent interrupt	Functional test, or time-slot monitoring	H.2.16.5 H.2.18.10.4			N/A
3 Clock	Wrong frequency (for quartz synchronized clock: harmonics/sub-harmonics only)	Frequency monitoring, or time slot monitoring	H.2.18.10.1 H.2.18.10.4			N/A
4 Memory						N/A
4.1 Invariable memory	All single bit faults	Periodic modified checksum, or multiple checksum, or word protection with single bit redundancy	H.2.19.3.1 H.2.19.3.2 H.2.19.8.2			
4.2 Variable memory	DC fault	Periodic static memory test, or Word protection with single bit redundancy	H.2.19.6 H.2.19.8.2			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
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 communication						N/A
6.1 Data	Data corruption of up to Hamming distance 3	Word protection with multi-bit redundancy, or CRC – single word, or transfer redundancy, or protocol test	H.2.19.8.1 H.2.19.4.1 H.2.18.2.2 H.2.18.14			
6.2 Addressing	Wrong address	Word protection with multi-bit redundancy including the address, or CRC – single word including the address, or transfer redundancy, or protocol test	H.2.19.8.1 H.2.19.4.1 H.2.18.2.2 H.2.18.14			N/A
6.3 Timing	Wrong point in time Wrong sequence	Time-slot monitoring, or scheduled transmission Logical monitoring, or time-slot monitoring, or scheduled transmission	H.2.18.10.4 H.2.18.18 H.2.18.10.2 H.2.18.10.4 H.2.18.18			N/A
7 Input/output periphery	Fault conditions specified in 19.11.2	Plausibility check	H.2.18.13			N/A
7.1 VOID						

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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	Verdict
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			
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 specification	Periodic self-test	H.2.16.6			N/A

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 circuits 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.

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Clause	Requirement + Test	Result - Remark	Verdict

TABLE R.2 – SPECIFIC FAULT/ERROR CONDITIONS

Component ^a	Fault/error	Acceptable measures ^{b, c}	Definitions	Document reference for applied measure	Document reference for applied test	Verdict
1 CPU 1.1 Registers	DC fault	Comparison of redundant CPUs by either: – reciprocal comparison – independent hardware comparator, or internal error detection, or redundant memory with comparison, or periodic self-tests using either – walkpat memory test – Abraham test – Transparent GALPAT test; or word protection with multi-bit redundancy, or static memory test and word protection with single bit redundancy	H.2.18.15 H.2.18.3 H.2.18.9 H.2.19.5 H.2.19.7 H.2.19.1 H.2.19.2.1 H.2.19.8.1 H.2.19.6 H.2.19.8.2			N/A
1.2 Instruction decoding and execution	Wrong decoding and execution	Comparison of redundant CPUs by either: – reciprocal comparison – independent hardware comparator, or internal error detection, or periodic self-test using equivalence class test	H.2.18.15 H.2.18.3 H.2.18.9 H.2.18.5			N/A
1.3 Programme counter	DC fault	Periodic self-test and monitoring using either: – independent time-slot and logical monitoring – internal error detection, or comparison of redundant functional channels by either: – reciprocal comparison – independent hardware comparator	H.2.16.7 H.2.18.10.3 H.2.18.9 H.2.18.15 H.2.18.3			N/A

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Clause	Requirement + Test	Result - Remark	Verdict

TABLE R.2 – SPECIFIC FAULT/ERROR CONDITIONS

Component ^a	Fault/error	Acceptable measures ^{b, c}	Definitions	Document reference for applied measure	Document reference for applied test	Verdict
1.4 Addressing	DC fault	Comparison of redundant CPUs by either: – reciprocal comparison – independent hardware comparator; or internal error detection; or periodic self-test using – a testing pattern of the address lines; or – a full bus redundancy – a multi bus parity including the address	H.2.18.15 H.2.18.3 H.2.18.9 H.2.16.7 H.2.18.22 H.2.18.1.1 H.2.18.1.2			N/A
1.5 Data paths instruction decoding	DC fault and execution	Comparison of redundant CPUs by either: – reciprocal comparison, or – independent hardware comparator, or – internal error detection, or – periodic self-test using a testing pattern, or – data redundancy, or – multi-bit bus parity	H.2.18.15 H.2.18.3 H.2.18.9 H.2.16.7 H.2.18.2.1 H.2.18.1.2			N/A
2 Interrupt handling and execution	No interrupt or too frequent interrupt related to different sources	Comparison of redundant functional channels by either – reciprocal comparison, – independent hardware comparator, or – independent time-slot and logical monitoring	H.2.18.15 H.2.18.3 H.2.18.10.3			N/A
3 Clock	Wrong frequency (for quartz synchronized clock: harmonics/ sub-harmonics only)	Frequency monitoring, or time-slot monitoring, or comparison of redundant functional channels by either: – reciprocal comparison – independent hardware comparator	H.2.18.10.1 H.2.18.10.4 H.2.18.15 H.2.18.3			N/A

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Clause	Requirement + Test	Result - Remark	Verdict

TABLE R.2 – SPECIFIC FAULT/ERROR CONDITIONS

Component ^a	Fault/error	Acceptable measures ^{b, c}	Definitions	Document reference for applied measure	Document reference for applied test	Verdict
4 Memory 4.1 Invariable memory	99,6 % coverage of all information errors	Comparison of redundant CPUs by either: – reciprocal comparison – independent hardware comparator, or redundant memory with comparison, or periodic cyclic redundancy check, either – single word – double word, or word protection with multi-bit redundancy	H.2.18.15 H.2.18.3 H.2.19.5 H.2.19.4.1 H.2.19.4.2 H.2.19.8.1			N/A
4.2 Variable memory	DC fault and dynamic cross links	Comparison of redundant CPUs by either: – reciprocal comparison – independent hardware comparator, or redundant memory with comparison, or periodic self-tests using either: – walkpat memory test – Abraham test – transparent GALPAT test, or word protection with multi-bit redundancy	H.2.18.15 H.2.18.3 H.2.19.5 H.2.19.7 H.2.19.1 H.2.19.2.1 H.2.19.8.1			N/A

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Clause	Requirement + Test	Result - Remark	Verdict

TABLE R.2 – SPECIFIC FAULT/ERROR CONDITIONS

Component ^a	Fault/error	Acceptable measures ^{b, c}	Definitions	Document reference for applied measure	Document reference for applied test	Verdict
4.3 Addressing (relevant to variable and invariable memory)	DC fault	Comparison of redundant CPUs by either: – reciprocal comparison, or – independent hardware comparator, or full bus redundancy testing pattern, or periodic cyclic redundancy check, either: – single word – double word, or word protection with multi-bit redundancy including the address	H.2.18.15 H.2.18.3 H.2.18.1.1 H.2.18.22 H.2.19.4.1 H.2.19.4.2 H.2.19.8.1			N/A
5 Internal data path 5.1 Data	DC fault	Comparison of redundant CPUs by either – reciprocal comparison – independent hardware comparator, or word protection with multi-bit redundancy including the address, or data redundancy, or testing pattern, or protocol test	H.2.18.15 H.2.18.3 H.2.19.8.1 H.2.18.2.1 H.2.18.22 H.2.18.14			N/A
5.2 Addressing	Wrong address and multiple addressing	Comparison of redundant CPUs by: – reciprocal comparison – independent hardware comparator, or word protection with multi-bit redundancy, including the address, or full bus redundancy; or testing pattern including the address	H.2.18.15 H.2.18.3 H.2.19.8.1 H.2.18.1.1 H.2.18.22			N/A

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Clause	Requirement + Test		Result - Remark		Verdict	
TABLE R.2 – SPECIFIC FAULT/ERROR CONDITIONS						
Component a	Fault/error	Acceptable measures b, c	Definitions	Document reference for applied measure	Document reference for applied test	Ver- dict
6 External communication 6.1 Data	Data corruption of up to Hamming distance 4	CRC – double word, or data redundancy or comparison of redundant functional channels by either – reciprocal comparison; or – independent hardware comparator	H.2.19.4.2 H.2.18.2.1 H.2.18.15 H.2.18.3			N/A
6.2 Addressing	Wrong address and multiple addressing	CRC – double word, including the address, or full bus redundancy of data and address, or comparison of redundant communication channels by either: – reciprocal comparison; or – independent hardware comparator	H.2.19.4.2 H.2.18.1.1 H.2.18.15 H.2.18.3			N/A
6.3 Timing	Wrong point in time Wrong sequence	Time-slot and logical monitoring, or comparison of redundant communication channels by either: – reciprocal comparison; or – independent hardware comparator Time-slot and logical monitoring, or comparison of redundant communication channels by either: – reciprocal comparison; or – independent hardware comparator	H.2.18.10.3 H.2.18.15 H.2.18.3 H.2.18.10.3 H.2.18.15 H.2.18.3			N/A

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Clause	Requirement + Test		Result - Remark		Verdict	
TABLE R.2 – SPECIFIC FAULT/ERROR CONDITIONS						
Component ^a	Fault/error	Acceptable measures ^{b, c}	Definitions	Document reference for applied measure	Document reference for applied test	Verdict
7 Input/output periphery 7.1 Digital I/O	Fault conditions specified in 19.11.2	Comparison of redundant CPUs by either: – reciprocal comparison – independent hardware comparator, or input comparison, or multiple parallel outputs, or output verification, or testing pattern, or code safety	H.2.18.15 H.2.18.3 H.2.18.8 H.2.18.11 H.2.18.12 H.2.18.22 H.2.18.2			N/A
7.2 Analog I/O 7.2.1 A/D and D/A converter	Fault conditions in 19.11.2	Comparison of redundant CPUs by either: – reciprocal comparison – independent hardware comparator, or input comparison, or multiple parallel outputs, or output verification, or testing pattern	H.2.18.15 H.2.18.3 H.2.18.8 H.2.18.11 H.2.18.12 H.2.18.22			N/A
7.2.2 Analog multiplexer	Wrong addressing	Comparison of redundant CPUs by either: – reciprocal comparison – independent hardware comparator, or input comparison or testing pattern	H.2.18.15 H.2.18.3 H.2.18.8 H.2.18.22			N/A
8 Monitoring devices and comparators	Any output outside the static and dynamic functional specification	Tested monitoring, or redundant monitoring and comparison, or error recognizing means	H.2.18.21 H.2.18.17 H.2.18.6			N/A

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Clause	Requirement + Test			Result - Remark		Verdict
TABLE R.2 – SPECIFIC FAULT/ERROR CONDITIONS						
Component ^a	Fault/error	Acceptable measures ^{b, c}	Definitions	Document reference for applied measure	Document reference for applied test	Verdict
9 Custom chips ^d e.g. ASIC, GAL, gate array	Any output outside the static and dynamic functional specification	Periodic self-test and monitoring, dual channel (diverse) with comparison, or error recognizing means	H.2.16.7 H.2.16.2 H.2.18.6			N/A
NOTE A DC fault model denotes a stuck-at fault model incorporating short circuits 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 software measure will cover the Table R.1 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.						

S	ANNEX S (INFORMATIVE) GUIDANCE FOR THE APPLICATION OF THIS STANDARD ON MEASUREMENT OF POWER INPUT AND CURRENT BASED ON THE REQUIREMENTS OF 10.1 AND 10.2 CONCERNING THE REPRESENTATIVE PERIOD		
	Flowchart giving guidance on measurement of power input and current concerning the representative period.		P
T	ANNEX T (NORMATIVE) UV-C RADIATION EFFECT ON NON-METALLIC MATERIALS		
	This annex provides requirements for non-metallic materials subject to direct or reflected UV-C radiation (100 nm to 280 nm) exposure and whose mechanical and electrical properties are relied upon for compliance with this standard.		N/A
	This annex does not apply to glass, ceramic and similar materials.		N/A
	The conditioning and tests are carried out on non-metallic material specimens prepared according to the relevant standard for the test method.		N/A
	The conditioning apparatus and test procedure are as specified in ISO 4892-1 and ISO 4892-2.		N/A
	Modifications to the clauses of ISO 4892-1:2016:		
5.1	Irradiance		
5.1.1	The UV-C emitter is a low pressure mercury lamp with a quartz envelope having a continuous spectral irradiance of 10 W/m ² at 254 nm.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
5.2	Temperature		
5.2.5	The black-panel temperature is 63 °C ± 3 °C.		N/A
5.3	Humidity and wetting		
5.3.1	Humidification of the chamber air is specified in part 2 when necessary.		N/A
9	Test report		
Modifications to the clauses of ISO 4892-2:2013:			
7	Procedure		
7.1	General		
	At least three test specimens of each non-metallic material providing mechanical support or impact resistance are exposed in each run.		N/A
	Ten samples of the insulated internal wiring are exposed in each run.		N/A
	When the internal wiring is provided in more than one colour, the colour having the heaviest organic pigment loading is used.		N/A
7.2	Mounting the test specimens		
	The specimens are attached to the specimen holders such that they are not subject to any applied stress.		N/A
7.3	Exposure		
	Before placing the specimens in the test chamber, the apparatus is operating under the specified exposure conditions and programmed to operate continuously, conditions are maintained throughout the exposure.		N/A
7.4	Measurement of radiant exposure		
	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	Determination of changes in properties after exposure		
	The non-metallic material properties and test methods for parts providing mechanical support or impact resistance are specified in Table T.1.		N/A
	The non-metallic material properties and test method for electrical insulation of internal wiring are specified in Table T.2.		N/A
8	Exposure report		
U	ANNEX U (NORMATIVE) APPLIANCES INTENDED FOR REMOTE COMMUNICATION THROUGH PUBLIC NETWORKS		

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Clause	Requirement + Test	Result - Remark	Verdict
	The measures given in this annex are intended to avoid unauthorized access and the effects of transmission failures via remote communication through public networks, where compliance with this standard could be impaired.		N/A
	However, in general, it does not cover aspects concerning confidentiality of data and consumer privacy.		N/A
U.1	Terms and definitions		
U.1.1	Definitions relating to remote functionality		
	Definitions used in this appendix as described.		N/A
U.2	Marking and instructions		
U.2.1	If there is provision for software download, instructions are provided on how or where to obtain the unique name or code given by the manufacturer, that identifies the current version of the software running in the appliance.		N/A
	The instructions also include the necessary steps the user must follow for the software update procedure.		N/A
U.3	Construction		
U.3.1	Software enabling communication with a public network is partitioned into modules separate from software which is necessary to comply with the other requirements of this standard.		N/A
U.3.2	Remote communication is established, implemented and terminated by the appliance via software that provides:		
	- data integrity protection concerning:		
	data corruption		N/A
	address corruption		N/A
	wrong timing or sequence		N/A
	permanent "auto-sending" or repetition		N/A
	interruption of data transfer		N/A
	- means to detect and respond to communication in which, for any reason, a message being communicated is incomplete, truncated, contains errors or has the correct format but delivers information that is outside the range expected for that type of message		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- means to detect and respond to communication in which, for any reason, a message being communicated is incomplete, truncated, contains errors or has the correct format but delivers information that is outside the range expected for that type of message		N/A
	- measures to control the fault/error conditions specified in Table R.1		N/A
U.3.3	Measures provided to protect against hazards arising from the reception of messages from several sources simultaneously or sequentially.		N/A
U.3.4	Remote communication is not enabled prior to authorization.		N/A
	Authorization is based on authentication using cryptographic techniques to ensure the identity of both parties.		N/A
	For the purposes of this requirement, communication between two entities for preparation of the authentication and authorization process is not considered remote communication.		N/A
U.3.5	Measures are taken to prevent unauthorized access and to detect transmission faults/errors in the remote communication.		N/A
U.3.6	The safe operation of an appliance does not depend on remote communication.		N/A
	In case of doubt, remote communication rendered inoperative for the relevant tests of this standard.		N/A
U.3.7	Cryptographic techniques are implemented to provide data integrity protection once authorization for remote communication is established.		N/A
	Cryptographic techniques employed are part of the appliance including its accessories, do not rely upon part of the router or similar data transmission device, and are performed prior to transmission.		N/A
U.3.8	Provisions are taken to ensure that software updates provided by the manufacturer and transmitted to the appliance via remote communication are verified prior to its installation:		
	- against corruption through communication		N/A
	- that the software version is compatible with the appliance for which the software version was designed		N/A
	The software which performs the above-mentioned checks contains measures to control the fault/error conditions specified in Table R.1.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
U.3.9	Permission for each installation of software in the appliance is given by the person responsible for the appliance..		N/A
	User activation of a mode that enables automatic software updates is permitted.		N/A
U.3.10	The installation of software does not impair compliance with the requirements of this standard during or after installation		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

10.1	TABLE: Power input deviation							N/A
Power deviation at voltage.	Voltage value (V)	P rated (W)	P measured (W)	Outlet marking (W)	ΔP	Required ΔP	Remark	
One Rated voltage								
Mean of voltage range of ≤ 10% With one power input relating to the mean								
Upper limit for other cases								
Lower limit for other cases								
Supplementary information: For combined appliance power to motor or motors =								

10.2	TABLE: Current deviation						P
Current deviation at voltage:	Voltage value (V)	I rated (A)	I measured (A)	Outlet marking (A)	ΔI	Required ΔI	Remark
One Rated voltage	--	--	--	--	--	--	--
DGG 150/4/65 H0AT5 TS 10230D	230 @50Hz	5.3	4.5	--	-15.1%	+15%	Pass
DRG 200/4/80 M0ET5 TS 10230Y	400 @50Hz	3.4	3.68	--	+8.2%	+15%	Pass
APG 400/2/G50H D0ET5 TS 10230Y	400 @50Hz	6.4	5.8	--	-9.4%	+15%	Pass
DRG 550/6/150 F0GT5 TS 10230Y	230 @50Hz	16.2	15.6	--	-3.7%	+15%	Pass
GRG 250/2/G40H A0AT6 TS 10230D	230 @60Hz	6.5	6.8	--	+4.6%	+15%	Pass
CTG 300/4/80 A0ET6 TS 10230Y	400 @60Hz	5.2	5.5	--	+5.8%	+15%	Pass
ZUG CP150G 4/6AD 265 PABB10230Y5	400 @50Hz	8.9	9.2	--	+3.4%	+15%	Pass
ZUG V080C 4/4AW 198 PABB10230Y5	400 @50Hz	8.4	8.5	--	+1.2%	+15%	Pass
ZUG OC065B 1.8/2BD 96 PABB10230Y6	230 @60Hz	6.8	6.9	--	+1.5%	+15%	Pass
Supplementary information: For combined appliance current to motor or motors =							

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Clause	Requirement + Test	Result - Remark	Verdict

11.8	TABLE: Heating Test (Heating appliances)					N/A
	Test voltage (V) : Test input power (W) : Frequency (Hz) :					—
	Ambient (°C) :					—
Thermocouple locations**		Max. temperature rise measured, ΔT (K)		Max. temperature rise limit, ΔT (K)		
Supplementary information: ** If a thermocouple is used to measure winding temperature the insulation class shall be reported next to the ΔT (K) limit						
	If the resistance method is used to measure winding temperature					
	Ambient, t ₁ (°C) :					—
	Ambient, t ₂ (°C) :					—
Temperature rise of winding		R ₁ (Ω)	R ₂ (Ω)	ΔT (K)	Max. ΔT (K)	Insulation class
Supplementary information: Test voltage for the results reported =						

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Clause	Requirement + Test	Result - Remark	Verdict

11.8	TABLE: Heating Test (Motor-operated appliances and combined appliances) Model: DGG 150/4/65 H0AT5 TS 10230D (S1 submerged)					P
	Test voltage (V) : R = One Rated Voltage (V) : U = Upper limit of range (V) : L =Lower limit of range (V) : Frequency (Hz) :			244V 50Hz		
	Ambient (°C) :			19°C – Water 40°C		
Thermocouple locations**		Max. temperature rise measured, ΔT (K)			Max. temperature rise limit, ΔT (K)	
		R	U	M	L	
Winding 1			43	*		140 (Class H)
Winding 2			45.4	*		140 (Class H)
Winding 3			40.1	*		140 (Class H)
Cable sheath			3.2	*		35
Cable at entry point			6.3	*		50
Connectors power cable wires – stator windings wires			10.1	*		50
External enclosure			33.4	*		Tmax 48
				*		
Supplementary information: * In general it will only be necessary to conduct the test at either the U or L condition whichever gives the higher current						
** If a thermocouple is used to measure winding temperature the insulation class shall be reported next to the ΔT (K) limit						
	If the resistance method is used to measure winding temperature					N/A
	Ambient, t1 (°C) :					—
	Ambient, t2 (°C) :					—
Temperature rise of winding		R1 (Ω)	R2 (Ω)	ΔT (K)	Max. ΔT (K)	Insulation class
Supplementary information: Test voltage for the results reported =						

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Clause	Requirement + Test			Result - Remark		Verdict
11.8	TABLE: Heating Test (Motor-operated appliances and combined appliances) Model: DGG 150/4/65 H0AT5 TS 10230D (S3 15% emerged)					P
	Test voltage (V) : R = One Rated Voltage (V) : U = Upper limit of range (V) : L =Lower limit of range (V) : Frequency (Hz) :			244V 50Hz		
	Ambient (°C) :			19°C		
Thermocouple locations**		Max. temperature rise measured, ΔT (K)				Max. temperature rise limit, ΔT (K)
		R	U	M	L	
Winding 1			39.3	*		140 (Class H)
Winding 2			42.6	*		140 (Class H)
Winding 3			35.4	*		140 (Class H)
Cable sheath			13.5	*		35
Cable at entry point			15.3	*		50
Connectors power cable wires – stator windings wires			17.5	*		50
External enclosure			42.1	*		Tmax 48
				*		
Supplementary information: * In general it will only be necessary to conduct the test at either the U or L condition whichever gives the higher current						
** If a thermocouple is used to measure winding temperature the insulation class shall be reported next to the ΔT (K) limit						
	If the resistance method is used to measure winding temperature					N/A
	Ambient, t1 (°C) :					—
	Ambient, t2 (°C) :					—
Temperature rise of winding		R1 (Ω)	R2 (Ω)	ΔT (K)		Max. ΔT (K)
						Insulation class
Supplementary information: Test voltage for the results reported =						

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Clause	Requirement + Test			Result - Remark		Verdict
11.8	TABLE: Heating Test (Motor-operated appliances and combined appliances) Model: DRG 200/4/80 M0ET5 TS 10230Y (S3 15% emerged)					P
	Test voltage (V) : R = One Rated Voltage (V) : U = Upper limit of range (V) : L =Lower limit of range (V) : Frequency (Hz) :			424V 50Hz		
	Ambient (°C) :			18°C		
Thermocouple locations**		Max. temperature rise measured, ΔT (K)				Max. temperature rise limit, ΔT (K)
		R	U	M	L	
Winding 1			33	*		140 (Class H)
Winding 2			31.3	*		140 (Class H)
Winding 3			31.7	*		140 (Class H)
Cable sheath			14.3	*		35
Cable at entry point			15.2	*		50
Connectors power cable wires – stator windings wires			17.4	*		50
External enclosure			39.8	*		Tmax 48
				*		
Supplementary information: * In general it will only be necessary to conduct the test at either the U or L condition whichever gives the higher current						
** If a thermocouple is used to measure winding temperature the insulation class shall be reported next to the ΔT (K) limit						
	If the resistance method is used to measure winding temperature					N/A
	Ambient, t1 (°C) :					—
	Ambient, t2 (°C) :					—
Temperature rise of winding		R1 (Ω)	R2 (Ω)	ΔT (K)		Max. ΔT (K)
						Insulation class
Supplementary information: Test voltage for the results reported =						

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Clause	Requirement + Test	Result - Remark	Verdict

11.8	TABLE: Heating Test (Motor-operated appliances and combined appliances) Model: APG 400/2/G50H D0ET5 TS 10230Y (S3 20% emerged)					P
	Test voltage (V) : R = One Rated Voltage (V) : U = Upper limit of range (V) : L =Lower limit of range (V) : Frequency (Hz) :			424V 50Hz		
	Ambient (°C) :			19°C		
Thermocouple locations**		Max. temperature rise measured, ΔT (K)			Max. temperature rise limit, ΔT (K)	
		R	U	M	L	
Winding 1			64.3	*		140 (Class H)
Winding 2			65.2	*		140 (Class H)
Winding 3			68.9	*		140 (Class H)
Cable sheath			27.2	*		35
Cable at entry point			29.5	*		50
Connectors power cable wires – stator windings wires			33.5	*		50
External enclosure			41.5	*		Tmax 48
				*		
Supplementary information: * In general it will only be necessary to conduct the test at either the U or L condition whichever gives the higher current						
** If a thermocouple is used to measure winding temperature the insulation class shall be reported next to the ΔT (K) limit						
	If the resistance method is used to measure winding temperature					N/A
	Ambient, t1 (°C) :					—
	Ambient, t2 (°C) :					—
Temperature rise of winding		R1 (Ω)	R2 (Ω)	ΔT (K)	Max. ΔT (K)	Insulation class
Supplementary information: Test voltage for the results reported =						

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Clause	Requirement + Test	Result - Remark	Verdict

11.8	TABLE: Heating Test (Motor-operated appliances and combined appliances) Model: CTG 300/4/80 A0ET6 TS 10230Y (S1 submerged)					P
	Test voltage (V) : R = One Rated Voltage (V) : U = Upper limit of range (V) : L =Lower limit of range (V) : Frequency (Hz) :			424V 60Hz		
	Ambient (°C) :			19°C – Water 40°C		
Thermocouple locations**		Max. temperature rise measured, ΔT (K)				Max. temperature rise limit, ΔT (K)
		R	U	M	L	
Winding 1			37.3	*		140 (Class H)
Winding 2			38	*		140 (Class H)
Winding 3			36.4	*		140 (Class H)
Cable sheath			5.2	*		35
Cable at entry point			7.6	*		50
Connectors power cable wires – stator windings wires			10.4	*		50
External enclosure			33.2	*		Tmax 48
				*		
Supplementary information: * In general it will only be necessary to conduct the test at either the U or L condition whichever gives the higher current						
** If a thermocouple is used to measure winding temperature the insulation class shall be reported next to the ΔT (K) limit						
	If the resistance method is used to measure winding temperature					N/A
	Ambient, t1 (°C) :					—
	Ambient, t2 (°C) :					—
Temperature rise of winding		R1 (Ω)	R2 (Ω)	ΔT (K)	Max. ΔT (K)	Insulation class
Supplementary information: Test voltage for the results reported =						

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Clause	Requirement + Test			Result - Remark		Verdict
11.8	TABLE: Heating Test (Motor-operated appliances and combined appliances) Model: CTG 300/4/80 A0ET6 TS 10230Y (S3 20% emerged)					P
	Test voltage (V) : R = One Rated Voltage (V) : U = Upper limit of range (V) : L =Lower limit of range (V) : Frequency (Hz) :			424V 60Hz		
	Ambient (°C) :			19°C		
Thermocouple locations**		Max. temperature rise measured, ΔT (K)				Max. temperature rise limit, ΔT (K)
		R	U	M	L	
Winding 1			40.6	*		140 (Class H)
Winding 2			41.8	*		140 (Class H)
Winding 3			40.3	*		140 (Class H)
Cable sheath			20.1	*		35
Cable at entry point			20.7	*		50
Connectors power cable wires – stator windings wires			23.6	*		50
External enclosure			47.6	*		Tmax 48
				*		
Supplementary information: * In general it will only be necessary to conduct the test at either the U or L condition whichever gives the higher current						
** If a thermocouple is used to measure winding temperature the insulation class shall be reported next to the ΔT (K) limit						
	If the resistance method is used to measure winding temperature					N/A
	Ambient, t1 (°C) :					—
	Ambient, t2 (°C) :					—
Temperature rise of winding		R1 (Ω)	R2 (Ω)	ΔT (K)		Max. ΔT (K)
						Insulation class
Supplementary information: Test voltage for the results reported =						

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Clause	Requirement + Test			Result - Remark		Verdict
11.8	TABLE: Heating Test (Motor-operated appliances and combined appliances) Model: ZUG CP150G 4/6AD 265 PABB10230Y5 (S1 emerged)					P
	Test voltage (V) : R = One Rated Voltage (V) : U = Upper limit of range (V) : L =Lower limit of range (V) : Frequency (Hz) :			424V 60Hz		
	Ambient (°C) :			18°C		
Thermocouple locations**		Max. temperature rise measured, ΔT (K)				Max. temperature rise limit, ΔT (K)
		R	U	M	L	
Winding 1			22.8	*		140 (Class H)
Winding 2			23.5	*		140 (Class H)
Winding 3			23.7	*		140 (Class H)
Cable sheath			10.3	*		35
Cable at entry point			13.4	*		50
Connectors power cable wires – stator windings wires			14	*		50
External enclosure			24.1	*		Tmax 48
				*		
Supplementary information: * In general it will only be necessary to conduct the test at either the U or L condition whichever gives the higher current						
** If a thermocouple is used to measure winding temperature the insulation class shall be reported next to the ΔT (K) limit						
	If the resistance method is used to measure winding temperature					N/A
	Ambient, t1 (°C) :					—
	Ambient, t2 (°C) :					—
Temperature rise of winding		R1 (Ω)	R2 (Ω)	ΔT (K)	Max. ΔT (K)	Insulation class
Supplementary information: Test voltage for the results reported =						

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Clause	Requirement + Test	Result - Remark	Verdict

11.8	TABLE: Heating Test (Motor-operated appliances and combined appliances) Model: ZUG OC065B 1.8/2BD 96 PABB10230Y6 (S1 emerged)					P
	Test voltage (V) : R = One Rated Voltage (V) : U = Upper limit of range (V) : L =Lower limit of range (V) : Frequency (Hz) :			244V 60Hz		
	Ambient (°C) :			20°C		
Thermocouple locations**		Max. temperature rise measured, ΔT (K)			Max. temperature rise limit, ΔT (K)	
		R	U	M	L	
Winding 1			80.7	*		140 (Class H)
Winding 2			81.1	*		140 (Class H)
Winding 3			82	*		140 (Class H)
Cable sheath			27.5	*		35
Cable at entry point			47.3	*		50
Connectors power cable wires – stator windings wires			46.7	*		50
External enclosure			47.6	*		Tmax 48
				*		
Supplementary information: * In general it will only be necessary to conduct the test at either the U or L condition whichever gives the higher current						
** If a thermocouple is used to measure winding temperature the insulation class shall be reported next to the ΔT (K) limit						
	If the resistance method is used to measure winding temperature					N/A
	Ambient, t1 (°C) :					—
	Ambient, t2 (°C) :					—
Temperature rise of winding		R1 (Ω)	R2 (Ω)	ΔT (K)	Max. ΔT (K)	Insulation class
Supplementary information: Test voltage for the results reported =						

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Clause	Requirement + Test	Result - Remark	Verdict

12	TABLE: Charging of metal-ion batteries						N/A
Battery type	Imbalance	T _{meas} (°C)	T _{cell} (°C)	T _{amb(max)} (°C)	T _{amb(min)} (°C)	T _{amb(test)} (°C)	

Supplementary information:

T_{meas} Cell surface temperature measured during the test
T_{cell} Cell surface temperature specified by the cell manufacturer
T_{amb(max)} Maximum ambient temperature for charging specified by the manufacturer
T_{amb(min)} Minimum ambient temperature for charging specified by the manufacturer
T_{amb(test)} Ambient temperature of the test room during the test

13.2	TABLE: Leakage current			P
	Heating appliances: 1,15 x rated input (W) :			—
	Motor-operated and combined appliances: 1,06 x rated voltage (V) :			—
Leakage current between:		I (mA)	Max. allowed I (mA)	
accessible metal parts intended to be connected to protective earth				
DGG 150/4/65 H0AT5 TS 10230D (230 @50Hz)		0.31mA	3.5mA	
DRG 200/4/80 M0ET5 TS 10230Y (400 @50Hz)		0.19mA	3.5mA	
APG 400/2/G50H D0ET5 TS 10230Y (400 @50Hz)		0.35mA	3.5mA	
CTG 300/4/80 A0ET6 TS 10230Y (400 @60Hz)		0.24mA	3.5mA	
ZUG CP150G 4/6AD 265 PABB10230Y5 (400 @50Hz)		0.38mA	3.5mA	
ZUG OC065B 1,8/2BD 96 PABB10230Y6 (230 @60Hz)		0.24mA	3.5mA	

Supplementary information: The values represent the maximum levels reached with the three switches in the different four positions

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Clause	Requirement + Test	Result - Remark	Verdict

13.3	TABLE: Dielectric Strength		P
Test voltage applied between: 1000V between live parts and accessible metal part and 3000V between live parts and accessible rotor		Test potential applied (V)	Breakdown / flashover (Yes/No)
DGG 150/4/65 H0AT5 TS 10230D (230 @50Hz)		1000V and 3000V	No
DRG 200/4/80 M0ET5 TS 10230Y (400 @50Hz)		1000V and 3000V	No
APG 400/2/G50H D0ET5 TS 10230Y (400 @50Hz)		1000V and 3000V	No
CTG 300/4/80 A0ET6 TS 10230Y (400 @60Hz)		1000V and 3000V	No
ZUG CP150G 4/6AD 265 PABB10230Y5 (400 @50Hz)		1000V and 3000V	No
ZUG OC065B 1,8/2BD 96 PABB10230Y6 (230 @60Hz)		1000V and 3000V	No
Supplementary information:			

14	TABLE: Transient overvoltages					N/A
Clearance between:	CI (mm)	Required CI (mm)	Rated impulse voltage (V)	Impulse test voltage (V)	Flashover (Yes/No)	
Supplementary information:						

16.2	TABLE: Leakage current		P
	Single phase appliances: 1,06 x rated voltage (V) :		—
	Three phase appliances: 1,06 x rated voltage divided by $\sqrt{3}$ (V) :	Test voltage = 140.8V or 244V Frequency = 50Hz or 60Hz	—
Leakage current between:		I (mA)	Max. allowed I (mA)
DGG 150/4/65 H0AT5 TS 10230D (230 @50Hz)		0.29mA	3.5mA
DRG 200/4/80 M0ET5 TS 10230Y (400 @50Hz)		0.23mA	3.5mA
APG 400/2/G50H D0ET5 TS 10230Y (400 @50Hz)		0.34mA	3.5mA
CTG 300/4/80 A0ET6 TS 10230Y (400 @60Hz)		0.22mA	3.5mA
ZUG CP150G 4/6AD 265 PABB10230Y5 (400 @50Hz)		0.37mA	3.5mA
ZUG OC065B 1,8/2BD 96 PABB10230Y6 (230 @60Hz)		0.25mA	3.5mA
Supplementary information: The values represent the maximum levels reached			

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Clause	Requirement + Test	Result - Remark	Verdict

16.3	TABLE: Dielectric Strength		P
Test voltage applied between: 1250V between live parts and accessible metal part and 3000V between live parts and accessible rotor		Test potential applied (V)	Breakdown / flashover (Yes/No)
DGG 150/4/65 H0AT5 TS 10230D (230 @50Hz)		1250V and 3000V	No
DRG 200/4/80 M0ET5 TS 10230Y (400 @50Hz)		1250V and 3000V	No
APG 400/2/G50H D0ET5 TS 10230Y (400 @50Hz)		1250V and 3000V	No
CTG 300/4/80 A0ET6 TS 10230Y (400 @60Hz)		1250V and 3000V	No
ZUG CP150G 4/6AD 265 PABB10230Y5 (400 @50Hz)		1250V and 3000V	No
ZUG OC065B 1,8/2BD 96 PABB10230Y6 (230 @60Hz)		1250V and 3000V	No
Supplementary information:			

17	TABLE: Overload protection				N/A
	Test voltage (V) : R = One Rated Voltage (V) : U = Upper limit of range (V) : L = Lower limit of range* (V) : Frequency (Hz) :				—
	Ambient (°C) :				—
Thermocouple locations**		Max. temperature rise measured, ΔT (K)		Max. temperature rise limit, ΔT (K)	
		R	U	L	
				*	
				*	
				*	
				*	
Supplementary information: * Only when a protection system actuates at Upper limit of the range					
** If a thermocouple is used to measure winding temperature the insulation class shall be reported next to the ΔT (K) limit					
	If the resistance method is used to measure winding temperature				
	Ambient, t ₁ (°C) :				—
	Ambient, t ₂ (°C) :				—
Temperature rise of winding	R ₁ (Ω)	R ₂ (Ω)	ΔT (K)	Max. ΔT (K)	Insulation class
Supplementary information: Test voltage for the results reported =					

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Clause	Requirement + Test	Result - Remark	Verdict

17	TABLE: Short-circuit protection			N/A
	Test voltage (V) : R = One Rated Voltage (V) : U = Upper limit of range (V) : L = Lower limit of range* (V) : Frequency (Hz) : Ambient (°C) :			—
Thermocouple locations**		Max. temperature rise measured, ΔT (K)		Max. temperature rise limit, ΔT (K)
		R	U	L
				*
				*
				*
				*
Supplementary information: * Only when a protection system actuates at Upper limit of the range ** If a thermocouple is used to measure winding temperature the insulation class shall be reported next to the ΔT (K) limit				
	If the resistance method is used to measure winding temperature			
	Ambient, t₁ (°C) :			—
	Ambient, t₂ (°C) :			—
Temperature rise of winding	R₁ (Ω)	R₂ (Ω)	ΔT (K)	Max. ΔT (K)
Supplementary information: Test voltage for the results reported =				

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Clause	Requirement + Test	Result - Remark	Verdict

19	TABLE: Abnormal operation conditions						P
Operational characteristics			YES/NO	Operational conditions			
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?			Yes				
Sub-clause	Operating conditions description	Test results description	PEC description	EMP 19.11.4	Software type required	19.11.3 PEC	Final result
19.2	Test power = Test voltage= Frequency =			N.A.			N/A
19.3	Test power = Test voltage= Frequency =						N/A
19.4							N/A
19.5							N/A
19.6	Frequency= Final applied voltage =			N.A.			N/A
19.7	See appended table	Locked rotor test Temperature of the appliance did not exceed the value specified in Table 8					P
19.8	Frequency= 50 or 60Hz Test voltage = 230V or 400V Rated Upper limit of range Lower limit of range*	One phase disconnected test Temperature of the appliance did not exceed the value specified in Table 8					P
19.9	See appended table						N/A
19.10	Frequency= Test voltage						N/A

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Clause	Requirement + Test			Result - Remark			Verdict
	= Rated Upper limit of range						
19.11.1	Frequency= Test voltage = Rated Upper limit of range						N/A
19.11.2	Frequency= Test voltage = Rated Upper limit of range Lower limit of range*						N/A
19.11.4	Frequency= Test voltage = Rated Upper limit of the range						N/A
19.11.4.8	Test voltage = Rated Upper limit of the range						N/A
19.14							N/A
19.15	Frequency= Test voltage = Rated Upper limit of the range						N/A
19.16	Test voltage = Rated Upper limit of the range						N/A
19.17							N/A
Supplementary information: * Only when a non-self resetting thermal cut-out or a intentionally weak part actuate at upper limit and does not at a lower limit							

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Clause	Requirement + Test			Result - Remark		Verdict
19.7	TABLE: Abnormal operation, locked rotor/moving parts					P
	Test voltage (V) :			Test voltage = 230V or 400V Frequency = 50Hz or 60Hz R = One rated voltage		—
	Ambient, t ₁ (°C) :			19°C		—
	Ambient, t ₂ (°C) :			19°C		—
Temperature rise of winding		R ₁ (Ω)	R ₂ (Ω)	ΔT (K)	T (°C)	Max. T (°C)
DGG 150/4/65 H0AT5 TS 10230D (230 @50Hz)						
Winding 1					85.7	210 (Class H)
Winding 2					100.7	210 (Class H)
Winding 3					67.2	210 (Class H)
DRG 200/4/80 M0ET5 TS 10230Y (400 @50Hz)						
Winding 1					64.7	210 (Class H)
Winding 2					58.2	210 (Class H)
Winding 3					54.3	210 (Class H)
APG 400/2/G50H D0ET5 TS 10230Y (400 @50Hz)						
Winding 1					74	210 (Class H)
Winding 2					77.5	210 (Class H)
Winding 3					99.8	210 (Class H)
CTG 300/4/80 A0ET6 TS 10230Y (400 @60Hz)						
Winding 1					41.1	210 (Class H)
Winding 2					46.6	210 (Class H)
Winding 3					33.6	210 (Class H)
ZUG CP150G 4/6AD 265 PABB10230Y5 (400 @50Hz)						
Winding 1					29.4	210 (Class H)
Winding 2					25.7	210 (Class H)
Winding 3					29.3	210 (Class H)
ZUG OC065B 1.8/2BD 96 PABB10230Y6 (230 @60Hz)						
Winding 1					48.4	210 (Class H)
Winding 2					48.2	210 (Class H)
Winding 3					48.2	210 (Class H)
Supplementary information:						

IEC 60335-2-41							
Clause	Requirement + Test				Result - Remark		Verdict
19.7	TABLE: Abnormal operation, locked rotor/moving parts						N/A
	Test voltage (V) :				Test voltage = Frequency = U = Upper limit of the range		—
	Ambient, t ₁ (°C) :						—
	Ambient, t ₂ (°C) :						—
Temperature rise of winding		R ₁ (Ω)	R ₂ (Ω)	ΔT (K)	T (°C)	Max. T (°C)	
Supplementary information:							

19.7	TABLE: Abnormal operation, locked rotor/moving parts					N/A
	Test voltage (V) :			Test voltage = Frequency = M = Mean of range*		—
	Ambient, t₁ (°C) :					—
	Ambient, t₂ (°C) :					—
Temperature rise of winding		R₁ (Ω)	R₂ (Ω)	ΔT (K)	T (°C)	Max. T (°C)
Supplementary information: * Only when a non-self resetting thermal cut-out or a intentionally weak part actuate at upper limit of the range and does not at a lower limit						

19.7	TABLE: Abnormal operation, locked rotor/moving parts					N/A
	Test voltage (V) :			Test voltage = Frequency = L = Lower limit of the range*		—
	Ambient, t₁ (°C) :					—
	Ambient, t₂ (°C) :					—
Temperature rise of winding		R₁ (Ω)	R₂ (Ω)	ΔT (K)	T (°C)	Max. T (°C)
Supplementary information: * Only when a non-self resetting thermal cut-out or a intentionally weak part actuate at upper limit of the range and does not at a lower limit						

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Clause	Requirement + Test				Result - Remark		Verdict
19.9	TABLE: Abnormal operation, running overload						N/A
	Test voltage (V) :				Test voltage = Frequency = R = One rated voltage		—
	Ambient, t ₁ (°C) :						—
	Ambient, t ₂ (°C) :						—
Temperature rise of winding		R ₁ (Ω)	R ₂ (Ω)	ΔT (K)	T (°C)	Max. T (°C)	
Supplementary information:							

19.9	TABLE: Abnormal operation, running overload					N/A
	Test voltage (V) :			Test voltage = Frequency = L = Lower limit of the range*		—
	Ambient, t₁ (°C) :					—
	Ambient, t₂ (°C) :					—
Temperature rise of winding		R₁ (Ω)	R₂ (Ω)	ΔT (K)	T (°C)	Max. T (°C)
Supplementary information: * Only when a non-self resetting thermal cut-out or a intentionally weak part actuate at upper limit of the range and does not at a lower limit						

19.9	TABLE: Abnormal operation, running overload					N/A
	Test voltage (V) :			Test voltage = Frequency = U = Upper limit of the range		—
	Ambient, t₁ (°C) :					—
	Ambient, t₂ (°C) :					—
Temperature rise of winding		R₁ (Ω)	R₂ (Ω)	ΔT (K)	T (°C)	Max. T (°C)
Supplementary information:						

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Clause	Requirement + Test	Result - Remark	Verdict
19.13	TABLE: Abnormal operation, temperature rises		N/A
Thermocouple locations		Max. temperature rise measured, ΔT (K)	Max. temperature rise limit, ΔT (K)
Supplementary information:			

21.1	TABLE: Impact resistance			P
Impacts per surface		Surface tested	Impact energy (Nm)	Comments
3		Metal enclosure of the pumps	1 J	No damages
Supplementary information:				

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Clause	Requirement + Test	Result - Remark	Verdict

24.1	TABLE: Critical components information				
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾
GREY SERIES					
Power supply and/or control cable	ELETTRO BRESCIA SpA	H07RN-F	Maximum working temp. on the conductor: +60° C Cable variants: 4G1 (4x1mm ²); 2x1 (2x1mm ²)	EN 50525-2-21:2011/AC:2013	IMQ HAR
	Alternative	H07RN-F			S mark or VDE or IMQ or similar
Power supply and/or control cable	ARISTON CAVI S.p.A	S1RN8-F	Maximum working temp. on the conductor: +90° C Cable variants: 4G1,5 (4x1,5mm ²); 4G1,5+3x1 (4x1,5mm ² + 3x1 mm ²); 4G2,5+3x1 (4x2,5mm ² + 3x1 mm ²); 4G4+3x1 (4x4mm ² + 3x1 mm ²); 7G1,5 (7x1,5mm ²); 7G1,5+3x1 (7x1,5mm ² + 3x1 mm ²); 7G2,5+3x1 (7x2,5mm ² + 3x1 mm ²)	IEC 60335-1 and IEC 60335-2-41. Construction based on EN 50525-2-21:2011/AC:2013	Tested in appliance
	Alternative	S1RN8-F			S mark or VDE or IMQ or similar
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	150/2_AT	P2=1,1kW, 2 poles, Duty S1 submerged - S3=30% emerged. Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	200/2_AT	P2=1,5kW, 2 poles, Duty S1 submerged - S3=30% emerged. Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	250/2_AT	P2=1,8kW, 2 poles, Duty S1 submerged - S3=20% emerged. Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	150/4_AT	P2=1,1kW, 4 poles, - Duty S1 submerged - S3=15% emerged. Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance

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Clause	Requirement + Test		Result - Remark		Verdict
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	300/2_ET	P2=2,2kW, 2 poles, Duty S1 submerged - S3=20% emerged. Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	200/4_ET	P2=1,5kW, 4 poles, Duty S1 submerged - S3=20% emerged. Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	400/2_ET	P2=3kW, 2 poles, Duty S1 submerged - S3=20% emerged. Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	250/4_ET	P2=1,8kW, 4 poles, Duty S1 submerged - S3=20% emerged. Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	300/4_ET	P2=2,2kW, 4 poles, Duty S1 submerged - S3=20% emerged. Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	400/4_ET	P2=3kW, 4 poles, Duty S1 submerged - S3=15% emerged. Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	550/2_FT	P2=4kW, 2 poles, Duty S1 submerged - S3=20% emerged. Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance

IEC 60335-2-41					
Clause	Requirement + Test		Result - Remark		Verdict
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	550/4_FT	P2=4kW, 4 poles, Duty S1 submerged - S3=15% emerged. Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	550/6_GT	P2=4kW, 6 poles, Duty S1 submerged - S3=20% emerged. Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Cable wiring (Electrical diagram)	ZENIT	NA-3A	No electric accessories installed (delta windings connection). Cable type 4G_.	IEC 60335-1	Tested in appliance
Cable wiring (Electrical diagram)	ZENIT	NA-3B	No electric accessories installed (star windings connection). Cable type 4G_.	IEC 60335-1	Tested in appliance
Cable wiring (Electrical diagram)	ZENIT	NA-3D	No electric accessories installed (star/delta windings connection). Cable type 7G_.	IEC 60335-1	Tested in appliance
Cable wiring (Electrical diagram)	ZENIT	TA-3A	n.3 bimetal thermal protectors (Klixon) in series inside the motor - delta windings connection - Power cable type 4G_ , control cable 2x1	IEC 60335-1	Tested in appliance
Cable wiring (Electrical diagram)	ZENIT	TA-3B	n.3 bimetal thermal protectors (Klixon) in series inside the motor -star windings connection - Power cable type 4G_ , control cable 2x1	IEC 60335-1	Tested in appliance
Cable wiring (Electrical diagram)	ZENIT	TA-3C	n.3 bimetal thermal protectors (Klixon) in series inside the motor -delta windings connection - Cable type 4G_+3x1	IEC 60335-1	Tested in appliance
Cable wiring (Electrical diagram)	ZENIT	TA-3D	n.3 bimetal thermal protectors (Klixon) in series inside the motor -star windings connection - Cable type 4G_+3x1	IEC 60335-1	Tested in appliance
Cable wiring (Electrical diagram)	ZENIT	TA-3F	n.3 bimetal thermal protectors (Klixon) in series inside the motor -star/delta windings connection - Cable type 7G_+3x1	IEC 60335-1	Tested in appliance

IEC 60335-2-41					
Clause	Requirement + Test		Result - Remark		Verdict
Cable wiring (Electrical diagram)	ZENIT	TS-3A	n.3 bimetal thermal protectors (Klixon) in series inside the motor - n.1 double leakage detector (mechanical seals chamber / stator housing) - delta windings connection - Power cable type 4G ₊ , control cable 4G1,5	IEC 60335-1	Tested in appliance
Cable wiring (Electrical diagram)	ZENIT	TS-3B	n.3 bimetal thermal protectors (Klixon) in series inside the motor - leakage detector - star windings connection - Power cable type 4G ₊ , control cable 4G1,5	IEC 60335-1	Tested in appliance
Cable wiring (Electrical diagram)	ZENIT	TS-3C	n.3 bimetal thermal protectors (Klixon) in series inside the motor - n.1 double leakage detector (mechanical seals chamber / stator housing) - delta windings connection - Cable type 4G ₊ +3x1	IEC 60335-1	Tested in appliance
Cable wiring (Electrical diagram)	ZENIT	TS-3D	n.3 bimetal thermal protectors (Klixon) in series inside the motor - leakage detector - star windings connection - Cable type 4G ₊ +3x1	IEC 60335-1	Tested in appliance
Cable wiring (Electrical diagram)	ZENIT	TS-3E	n.3 bimetal thermal protectors (Klixon) in series inside the motor - n.1 double leakage detector (mechanical seals chamber / stator housing) - star windings connection - Power cable type 2x4G ₊ , control cable 4G1,5	IEC 60335-1	Tested in appliance
Cable wiring (Electrical diagram)	ZENIT	TS-3F	n.3 bimetal thermal protectors (Klixon) in series inside the motor -n.1 double leakage detector (mechanical seals chamber / stator housing) - star/delta windings connection - Cable type 7G ₊ +3x1	IEC 60335-1	Tested in appliance

IEC 60335-2-41					
Clause	Requirement + Test		Result - Remark		Verdict
Thermal protector (Klixon)	Thermik Gerätebau GmbH	S01	Contact NC, Nominal switching temperature (NST) 150°C triple element; Reverse switch temperature (RST) below NST: $\geq 35^\circ\text{C}$; Rated Voltage AC 250V Rated current AC $\cos \phi = 1.0/\text{cycles } 2,5 \text{ A} / 10.000$ Rated current AC $\cos \phi = 0.6/\text{cycles } 1,6 \text{ A} / 10.000$ Max. switching current AC $\cos \phi = 1.0/\text{cycles } 6,3 \text{ A} / 3.000$ 7,5 A / 300 Rated current AC $\cos \phi = 0.4/\text{cycles } 1,8 \text{ A} / 10.000$ Max. switching current AC $\cos \phi = 0.4/\text{cycles } 7,2 \text{ A} / 1.000$	IEC 60730-1:2022, IEC 60730-2-9:2026	VDE Certificate No. 40022282
Thermal protection – Klixon / Thermostat (alternative)	Alternative	Same ratings of S01			VDE or similar
Through connector (Wire connectors for control cable)	CEMBRE	PL03-M	Conductor cross section: $0,25 \div 1,5 \text{ mm}^2$.	IEC 60335-1	Tested in appliance
	Elektrozubehor	F 1515 PSK	Max rated Voltage: min 600V, Max operating temperature: min 75°C . UL 94 flammability rating V-0	IEC 60335-1	Tested in appliance
	CEMBRE	PL06-M	Conductor cross section: $1,5 \div 2,5 \text{ mm}^2$.	IEC 60335-1	Tested in appliance
	Elektrozubehor	F 2517 PSK	Max rated Voltage: min 300V, Max operating temperature: min 75°C . UL 94 flammability rating V-0	IEC 60335-1	Tested in appliance
One-way terminal block - End connector (Wire connectors for power cable)	BM Group	00270	Conductor cross section: $1,5 \div 2,5 \text{ mm}^2$. Max rated Voltage: min 600V, Max operating temperature: min 105°C . UL 94 flammability rating V-2	IEC 60335-1	Tested in appliance
	Alternative: CEMBRE	NL06-P		IEC 60335-1	Tested in appliance
	BM Group	00370	Conductor cross section: $2,5 \div 6 \text{ mm}^2$. Max rated Voltage: min 600V, Max operating temperature: min 105°C . UL 94 flammability rating V-2	IEC 60335-1	Tested in appliance
	Alternative: CEMBRE	NL1-P		IEC 60335-1	Tested in appliance
	BM Group	00470	Conductor cross section: $6 \div 10 \text{ mm}^2$. Max rated Voltage: min 600V, Max operating temperature: min 105°C . UL 94 flammability rating V-2	IEC 60335-1	Tested in appliance

IEC 60335-2-41					
Clause	Requirement + Test		Result - Remark		Verdict
Ring Terminal for earthing conductor	Alternative	M6 ring terminal M8 ring terminal	Conductor cross section: 1,5÷2,5mm ² Conductor cross section: 2,5÷6mm ²	IEC 60335-1	Tested in appliance
Feed-through terminal block for power and control cable	Weidmüller	WDU 10	Wire cross section max 10 mm ² , Rated current 57 A, Max voltage 1000 V, Number of connections: 2. Continuous operating temperature max. 130 °C, GW750°C – 850°C. UL 94 flammability rating V0	EN IEC 60947-7-1:2025	IEC, Dekra or similar
	Phoenix Contact	UK 10 N		EN IEC 60947-7-1:2025	IEC, Dekra or similar
	Schneider Electric	Linergy TR type NSYTRV102		EN IEC 60947-7-1:2025	IEC, Dekra or similar
	CABUR	CBC10GR		EN IEC 60947-7-1:2025	IEC, Dekra or similar
Seals and O-ring	Alternative	Alternative	Material NBR; operating temperature - 20÷110°C	IEC 60335-1	Tested in appliance
Cable Gland	ZENIT	Gland body 2xd21	Element 2 holes x d14, material: AISI 304. Sealing ring in NBR, max operating temperature = 110°C, dimensions (dext/H/dint): 21/46,5/10,2 and 21/46,5/9,5 or 21/46,5/10,2 and blind sealing ring 21/13/0.	IEC 60335-1	Tested in appliance
Cable Glands	ZENIT	Gland body d27(16)	Element d26, material: steel 1.053 (C45). Sealing ring in NBR, max operating temperature = 110°C, dimensions (dext/H/dint): 27/33/11,2 or 27/33/12,5 or 27/33/15 depending on the cable size.	IEC 60335-1	Tested in appliance
Cable Glands	ZENIT	Gland body d32(21)	Element d31, material: steel 1.053 (C45). Sealing ring in NBR, max operating temperature = 110°C, dimensions (dext/H/dint): 32/32/15 or 32/32/16,5 or 32/32/18 or 32/32/20 or 32/34,5/16,5 or 32/34,5/18 or 32/34,5/20 depending on the cable size.	IEC 60335-1	Tested in appliance

IEC 60335-2-41					
Clause	Requirement + Test		Result - Remark		Verdict
Cable Glands	ZENIT	Gland body d37(25)	Element d36, material: steel 1.053 (C45). Sealing ring in NBR, max operating temperature = 110°C, dimensions (dext/H/dint): 37/33/16,5 or 37/33/20 or 37/33/23,2 depending on the cable size.	IEC 60335-1	Tested in appliance
Cable Glands	ZENIT	Gland body d37(27,5)	Element d36, material: steel 1.053 (C45). Sealing ring in NBR, max operating temperature = 110°C, dimensions (dext/H/dint): 37/33/26,8.	IEC 60335-1	Tested in appliance
Mechanical seals (enclosure G05L - shaft diameter d15)	Meccanotecnica Umbra or Burgmann or Alternative	Double mechanical seal - Meccanotecnica Umbra FP/15 or equivalent	Sealing faces motor side: Silicon Carbide /Graphite; Sealing faces impeller side: Silicon Carbide / Silicon Carbide. Elastomers (O-ring, bellows): NBR. Metal parts: Stainless Steel. Operating limits: Maximum operating pressure: 12 bar; Maximum sliding velocity: 15 m/s; Operating temperature: -30°C ÷ +200°C	IEC 60335-1	Tested in appliance
Mechanical seals (enclosure G05L - shaft diameter d18)		Double mechanical seal - Meccanotecnica Umbra FP/18 or equivalent			
Mechanical seals (Pumps with low discharge pressure - enclosure G06S, G06L - shaft diameter d25)	Burgmann or Meccanotecnica Umbra or Alternative	Burgmann BT-AR/25 (motor side) - eMG/25 (impeller side) or equivalent	Sealing faces motor side: Silicon Carbide /Graphite; Sealing faces impeller side: Silicon Carbide / Silicon Carbide. Elastomers (O-ring, bellows): NBR on BT-AR, VITON on eMG. Metal parts: Stainless Steel. Operating limits BT-AR: Maximum operating pressure 6 bar; Maximum sliding velocity 10 m/s; Operating temperature -20°C ÷ +120°C. Operating limits models eMG: Maximum operating pressure 16 bar; Maximum sliding velocity 10 m/s; Operating temperature -20°C ÷ +140°C.	IEC 60335-1	Tested in appliance
Mechanical seals (Pumps with low discharge pressure - enclosure G07S, G07L - shaft diameter d30)		Burgmann BT-AR/30 (motor side) - eMG/30 (impeller side) or equivalent			
Mechanical seals (Pumps with low discharge pressure - enclosure G08L - shaft diameter d35)		Burgmann BT-AR/35 (motor side) - eMG/35 (impeller side) or equivalent			

IEC 60335-2-41					
Clause	Requirement + Test		Result - Remark		Verdict
Mechanical seals (Pumps with high discharge pressure - enclosure G06S, G06L - shaft diameter d25)	Burgmann or Meccanotecnica Umbra or Alternative	Burgmann BT-AR/25 (motor side) - M7N/25 (impeller side) or equivalent	Sealing faces motor side: Silicon Carbide / Graphite; Sealing faces impeller side: Silicon Carbide / Silicon Carbide. Elastomers (O-ring, bellows): NBR on BT-AR, VITON on M7N. Metal parts: Stainless Steel. Operating limits BT-AR: Maximum operating pressure 6 bar; Maximum sliding velocity 10 m/s; Operating temperature -20°C ÷ +120°C. Operating limits models M7N: Maximum operating pressure 25 bar; Maximum sliding velocity 20 m/s; Operating temperature -50°C ÷ +220°C.	IEC 60335-1	Tested in appliance
Mechanical seals (Pumps with high discharge pressure - enclosure G07S, G07L - shaft diameter d30)		Burgmann BT-AR/30 (motor side) - M7N/30 (impeller side) or equivalent			
Mechanical seals (Pumps with high discharge pressure - enclosure G08L - shaft diameter d35)		Burgmann BT-AR/35 (motor side) - M7N/35 (impeller side) or equivalent			
Mechanical seals (Pumps with low discharge pressure - enclosure M08S, M08L - shaft diameter d40)	Burgmann or Meccanotecnica Umbra or Alternative	Burgmann eMG/40 (motor side) - eMG/40 (impeller side) or equivalent	Sealing faces motor and impeller side: Silicon Carbide / Silicon Carbide. Elastomers (O-ring, bellows): VITON. Metal parts: Stainless Steel. Operating limits models eMG: Maximum operating pressure 16 bar; Maximum sliding velocity 10 m/s; Operating temperature -20°C ÷ +140°C.	IEC 60335-1	Tested in appliance
Mechanical seals (Pumps with low discharge pressure - enclosure G10S, G10L - shaft diameter d45)		Burgmann eMG/45 (motor side) - eMG/45 (impeller side) or equivalent			
Mechanical seals (Pumps with high discharge pressure - enclosure M08S, M08L - shaft diameter d40)	Burgmann or Meccanotecnica Umbra or Alternative	Burgmann eMG/40 (motor side) - M7N/40 (impeller side) or equivalent	Sealing faces motor and impeller side: Silicon Carbide / Silicon Carbide. Elastomers (O-ring, bellows): VITON. Metal parts: Stainless Steel. Operating limits models eMG: Maximum operating pressure 16 bar; Maximum sliding velocity 10 m/s; Operating temperature -20°C ÷ +140°C. Operating limits models M7N: Maximum operating pressure 25 bar; Maximum sliding velocity 20 m/s; Operating temperature -50°C ÷ +220°C.	IEC 60335-1	Tested in appliance
Mechanical seals (Pumps with high discharge pressure - enclosure G10S, G10L - shaft diameter d45)		Burgmann eMG/45 (motor side) - M7N/45 (impeller side) or equivalent			

IEC 60335-2-41					
Clause	Requirement + Test		Result - Remark		Verdict
Motor Enclosures, intermediate support, pump plates, pump bodies and suction flange (where applicable)	Zenit	Alternative	Material: cast iron EN-GJL250 Minimum thickness: 5mm.	IEC 60335-1	Tested in appliance
UNIQA SERIES					
Power supply and/or control cable	ARISTON CAVI S.p.A	S1RN8-F	Maximum working temp. on the conductor: -+90° C Cable variants: 4G1,5 (4x1,5mm ²); 4G1,5+3x1 (4x1,5mm ² + 3x1 mm ²); 4G2,5+3x1 (4x2,5mm ² + 3x1 mm ²); 4G4+3x1 (4x4mm ² + 3x1 mm ²); 7G1,5 (7x1,5mm ²); 7G1,5+3x1 (7x1,5mm ² + 3x1 mm ²); 7G2,5+3x1 (7x2,5mm ² + 3x1 mm ²)	IEC 60335-1 and IEC 60335-2-41. Construction based on EN 50525-2-21:2011/AC:2013	Tested in appliance S mark or VDE or IMQ or similar
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	1,8/2BW	P2=1,8kW, 2 poles, Duty S1 submerged or emerged - Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	1,8/2BD	P2=1,8kW, 2 poles, - Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	2,2/2BW	P2=2,2kW, 2 poles, Duty S1 submerged - Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	3/2BW	P2=3kW, 2 poles, Duty S1 submerged - Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	1,1/4BW	P2=1,1kW, 4 poles, Duty S1 submerged - Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance

IEC 60335-2-41					
Clause	Requirement + Test		Result - Remark		Verdict
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	1,5/4BW	P2=1,5kW, 4 poles, Duty S1 submerged - Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	1,1/6BW	P2=1,1kW, 6 poles, Duty S1 submerged - Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	4/2BW	P2=4kW, 2 poles, Duty S1 submerged - Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	1,8/4BW	P2=1,8kW, 4 poles, Duty S1 submerged - Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	2,2/4BW	P2=2,2kW, 4 poles, Duty S1 submerged - Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	1,5/6BW	P2=1,5kW, 6 poles, Duty S1 submerged - Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	3/4BW	P2=3kW, 4 poles, - Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	1,8/6BW	P2=1,8kW, 6 poles, Duty S1 submerged - Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance

IEC 60335-2-41					
Clause	Requirement + Test		Result - Remark		Verdict
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	4/2AW	P2=4kW, 2 poles, Duty S1 submerged - Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	3/4AW	P2=3kW, 4 poles, Duty S1 submerged - Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	4/2AD	P2=4kW, 2 poles, Duty S1 submerged or emerged - Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	4/4AW	P2=4kW, 4 poles, Duty S1 submerged - Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	4/4AD	P2=4kW, 4 poles, Duty S1 submerged or emerged - Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	3/6AW	P2=3kW, 6 poles, Duty S1 submerged - Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	4/6AW	P2=4kW, 6 poles, Duty S1 submerged - Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	4/4AD	P2=4kW, 4 poles, Duty S1 submerged or emerged - Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance

IEC 60335-2-41					
Clause	Requirement + Test		Result - Remark		Verdict
Electric Motor - Asynchronous, 3-phase, insulation class H, IP68	ZENIT	4/6AD	P2=4kW, 6 poles, Duty S1 submerged or emerged - Variants: 230V; 400V; 230/400V - 50Hz; 230V; 400V; 230/400V - 60Hz;	IEC 60034-1:2026 IEC 60335-1	Tested in appliance
Cable wiring (Electrical diagram)	ZENIT	BB	n.3 bimetal thermal protectors (Klixon) in series inside the motor - n.1 double leakage detector (mechanical seals chamber / stator housing). Cable variants: Star/Delta: (7G_+3x1); DOL (direct on line): (4G_+3x1)	IEC 60335-1	Tested in appliance
Cable wiring (Electrical diagram)	ZENIT	BE	n.3 bimetal thermal protectors (Klixon) in series inside the motor - n.3 leakage detectors (mechanical seals chamber, stator housing and electric connection chamber). Cable variants: Star/Delta: (7G_+3x1) + (4G1,5); DOL (direct on line): (4G_+3x1) + (4G1,5).	IEC 60335-1	Tested in appliance
Cable wiring (Electrical diagram)	ZENIT	BF	n.3 bimetal thermal protectors (Klixon) in series inside the motor - n.1 double leakage detector (mechanical seals chamber / stator housing) - n.1 vibration sensor (upper bearing). Cable variants: Star/Delta: (7G_+3x1) + (4G1,5); DOL (direct on line): (4G_+3x1) + (4G1,5).	IEC 60335-1	Tested in appliance
Cable wiring (Electrical diagram)	ZENIT	CB	n.3 PTC thermistors in series inside the motor - n.1 double leakage detector (mechanical seals chamber / stator housing). Cable variants: Star/Delta: (7G_+3x1); DOL (direct on line): (4G_+3x1)	IEC 60335-1	Tested in appliance

IEC 60335-2-41					
Clause	Requirement + Test		Result - Remark		Verdict
Cable wiring (Electrical diagram)	ZENIT	CE	n.3 PTC thermistors in series inside the motor - n.3 leakage detectors (mechanical seals chamber, stator housing and electric connection chamber). Cable variants: Star/Delta: (7G_+3x1) + (4G1,5); DOL (direct on line): (4G_+3x1) + (4G1,5).	IEC 60335-1	Tested in appliance
Cable wiring (Electrical diagram)	ZENIT	CI	n.3 PTC thermistors in series inside the motor - n.1 double leakage detector (mechanical seals chamber / stator housing) - n.1 vibration sensor (upper bearing). Cable variants: Star/Delta: (7G_+3x1) + (4G1,5); DOL (direct on line): (4G_+3x1) + (4G1,5).	IEC 60335-1	Tested in appliance
Cable wiring (Electrical diagram)	ZENIT	DB	n.3 PTC thermistors in series inside the motor - n.2 PTC thermistor for bearings (upper and lower) - n.1 double leakage detector (mechanical seals chamber / stator housing). Cable variants: Star/Delta: (7G_+3x1) + (7G1,5); DOL (direct on line): (4G_) + (15G1).	IEC 60335-1	Tested in appliance
Cable wiring (Electrical diagram)	ZENIT	DE	n.3 PTC thermistors in series inside the motor - n.2 PTC thermistor for bearings (upper and lower) - n.3 leakage detectors (mechanical seals chamber, stator housing and electric connection chamber). Cable variants: Star/Delta: (7G_+3x1) + (7G1,5), (7G_+3x1) + (7G1,5+3x1); DOL (direct on line): (4G_) + (15G1).	IEC 60335-1	Tested in appliance

IEC 60335-2-41					
Clause	Requirement + Test		Result - Remark		Verdict
Cable wiring (Electrical diagram)	ZENIT	DF	n.3 PTC thermistors in series inside the motor - n.2 PTC thermistor for bearings (upper and lower) - n.3 leakage detectors (mechanical seals chamber, stator housing and electric connection chamber) - n.1 vibration sensor (upper bearing). Cable variants: Star/Delta: (7G_+3x1) + (15G1); DOL (direct on line): (4G_) + (15G1).	IEC 60335-1	Tested in appliance
Cable wiring (Electrical diagram)	ZENIT	EB	n.3 independent PT100 temperature sensors inside the motor (n.1 per phase) - n.2 PT100 temperature sensor for bearings (upper and lower) - n.3 leakage detectors (mechanical seals chamber, stator housing and electric connection chamber). Cable variants: Star/Delta: (7G_+3x1) + (15G1); DOL (direct on line): (4G_) + (15G1).	IEC 60335-1	Tested in appliance
Cable wiring (Electrical diagram)	ZENIT	EI	n.3 independent PT100 temperature sensors inside the motor (n.1 per each phase) - n.2 PT100 temperature sensor for bearings (upper and lower) - n.3 leakage detectors (mechanical seals chamber, stator housing and electric connection chamber) - n.1 vibration sensor (upper bearing). Cable variants: Star/Delta: (7G_+3x1) + (25G1); DOL (direct on line): (4G_) + (25G1).	IEC 60335-1	Tested in appliance

IEC 60335-2-41					
Clause	Requirement + Test		Result - Remark		Verdict
Cable wiring (Electrical diagram)	ZENIT	JA	n.3 independent PT100 temperature sensors inside the motor (n.1 per each phase) - n.1 double leakage detector (mechanical seals chamber / stator housing). Cable variants: Star/Delta: (7G_+3x1) + (7G1,5), (7G_+3x1) + (7G1,5+3x1), (7G_+3x1) + (15G1); DOL (direct on line): (4G_+3x1) + (7G1,5), (4G_+3x1) + (7G1,5+3x1), (4G_) + (15G1).	IEC 60335-1	Tested in appliance
Cable wiring (Electrical diagram)	ZENIT	JB	n.3 independent PT100 temperature sensors inside the motor (n.1 per each phase) - n.3 leakage detectors (mechanical seals chamber, stator housing and electric connection chamber). Cable variants: Star/Delta: (7G_+3x1) + (7G1,5), (7G_+3x1) + (15G1); DOL (direct on line): (4G_+3x1) + (7G1,5), (4G_+3x1) + (7G1,5+3x1), (4G_) + (15G1).	IEC 60335-1	Tested in appliance
Thermal protector (Klixon)	Thermik Gerätebau GmbH	S01	Contact NC, Nominal switching temperature (NST) 150°C triple element; Reverse switch temperature (RST) below NST: $\geq 35^{\circ}\text{C}$; Rated Voltage AC 250V	IEC 60730-1:2022, IEC 60730-2-9:2026	VDE Certificate No. 40022282
Thermal protection – Klixon / Thermostat (alternative)	Alternative	Same ratings of S01	Rated current AC $\cos \phi = 1.0/\text{cycles } 2,5 \text{ A} / 10.000$ Rated current AC $\cos \phi = 0.6/\text{cycles } 1,6 \text{ A} / 10.000$ Max. switching current AC $\cos \phi = 1.0/\text{cycles } 6,3 \text{ A} / 3.000$ 7,5 A / 300 Rated current AC $\cos \phi = 0.4/\text{cycles } 1,8 \text{ A} / 10.000$ Max. switching current AC $\cos \phi = 0.4/\text{cycles } 7,2 \text{ A} / 1.000$		VDE or similar
PTC Thermistor (alternative)	Thermik Gerätebau GmbH	SNM	Nominal temperature response (Tref) 120°C single single element,	IEC 60738-1:2022	UL Cert.: 20150715-E130346

IEC 60335-2-41					
Clause	Requirement + Test		Result - Remark		Verdict
	Alternative	Same ratings of SNN	150°C triple element, Dielectric strength of the insulation $U_{eff} = 2.500$ V.		VDE or similar
Resistance Temperature Detectors – PT100 (alternative)	MIOTTI	PT100 R8-3	Temperature range 0°C - 250°C (class B)	EN IEC 60751:2022	Tested in appliance
	Alternative	Same ratings of PT100 R8-3			
Vibration sensor (optional)	Hansford Sensors	HS-420S	4-20mA, velocity range 0-20mm/sec	IEC 60335-1	Tested in appliance
	Alternative	Same of HS-420S			
Through connector (Wire connectors for control cable)	CEMBRE	PL03-M	Conductor cross section: 0,25÷1,5mm².	IEC 60335-1	Tested in appliance
	Elektrozubehor	F 1515 PSK	Max rated Voltage: min 600V, Max operating temperature: min 75°C. UL 94 flammability rating V-0	IEC 60335-1	Tested in appliance
	CEMBRE	PL06-M	Conductor cross section: 1,5÷2,5mm².	IEC 60335-1	Tested in appliance
	Elektrozubehor	F 2517 PSK	Max rated Voltage: min 300V, Max operating temperature: min 75°C. UL 94 flammability rating V-0	IEC 60335-1	Tested in appliance
One-way terminal block - End connector (Wire connectors for power cable)	BM Group	00270	Conductor cross section: 1,5÷2,5mm². Max rated Voltage: min 600V, Max operating temperature: min 105°C. UL 94 flammability rating V-2	IEC 60335-1	Tested in appliance
	Alternative: CEMBRE	NL06-P	Conductor cross section: 1,5÷2,5mm². Max rated Voltage: min 600V, Max operating temperature: min 105°C. UL 94 flammability rating V-2	IEC 60335-1	Tested in appliance
	BM Group	00370	Conductor cross section: 2,5÷6 mm². Max rated Voltage: min 600V, Max operating temperature: min 105°C. UL 94 flammability rating V-2	IEC 60335-1	Tested in appliance
	Alternative: CEMBRE	NL1-P	Conductor cross section: 2,5÷6 mm². Max rated Voltage: min 600V, Max operating temperature: min 105°C. UL 94 flammability rating V-2	IEC 60335-1	Tested in appliance
	BM Group	00470	Conductor cross section: 6÷10 mm². Max rated Voltage: min 600V, Max operating temperature: min 105°C. UL 94 flammability rating V-2	IEC 60335-1	Tested in appliance
Ring Terminal for earthing conductor	Alternative	M6 ring terminal M8 ring terminal	Conductor cross section: 1,5÷2,5mm² Conductor cross section: 2,5÷6mm²	IEC 60335-1	Tested in appliance
Feed-through terminal block for power and control cable	Weidmüller	WDU 10	Wire cross section max 10 mm², Rated current 57 A, Max voltage 1000 V, Number of connections: 2.	EN IEC 60947-7-1:2025	IEC, Dekra or similar
	Phoenix Contact	UK 10 N		EN IEC 60947-7-1:2025	IEC, Dekra or similar
	Schneider Electric	Linergy TR type NSYTRV102			

IEC 60335-2-41					
Clause	Requirement + Test		Result - Remark		Verdict
	CABUR	CBC10GR	Continuous operating temperature max. 130 °C, GW750°C – 850°C. UL 94 flammability rating V0	EN IEC 60947-7-1:2025	IEC, Dekra or similar
Seals and O-ring	Alternative	Alternative	Material NBR; operating temperature - 20÷110°C	IEC 60335-1	Tested in appliance
Cable Glands	ZENIT	Gland body d27(16)	Element d26, material: steel 1.053 (C45). Sealing ring in NBR, max operating temperature = 110°C, dimensions (dext/H/dint): 27/33/11,2 or 27/33/12,5; 27/33/15 depending on the cable size.	IEC 60335-1	Tested in appliance
Cable Glands	ZENIT	Gland body d32(21)	Element d31, material: steel 1.053 (C45). Sealing ring in NBR, max operating temperature = 110°C, dimensions (dext/H/dint): 32/32/15 or 32/32/16,5 or 32/32/18 or 32/32/20 or 32/34,5/16,5 or 32/34,5/18 or 32/34,5/20 depending on the cable size.	IEC 60335-1	Tested in appliance
Cable Glands	ZENIT	Gland body d37(25)	Element d36, material: steel 1.053 (C45). Sealing ring in NBR, max operating temperature = 110°C, dimensions (dext/H/dint): 37/33/16,5; 37/33/20; 37/33/23,2 depending on the cable size.	IEC 60335-1	Tested in appliance
Cable Glands	ZENIT	Gland body d37(27,5)	Element d36, material: steel 1.053 (C45). Sealing ring in NBR, max operating temperature = 110°C, dimensions (dext/H/dint): 37/33/26,8.	IEC 60335-1	Tested in appliance
Mechanical seals (enclosure G05L - shaft diameter d15)	Meccanotecnica Umbra or Burgmann or Alternative	Double mechanical seal - Meccanotecnica Umbra FP/15 or equivalent	Sealing faces motor side: Silicon Carbide /Graphite; Sealing faces impeller side: Silicon Carbide /	IEC 60335-1	Tested in appliance

IEC 60335-2-41					
Clause	Requirement + Test			Result - Remark	Verdict
Mechanical seals (enclosure G05L - shaft diameter d18)		Double mechanical seal- Meccanotecnica Umbra FP/18 or equivalent	Silicon Carbide. Elastomers (O-ring, bellows): NBR. Metal parts: Stainless Steel. Operating limits: Maximum operating pressure: 12 bar; Maximum sliding velocity: 15 m/s; Operating temperature: -30°C ÷ +200°C		
Mechanical seals (Pumps with low discharge pressure - enclosure G06S, G06L - shaft diameter d25)	Burgmann or Meccanotecnica Umbra or Alternative	Burgmann BT-AR/25 (motor side) - eMG/25 (impeller side) or equivalent	Sealing faces motor side: Silicon Carbide /Graphite; Sealing faces impeller side: Silicon Carbide / Silicon Carbide.	IEC 60335-1	Tested in appliance
Mechanical seals (Pumps with low discharge pressure - enclosure G07S, G07L - shaft diameter d30)		Burgmann BT-AR/30 (motor side) - eMG/30 (impeller side) or equivalent	Elastomers (O-ring, bellows): NBR on BT-AR, VITON on eMG. Metal parts: Stainless Steel. Operating limits BT-AR: Maximum operating pressure 6 bar; Maximum sliding velocity 10 m/s; Operating temperature -20°C ÷ +120°C.		
Mechanical seals (Pumps with low discharge pressure - enclosure G08L - shaft diameter d35)		Burgmann BT-AR/35 (motor side) - eMG/35 (impeller side) or equivalent	Operating limits models eMG: Maximum operating pressure 16 bar; Maximum sliding velocity 10 m/s; Operating temperature -20°C ÷ +140°C.		
Mechanical seals (Pumps with high discharge pressure - enclosure G06S, G06L - shaft diameter d25)	Burgmann or Meccanotecnica Umbra or Alternative	Burgmann BT-AR/25 (motor side) - M7N/25 (impeller side) or equivalent	Sealing faces motor side: Silicon Carbide /Graphite; Sealing faces impeller side: Silicon Carbide / Silicon Carbide.	IEC 60335-1	Tested in appliance
Mechanical seals (Pumps with high discharge pressure - enclosure G07S, G07L - shaft diameter d30)		Burgmann BT-AR/30 (motor side) - M7N/30 (impeller side) or equivalent	Elastomers(O-ring, bellows): NBR on BT-AR, VITON on M7N. Metal parts: Stainless Steel. Operating limits BT-AR: Maximum operating pressure 6 bar; Maximum sliding velocity 10 m/s; Operating temperature -20°C ÷ +120°C.		
Mechanical seals (Pumps with high discharge pressure - enclosure G08L - shaft diameter d35)		Burgmann BT-AR/35 (motor side) - M7N/35 (impeller side) or equivalent	Operating limits models M7N: Maximum operating pressure 25 bar; Maximum sliding velocity 20 m/s; Operating temperature -50°C ÷ +220°C.		

IEC 60335-2-41					
Clause	Requirement + Test		Result - Remark		Verdict
Mechanical seals (Pumps with low discharge pressure - enclosure M08S, M08L - shaft diameter d40)	Burgmann or Meccanotecnica Umbra or Alternative	Burgmann eMG/40 (motor side) - eMG/40 (impeller side) or equivalent	Sealing faces motor and impeller side: Silicon Carbide / Silicon Carbide. Elastomers (O-ring, bellows): VITON. Metal parts: Stainless Steel. Operating limits models eMG: Maximum operating pressure 16 bar; Maximum sliding velocity 10 m/s; Operating temperature -20°C ÷ +140°C.	IEC 60335-1	Tested in appliance
Mechanical seals (Pumps with low discharge pressure - enclosure G10S, G10L - shaft diameter d45)		Burgmann eMG/45 (motor side) - eMG/45 (impeller side) or equivalent			
Mechanical seals (Pumps with high discharge pressure - enclosure M08S, M08L - shaft diameter d40)	Burgmann or Meccanotecnica Umbra or Alternative	Burgmann eMG/40 (motor side) - M7N/40 (impeller side) or equivalent	Sealing faces motor and impeller side: Silicon Carbide / Silicon Carbide. Elastomers (O-ring, bellows): VITON. Metal parts: Stainless Steel. Operating limits models eMG: Maximum operating pressure 16 bar; Maximum sliding velocity 10 m/s; Operating temperature -20°C ÷ +140°C.	IEC 60335-1	Tested in appliance
Mechanical seals (Pumps with high discharge pressure - enclosure G10S, G10L - shaft diameter d45)		Burgmann eMG/45 (motor side) - M7N/45 (impeller side) or equivalent	Operating limits models M7N: Maximum operating pressure 25 bar; Maximum sliding velocity 20 m/s; Operating temperature -50°C ÷ +220°C.		
Motor Enclosures, intermediate support, pump plates, pump bodies and suction flange (where applicable)	Zenit	Alternative	Material: cast iron EN-GJL250 Minimum thickness: 5mm.	IEC 60335-1	Tested in appliance
External cooling jacket	Zenit	M10S DRY	Material: stainless steel AISI304 Minimum thickness: 1,5mm.	IEC 60335-1	Tested in appliance
Supplementary information:					
1) Provided evidence ensures the agreed level of compliance. See OD-CB2039.					

IEC 60335-2-41			
Clause	Requirement + Test	Result - Remark	Verdict

25.16	TABLE:				N/A
Supply Cord Designation Lightest permissible type	Smallest cross-sectional area (mm ²)	Supply Cord Designation Next heavier permissible type	Largest cross-sectional area (mm ²)	Verdict	

Supplementary information: For Type X attachment the appliance was supplied with supply cord (See 25.7)
Type =cross-sectional area = mm²

25.17	TABLE:				P
Supply Cord Designation Supplied type (See 25.7)	Cross-sectional area (mm ²)	Verdict	Supply Cord Designation Listed alternative type in 24.1 Table	cross-sectional area (mm ²)	Verdict
H07RNF	max 2.5mm ²	Pull force 100N Torque force 0.35nm	S1RN8-F	max 2.5mm ²	Pull force 100N Torque force 0.35nm

Supplementary information: For Type Y attachment the appliance was supplied with supply cord (See 25.7)
Type = H07RNF or S1RN8-F cross-sectional area = max 2.5mm²

IEC 60335-2-41			
Clause	Requirement + Test	Result - Remark	Verdict

28.1	TABLE: Threaded part torque test			N/A
Threaded part identification		Diameter of thread (mm)	Column number (I, II, or III)	Applied torque (Nm)
Supplementary information:				

29	TABLE: Clearance and creepage distance measurements					P
Clearance cl and creepage distance dcr at/of:	Up (V)	U r.m.s. (V)	Required cl (mm)	cl (mm)	Required dcr (mm)	dcr (mm)
GREY and UNIQA Series	325	230	1.5	4.5	0.56	3.5
GREY and UNIQA Series	566	400	1.5	4.5	1	4.5
Supplementary information: Overvoltage category II – Pollution degree 1						

30.1	TABLE: Ball pressure test of thermoplastics			N/A
Allowed impression diameter (mm) :				—
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)	
Supplementary information:				

IEC 60335-2-41			
Clause	Requirement + Test	Result - Remark	Verdict

30.2	TABLE: Resistance to heat and fire - Glow wire tests							P
Object/ Part No./ Material	Manufacturer / trademark	Glow wire test (GWT); (°C)						Verdict
		550	650		750		850	
			te	ti	te	ti		
Feed-through terminal block for power and control cable	Weidmüller / WDU 10	V0			0	0	X	Pass
	Phoenix Contact / UK 10 N	V0			0	0	X	Pass
	Schneider Electric / Linergy TR type NSYTRV102	V0			0	0	X	Pass
	CABUR / CBC10GR	V0			0	0	X	Pass
One-way terminal block - End connector (Wire connectors for power cable)	BM Group / 00270	V2			0	0	X	Pass
	Cembre / NL06-P	V2			0	0	X	Pass
	BM Group / 00370	V2			0	0	X	Pass
	BM Group / 00470	V2			0	0	X	Pass
	Cembre / NL1-P	V2			0	0	X	Pass
Object/ Part No./ Material	Manufacturer / trademark	Glow-wire flammability index (GWFI), °C				GW ignition temp. (GWIT), °C		Verdict
		550	650	750	850	675	775	
The test specimen passed the glow wire test (GWT) with no ignition [(te – ti) ≤ 2s] (Yes/No) :								
If no, then surrounding parts passed the needle-flame test of annex E (Yes/No) :								
The test specimen passed the test by virtue of most of the flaming material being withdrawn with the glow-wire (Yes/No)? :								
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. Indicate the voltage for obtaining the current upon which the GWT severity is based: If marked with a rated voltage: Rated voltage ☐ If marked with a rated voltage range: Lower limit of voltage range; ☐ Upper limit of voltage range ☐								

IEC 60335-2-41			
Clause	Requirement + Test	Result - Remark	Verdict

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)	Verdict
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					

ATTACHMENT to TRF IEC60335-2-41N			
Clause	Requirement + Test	Result - Remark	Verdict
ATTACHMENT TO TEST REPORT IEC 60335-2-41 (AUSTRALIA/NEW ZEALAND) NATIONAL DIFFERENCES (Household and similar electrical appliances – Safety – Part 2-41: Particular requirements for pumps)			
Differences according to.....:	AS/NZS 60335.2.41:2024 AS/NZS 60335.1:2022		
TRF template used:.....:	IECEE OD-2020-F3:2022, Ed. 1.2		
Attachment Form No.....:	AU_NZ_ND_IEC60335_2_41N		
Attachment Originator	NZ Electrotechnical Committee/Standards New Zealand		
Master Attachment.....:	Date 2024-07-08		
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	Australia/New Zealand Common National Differences		
5	GENERAL CONDITIONS FOR THE TESTS		
5.2	Insert the following variation:		
	If the tests of AZ.22.201 need to be performed they are carried out on separate appliances, the number of appliances is that required by AS/NZS 3112. (AS/NZS 60335.1:2022)		P
5.8.1	Replace the test condition by the following variation:		
	Appliances for AC only are tested with AC at 50 Hz, and those for AC and DC are tested at AC 50 Hz or DC whichever is the more unfavourable supply. (AS/NZS 60335.1:2022)		N/A
6	CLASSIFICATION		
6.1	Replace the first paragraph of the requirement by the following variation:		
	Appliances shall be of one of the following classes with respect to protection against electric shock class I, class II, class III. (AS/NZS 60335.1:2022)	Class I	P
7	MARKING AND INSTRUCTIONS		
7.8	Replace the first dashed item of the requirement with the following variation:		

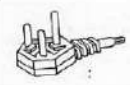
ATTACHMENT to TRF IEC60335-2-41N			
Clause	Requirement + Test	Result - Remark	Verdict
	– in class I appliances incorporating tubular sheathed or embedded heating elements or appliance outlets complying with the standard sheets in IEC 60320-3 accessible to the user or socket-outlets accessible to the user the terminal for the neutral conductor shall be indicated by the letter N; (AS/NZS 60335.1:2022)		N/A
7.13	Replace the requirement with the following variation:		
	Instructions and other text required by this standard are written in English. (AS/NZS 60335.1:2022)		P
22	CONSTRUCTION		
22.2	Add the following variation:		
	For appliances used in a system with polarized plugs intended for connection to polarized socket-outlets, single-pole protective devices that disconnect heating elements from the supply mains in single-phase, class I appliances shall be connected to the line (active) conductor. (AS/NZS 60335.1:2022)		N/A
22.3	Replace the text with the following variation:		
	VOID (AS/NZS 60335.1:2022)		P
22.61	Add the following variation:		
	The socket outlets shall - comply with AS/NZS 3112; - accept a 3-pin, flat-pin plug as described in Figure 2.1(a1) of AS/NZS 3112. (AS/NZS 60335.1:2022)		N/A
AZ.22.201	Appliances having integral pins for insertion into socket outlets shall comply with the appropriate requirements of AS/NZS 3112.		N/A
	Compliance is checked as specified in Appendix J of AS/NZS 3112. (AS/NZS 60335.1:2022)		N/A
24	COMPONENTS		
24.1	Insert the following variation before NOTE 1:		
	NOTE 201 The relevant IEC standard can be replaced with the relevant Australia/New Zealand standard where applicable. (AS/NZS 60335.1:2022)		P
25	SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS		
25.1	Insert the following variation:		

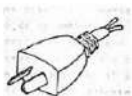
ATTACHMENT to TRF IEC60335-2-41N			
Clause	Requirement + Test	Result - Remark	Verdict
	Supply cords for single-phase appliances having a rating including but not exceeding 20 A, other than those intended to be permanently connected to fixed wiring, shall be fitted with an appropriate plug complying with: – AS/NZS 3112, for household appliances; or – AS/NZS 3112, AS/NZS 3123 or IEC 60309 for commercial and industrial appliances. (AS/NZS 60335.1:2022)	No single phase	N/A
Table 11	In footnote <i>a</i> insert the following variation		
	However, they cannot be used in class I appliances. (AS/NZS 60335.1:2022)		N/A
25.7	Add the following variation to the addition:		
	For non-submersible pumps intended for use outdoors, other than pumps intended for use in swimming pools and class III pumps, a heavy duty PVC cord complying with AS/NZS 3191 may be used for the supply cord. (AS/NZS 60335.2.41:2024)	Submersible pumps	N/A
	Special national conditions (if any)		
	Australia		
5	GENERAL CONDITIONS FOR THE TESTS		
AU.5.201	For appliances, other than class III appliances, that are intended for connections to the supply mains (AS/NZS 60335.1:2022)		P
	for single phase appliances, if marked with a rated voltage of either "230 V" or "240 V" test: • at the multiplication factor (of less than 1) × 230 V; and • at the multiplication factor (of greater than 1) × 240 V; (AS/NZS 60335.1:2022)	No single phase	N/A
	for multi-phase appliances, if marked with a rated voltage of either "400 V" or "415 V" test: • at the multiplication factor (of less than 1) × 400 V; and • at the multiplication factor (of greater than 1) × 415 V; (AS/NZS 60335.1:2022)	400V	P

ATTACHMENT to TRF IEC60335-2-41N			
Clause	Requirement + Test	Result - Remark	Verdict
	If marked with a rated voltage range then test: - at the multiplication factor (of less than 1) $\times$ the lower extremity of the rated voltage range; and - at the multiplication factor (of greater than 1) $\times$ the higher extremity of the rated voltage range; or - at the worst case voltage within the rated voltage range. (AS/NZS 60335.1:2022)		N/A
	NOTE 1 Example of calculation The appliance is marked with a rated current or rated power input at 230 V only and so will need a calculation to determine the rated values at the upper value of rated voltage of 240V. If the appliance is marked with a rated voltage of 230 V and a rated current "A" or a rated power input "P", then for the upper limit voltage testing at 240V it will be tested as if it is marked with a rated voltage of 240 V and a rated current of $A \times (240/230)$ or a rated power input of $P \times (240/230)^2$. The appliance is marked with a rated current or rated power input at 240 V only and so will need a calculation to determine the rated values at the lower value of rated voltage of 230 V. If the appliance is marked with a rated voltage of 240 V and a rated current "A" or a rated power input "P", then for the lower limit voltage testing at 230 V it will be tested as if it is marked with a rated voltage of 230 V and a rated current of $A \times (230/240)$ or a rated power input of $P \times (230/240)^2$ (AS/NZS 60335.1:2022)		N/A
7	MARKING AND INSTRUCTIONS		
7.1	After the first paragraph of the requirement insert the following variation:		
	Appliances intended for connection to the supply mains, other than class III appliances, shall be marked with:		P
	- a rated voltage of at least: 230 V for single-phase appliances; 400 V for multi-phase appliances; or (AS/NZS 60335.1:2022)	400V	P
	- a rated voltage range that includes: 230 V for single-phase appliances; 400 V for multi-phase appliances. (AS/NZS 60335.1:2022)		N/A
24	COMPONENTS		
24.1.7	Telecommunication interface circuitry must comply with the Telecom Labelling Notice issued under the Telecommunications Act instead of IEC 62151		N/A
	(AS/NZS 60335.1:2022)		
30	RESISTANCE TO HEAT AND FIRE		
30.1	Insert the following variation		

ATTACHMENT to TRF IEC60335-2-41N			
Clause	Requirement + Test	Result - Remark	Verdict
	For circuit breakers used for compliance with 22.61, the test on external parts and parts supporting live parts is carried out at a temperature of 40 °C ± 2 °C plus the maximum temperature rise determined during the test of Clause 11 but it shall be at least 160 °C. (AS/NZS 60335.1:2022)		N/A
	New Zealand		
5	GENERAL CONDITIONS FOR THE TESTS		
NZ.5.201	For appliances, other than Class III appliances, that are intended for connection to the low voltage supply mains, and having more than one rated voltage or rated voltage range, all tests shall be carried out at a rated voltage of 230 V (single phase) or 400 V (multi-phase). (AS/NZS 60335.1:2022)	Test conducted at 400V	P
7	MARKING AND INSTRUCTIONS		
7.1	After the first paragraph of the requirement insert the following variation:		
	Appliances intended for connection to the supply mains, other than class III appliances, shall be marked with:		P
	- a rated voltage of: • 230 V for single-phase appliances; • 400 V for multi-phase appliances; or (AS/NZS 60335.1:2022)	400V	P
	- a rated voltage range that includes: • 230 V for single-phase appliances; • 400 V for multi-phase appliances. (AS/NZS 60335.1:2022)		N/A
ANZ	Annex ANZ (normative) Normative references to international publications with their corresponding joint Australia/New Zealand publications		

ATTACHMENT to TRF IEC60335-2-41N			
Clause	Requirement + Test	Result - Remark	Verdict
	When an international publication has been modified by national variations the relevant joint Australia/New Zealand publications applies if the national variations are needed to ensure the safety of the appliance for Australia/New Zealand conditions. These international publications are indicated by (mod). If an international publication is not so indicated, then either it or the listed Australia/New Zealand publication may be used. Where there is no equivalent international publication listed to a listed Australia/New Zealand publication, then the Australia/New Zealand publication applies.		P

ATTACHMENT to TRF (add Test Report Form No.)			
Clause	Requirement + Test	Result - Remark	Verdict
ATTACHMENT TO TEST REPORT IEC 60335-1 ARGENTINA NATIONAL DIFFERENCES HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES - SAFETY - PART 1: GENERAL REQUIREMENTS			
Differences according to.....: Special National Conditions			
TRF template used:.....: IECEE OD-2020-F3:2022, Ed. 1.2			
Attachment Form No.....: AR_ND_IEC60335_1_A			
Attachment Originator: IRAM – Instituto Argentino de Normalización y Certificación			
Master Attachment.....: 2024-06-06			
Copyright © 2022 IEC System for Conformity Testing and Certification of Electrical Equipment (IECEE), Geneva, Switzerland. All rights reserved.			
	National Differences		
	Not applicable		P
	Special national conditions (if any)		
	- Appliances other than SELV, ratings shall cover 220 VAC - 50 Hz or 3x380 VAC – 50 Hz	400V – 50/60Hz	P
	- Class 0 and Class 0I appliances are not allowed	Class I	P
	- Safety instructions and manuals shall be written in Spanish language		P
	- Country of origin shall be shown on the marking plate		P
	- Class I appliances provided with plugs shall be provided with the label specified in sheet "Class I" <u>IMPORTANTE PARA EL USUARIO</u> Los aparatos de la Clase I, poseen ficha de 3 espigas planas con toma de tierra, para aumentar su seguridad.  NO LA ELIMINE colocando un adaptador o reemplazando la ficha por otra de 2 espigas. PARA SU SEGURIDAD, su instalación debe estar provista de conductor de tierra. De no ser así, realice la adecuación con personal especializado.	No plug	N/A

ATTACHMENT to TRF (add Test Report Form No.)			
Clause	Requirement + Test	Result - Remark	Verdict
	- Class II appliances provided with plugs shall be provided with the label specified in sheet "Class II" IMPORTANTE PARA EL USUARIO Los aparatos de la Clase II, que se identifican con el símbolo  poseen ficha de 2 espigas planas sin toma de tierra, pues poseen doble aislación o aislación reforzada en todas sus partes.  NO LA ELIMINE colocando un adaptador o reemplazando la ficha por otra de 2 espigas cilíndricas, ya que la misma es compatible con los tomacorrientes con toma de tierra. PARA SU SEGURIDAD, su instalación debe estar provista de conductor de tierra. De no ser así, realice la adecuación con personal especializado.	Class I	N/A
	- Plugs shall be in conformity with IRAM 2063 Standard for Class II appliances and IRAM 2073 Standard for Class I appliances		N/A
	- Appliances with detachable interchangeable plug pins must include with its products, written instructions to inform the customer about the type of interchangeable and detachable plug pins approved and suitable for use in Argentina.		N/A
	- Direct plug-in appliances or appliances provided with integrated plugs shall be according to geometry of IRAM 2063 standard for Class II appliances or IRAM 2073 standard for Class I appliances		N/A
	- Appliances with integrated socket outlet shall be according to geometry of IRAM 2071 standard.		N/A

ATTACHMENT to TRF (IEC60335_1BB)		
ATTACHMENT TO TEST REPORT		
IEC 60335-1:2020		
(SAUDI ARABIA) NATIONAL DIFFERENCES		
(Household and Similar Electrical Appliances - Safety - Part 1: General Requirements)		
Differences according to.....: National standard SASO-GSO-IEC-60335-1		
TRF template used:.....: IECEE OD-2020-F3:2024, Ed. 1.3		
Attachment Form No.....: SA_ND_IEC60335_1BB		
Attachment Originator Saudi Standards, Metrology and Quality Organization (SASO)		
Master Attachment 2025-04-28		
Copyright © 2024 IEC System for Conformity Testing and Certification of Electrical Equipment (IECEE), Geneva, Switzerland. All rights reserved.		
National Differences		
Plugs used for pluggable equipment comply with standard SASO-2203		
Type of plug & socket-outlets: G type		N/A
Frequency and tolerance (Hz)		
60 Hz ± 0.2	60 Hz only models having last character "6" in product code	P
Rated Voltage (V)		
Single phase 230 V Three phase 400 V	400V	P
Voltage tolerance (%) ± 5		

ATTACHMENT to TRF (add Test Report Form No.)			
Clause	Requirement + Test	Result - Remark	Verdict
ATTACHMENT TO TEST REPORT IEC 60335-2-41:2024 IEC 60335-1:2020 UNITED ARAB EMIRATES NATIONAL DIFFERENCES HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY – PART 2-41: PARTICULAR REQUIREMENTS FOR PUMPS			
Differences according to.....: CARL-01 – Requirements for Registration of Low Voltage Equipment			
TRF template used:.....: IECEE OD-2020-F3:2022, Ed. 1.2			
Attachment Form No.....: AE_ND_IEC60335_2_41N			
Attachment Originator: Ministry of Industry and Advanced Technology (MoIAT), UAE			
Master Attachment.....: 2024-06-15			
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	National Differences		
5	GENERAL CONDITIONS FOR THE TESTS		
5.8.1	Replace the test condition by the following variation:		
	Appliances for a.c. only are tested with a.c. at 50Hz, and those for a.c. and d.c., are tested at 50Hz or d.c., whichever is the more unfavourable supply.	AC only	P
7	MARKING AND INSTRUCTIONS		
7.13	Replace the requirement with the following variation:		
	Instructions and other text required by this standard shall be written in languages that includes, at least, English and Arabic.		P
25	SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS		
25.1	Insert the following variation:		
	Supply cords for single-phase appliances used in domestic and commercial installations intended for direct connection to the supply mains, shall be fitted with an appropriate plug complying with: BS 1363 for appliances having a marked rating of 13A or less; or BS 546 for appliances having a marked rating of 15A.	No single phase	N/A
	Special national conditions (if any)		
7	MARKING AND INSTRUCTIONS		
7.1	Addition:		

ATTACHMENT to TRF (add Test Report Form No.)			
Clause	Requirement + Test	Result - Remark	Verdict
	- Country of Origin		P
7.1	After the first paragraph of the requirement insert the following variation:		
	Appliances intended for connection to the supply mains, other than class III appliances, shall be marked with:		P
	- a rated voltage of at least:230V for single-phase appliances;400V for multi-phase appliances; or	400V	P
	- a rated voltage range that includes:230V for single-phase appliances;400V for multi-phase appliances.		N/A

PHOTOS



APG 400_2_G50H



CTG 300_4_80



DGG 150_4_65



DRG 400_4_80



DRG 550_6_150



GRG 250_2_G40H



ZUG CP 150G 4_6_AD265PA



ZUG OC 65B 1.8_2_BD96PA



ZUG V 80C 4_4_AW198PA



Example of AP (High head) hydraulic



Motor sample: G400/2 motor (P2 = 3 kW - 2 poles)



Example of Suction strainer



Example of Pump body



Example of Pump body



Example of Impeller



Example of Impeller



Example of Pump plate



Example of Pump plate



Example of Upper bearing support



Example of Upper bearing support



Example of Mechanical seals



Example of Motor shaft and bearings



Example of Motor cover



Example of Motor cover



Example of Motor case and stator



Example of Cable gland