# TEST REPORT

**EN 60335-2-41**
**Safety of Household and similar electrical appliances**
**Part 2-41: Particular requirements for pumps**
**EN 62233**
**Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure IEC 62233:2005**

| | |
|---|---|
| Report Number..... | OViSCE2104-032L |
| Date of Issue..... | Apr. 23, 2021 |
| number of pages..... | 81 |
| Testing Laboratory..... | Zhejiang European African Testing&Certification Co., Ltd. |
| Address..... | 4th Floor, Building 4, No. 888 Donghuan Road, Development Zone, Taizhou City, Zhejiang P.R.China |
| Testing location/procedure..... | The same as above |
| Applicant's Name..... | Tianjin Streampumps Industry Co., Ltd. |
| Address..... | No.17, Xeda Jimei Ind. Park Xiqing Economic Development Area, Tianjin, China |
| **Test specification:** | |
| Standard..... | EN 60335-1:2012+A11:2014+A13:2017+A1:2019+ A14:2019+A2:2019, EN 60335-2-41:2003+A1:2004+A2:2010, EN 62233:2008+AC:2008 |
| Test procedure..... | CE-LVD Directive |
| Non-standard test method..... | N/A |
| **Test Report Form No.....** | IEC 60335_2_41 |
| Test Report Form(s) Originator..... | VDE |
| Master TRF..... | Dated 2013-04 |
| **Test item description.....** | Submersible Pump |
| Trade Mark..... | / |
| Manufacturer..... | Tianjin Streampumps Industry Co., Ltd. |
| Address..... | No.17, Xeda Jimei Ind. Park Xiqing Economic Development Area, Tianjin, China |
| Model/Type reference..... | SVQ2200(F) (Cover models see models list) |
| Ratings..... | See copy of marking plate |

| | | | |
|---|---|---|---|
| **Testing procedure and testing location:** | | | |
| ☐ | **Testing Laboratory:** | Zhejiang European African Testing&Certification Co., Ltd. | |
| **Testing Location/address.....** | | 4th Floor, Building 4, No. 888 Donghuan Road, Development Zone,Taizhou City, Zhejiang P.R.China | |
| ☐ | **Associated Laboratory:** | N/A | |
| **Testing Location/address.....** | | | |
| ☐ | **Tested by(name+signature):** | Jason Zhen | |
| ☐ | **Approved by(+signature)....:** | Aimee Li | |
| ☐ | **Testing procedure:TMP** | N/A | |
| ☐ | **Tested by(name+signature):** | N/A | |
| ☐ | **Approved by(+signature)....:** | N/A | |
| **Testing Location/address.....** | | N/A | |
| ☐ | **Testing procedure:WMT** | N/A | |
| ☐ | **Tested by(name+signature):** | N/A | |
| ☐ | **Witnessed by(+signature)..:** | N/A | |
| ☐ | **Approved by(+signature)....:** | N/A | |
| **Testing Location/address.....** | | N/A | |
| ☐ | **Testing procedure:SMT** | N/A | |
| ☐ | **Tested by(name+signature):** | N/A | |
| ☐ | **Approved by(+signature)....:** | N/A | |
| ☐ | **Supervised by(+signature).:** | N/A | |
| **Testing Location/address.....** | | N/A | |
| ☐ | **Testing procedure:RMT** | N/A | |
| ☐ | **Tested by(name+signature):** | N/A | |
| ☐ | **Approved by(+signature)....:** | N/A | |
| ☐ | **Supervised by(+signature).:** | N/A | |

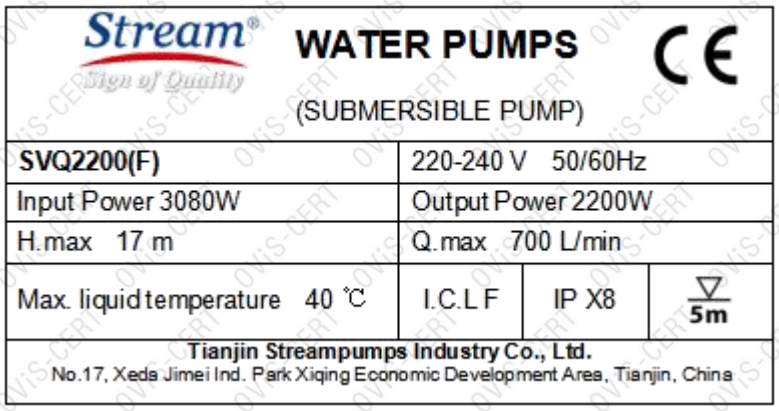
**List of Attachments (including a total number of pages in each attachment):**
Appendix I – Photo documentation – attachment 2 pages.

**Summary of testing:**

| **Tests performed (name of test and test clause):** | **Testing location:** |
|---|---|
| The provided samples were tested and found to meet the below standards:<br>EN 60335-1:2012+A11:2014+A13:2017 +A1:2019+A14:2019+A2:2019,<br>EN 60335-2-41:2003+A1:2004+A2:2010,<br>EN 62233:2008+AC:2008 | Zhejiang European African Testing&Certification Co., Ltd. 4th Floor, Building 4, No. 888 Donghuan Road, Development Zone,Taizhou City, Zhejiang P.R.China |

**Summary of compliance with National Differences:**
The requirements of national differences of The Europe Union were taken into account.

**Copy of marking plate:**
**The artwork below may be only a draft.**



**Test item particulars:**

| | |
|---|---|
| Supply connection | Supply cord with a plug |
| Nature of supply | a.c. |
| Class of protection against electric shock | I |
| Degree of protection against moisture | IPX8 |
| Type of cord attachment | Y |
| Portable appliances | ☐ |
| Fixed appliances | ☒ |
| Built-in appliances | ☐ |
| Indoor use | ☐ |
| Outdoor use | ☒ |
| Submersible pumps | ☒ |
| Maximum operating depth | 5m |
| 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 | ☐ |

**Possible test case verdicts:**

- test case does not apply to the test object .....: N/A
- test object does meet the requirement .....: P(ass)
- test object does not meet the requirement .....: F(ail)

## Summary of testing:

| | |
|---|---|
| Date of receipt of test item.....: | Apr. 12, 2021 |
| Date(s) of performance of test.....: | Apr. 13, 2021 to Apr. 22, 2021 |
| Sample appearance and function are in normal condition, yes or no.....: | Yes |
| Ambient temperature.....: | 20-25℃ |
| Ambient humidity.....: | 55-65% |

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 testing laboratory.
"(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.

The samples under test are in good condition.
The test items comply with the requirements of the standard.

| | |
|---|---|
| **Name and address of factory (ies)..... :** | Same as manufacturer |

**General product information:**
The test results presented in this report relate only to the object tested.

There are 468 models listed in this report, them shared the very similar construction/appearance and most critical components, the used motors for them were from the same manufacturer with very similar manufacturing process and shared the same working principle

Rating labels for other models are similar with nameplate except listed in following table.
Model/Type reference and rating table:
All models:I.C.F, 220-240V, 50/60Hz, Tmax 40℃, Max operation depth 5m, IPX8

| Model | Input Power (W) | Output Power (W) | H.max. (m) | Q.max. (L/min) |
|---|---|---|---|---|
| SPK530 | 742 | 530 | 11 | 170 |
| SPK530A(F) | 742 | 530 | 11 | 250 |
| SPK450 | 840 | 600 | 10 | 85 |
| SPK450A(F) | 840 | 600 | 11 | 260 |
| SPK450B(F) | 840 | 600 | 20 | 110 |
| SPT500(F) | 700 | 500 | 12 | 210 |
| SPT750B(F) | 1050 | 750 | 18 | 233 |

| | | | | |
|---|---|---|---|---|
| SPT1100A(F) | 1540 | 1100 | 19 | 390 |
| KBZ21.5 | 2100 | 1500 | 22 | 450 |
| KBZ31.5 | 2100 | 1500 | 14.5 | 670 |
| KBZ22.2 | 3080 | 2200 | 26 | 550 |
| KBZ32.2 | 3080 | 2200 | 19 | 920 |
| KBZ23.7 | 5180 | 3700 | 34 | 550 |
| KBZ33.7 | 5180 | 3700 | 29 | 920 |
| KBZ35.5 | 7700 | 5500 | 18.5 | 1500 |
| KBZ43.7 | 7700 | 5500 | 34 | 1250 |
| KBZ45.5 | 7700 | 5500 | 23 | 1750 |
| KBZ47.5 | 10500 | 7500 | 40 | 1400 |
| KBZ411 | 21000 | 15000 | 48.5 | 1400 |
| KBZ415 | 21000 | 15000 | 56 | 1400 |
| KBZ67.5 | 10500 | 7500 | 31 | 2080 |
| KBZ611 | 21000 | 15000 | 48.5 | 1400 |
| KBZ615 | 21000 | 15000 | 40 | 2600 |
| SPSN250(F) | 350 | 250 | 8 | 140 |
| SPSN750(F) | 1050 | 750 | 14 | 250 |
| SPSN1100(F) | 1540 | 1100 | 16 | 270 |
| SV25-10-1.5(F) | 2100 | 1500 | 17 | 530 |
| SV9-10-0.9F | 1260 | 900 | 12 | 380 |
| SVX15-7-0.75(F) | 1050 | 750 | 9 | 550 |
| SVX10-12-1.1(F) | 1540 | 1100 | 14 | 500 |
| SQD1.5-12-0.25L(F) | 350 | 250 | 14 | 83 |
| SQD1.5-17-0.37L(F) | 518 | 370 | 18 | 100 |
| SQD1.5-25-0.55L(F) | 770 | 550 | 26 | 83 |
| SQD3-18-0.55L(F) | 770 | 550 | 20 | 133 |
| SQD10-12-0.55L(F) | 770 | 550 | 18 | 250 |
| SQD15-7-0.55L(F) | 770 | 550 | 9 | 400 |
| SQD1.5-32-0.75L(F) | 1050 | 750 | 33 | 133 |
| SQD3-24-0.75L(F) | 1050 | 750 | 25 | 150 |
| SQD15-10-0.75L(F) | 1050 | 750 | 12 | 600 |
| SQD8-18-0.75L(F) | 1050 | 750 | 20 | 250 |
| SQD10-16-0.75L(F) | 1050 | 750 | 20 | 250 |
| SQD15-10-0.75L(F) | 1050 | 750 | 12 | 600 |
| SQD15-7-0.55L(F) | 770 | 550 | 9 | 400 |
| SQD25-6-0.75L(F) | 1050 | 750 | 11 | 583 |
| SQD30-6-0.75L(F) | 1050 | 750 | 11 | 750 |
| SQD3-30-1.1L(F) | 1540 | 1100 | 31 | 166 |

| | | | | |
|---|---|---|---|---|
| SQD14-16-1.1L(F) | 1540 | 1100 | 18 | 483 |
| SQD15-14-1.1L(F) | 1050 | 750 | 18 | 483 |
| SQD15-32-0.75L(F ) | 1050 | 750 | 10 | 1000 |
| SQD25-6-0.75L(F) | 1050 | 750 | 11 | 584 |
| SQD40-6-1.1L(F) | 1540 | 1100 | 10 | 1000 |
| SQX8-18-0.75L | 1050 | 750 | 20 | 250 |
| SQX10-16-0.75L | 1050 | 750 | 20 | 250 |
| SQX30-6-0.75L | 1050 | 750 | 11 | 750 |
| SQX3-30-1.1L | 1540 | 1100 | 31 | 166 |
| SQX14-16-1.1L | 1540 | 1100 | 18 | 483 |
| SQX15-14-1.1L | 1540 | 1100 | 18 | 483 |
| SQX40-6-1.1L | 1540 | 1100 | 10 | 1000 |
| SQX25-12-1.5L | 2100 | 1500 | 18 | 616 |
| SQX40-9-1.5L | 2100 | 1500 | 12 | 1016 |
| SPC180(F) | 252 | 180 | 6 | 80 |
| SPC250(F) | 350 | 250 | 8 | 130 |
| SPC370(F) | 518 | 370 | 13 | 216 |
| SPC400(F) | 560 | 400 | 9 | 216 |
| SPC550(F) | 770 | 550 | 10 | 260 |
| SPC750(F) | 1050 | 750 | 12 | 333 |
| SPC1100(F) | 1540 | 1100 | 9 | 666 |
| SPC-Y1 | 1400 | 1000 | 25 | 135 |
| SPC-Y1.5 | 2100 | 1500 | 28 | 185 |
| SPC-Y2.2 | 3080 | 2200 | 38 | 100 |
| SPC-1.5-Y1F | 1400 | 1000 | 25 | 135 |
| SPC2-Y1.5F | 2100 | 1500 | 28 | 185 |
| SPC-3-Y2.2F | 3080 | 2200 | 38 | 100 |
| SPC2-60/6-1.1(F) | 1540 | 1100 | 65 | 120 |
| SPC3-18-0.55(F) | 770 | 550 | 21 | 108 |
| SPC3-24-0.75(F) | 1050 | 750 | 26 | 100 |
| SPC5-10-0.25(F) | 350 | 250 | 13 | 130 |
| SPC6-32-1.5(F) | 2100 | 1500 | 34 | 216 |
| SPC6-7-0.18(F) | 252 | 180 | 8.5 | 166 |
| SPC7-8-0.25(F) | 350 | 250 | 9 | 200 |
| SPC8-20-1.5 | 2100 | 1500 | 32 | 300 |
| SPC9-6-0.45F | 630 | 450 | 12 | 200 |
| SPC10-15-0.9F | 1260 | 900 | 17 | 300 |
| SPC10-10-0.55(F) | 770 | 550 | 13.5 | 285 |
| SPC10-18-1.1S | 1540 | 1100 | 20 | 250 |

| | | | | |
|---|---|---|---|---|
| SPC10-18-1.1F | 1540 | 1100 | 20 | 250 |
| SPC10-16-0.75(F) | 1050 | 750 | 19 | 390 |
| SPC15-15-1.1(F) | 1540 | 1100 | 17 | 475 |
| SPC25-12/1.5 | 2100 | 1500 | 22 | 666 |
| SPC30-6-0.75(F) | 1050 | 750 | 9 | 780 |
| SPC37-4-0.75(F) | 1050 | 750 | 8 | 650 |
| SPC40-7-1.1(F) | 1540 | 1100 | 10 | 900 |
| SPC40-9-1.5(F) | 2100 | 1500 | 13.5 | 1100 |
| SPC60-18-5.5 | 7700 | 5500 | 32 | 300 |
| SPC6-18-0.75(F) | 1050 | 750 | 21 | 265 |
| SPC6-28/2-1.1(F) | 1540 | 1100 | 28 | 250 |
| SPC6-28/2-1.1A(F) | 1540 | 1100 | 28 | 250 |
| SPC2-40/4-0.75F | 1050 | 750 | 43 | 120 |
| SPC2-50/5-0.9(F) | 1260 | 900 | 53 | 125 |
| SPC2-60/6-1.1(F) | 1540 | 1100 | 65 | 120 |
| SPC5-30/3-1.1(F) | 1540 | 1100 | 40 | 166 |
| SPC5-40/4-1.5(F) | 2100 | 1500 | 50 | 166 |
| SPC5-50/5-2.2(F) | 3080 | 2200 | 70 | 166 |
| SPC3-65/6-2.2(F) | 3080 | 2200 | 90 | 100 |
| SPC6-28/2-1.1A(F) | 1540 | 1100 | 28 | 250 |
| SPC6-39/3-1.5A(F) | 2100 | 1500 | 70 | 240 |
| SPC4-60/4-2.2A(F) | 3080 | 2200 | 42 | 166 |
| SVQ180(F) | 252 | 180 | 7 | 133 |
| SVQ250(F) | 350 | 250 | 7.5 | 150 |
| SVQ370F | 518 | 370 | 8 | 180 |
| SVQ450AF | 630 | 450 | 11 | 260 |
| SVQ450(F) | 630 | 450 | 8.5 | 200 |
| SVQ750(F) | 1050 | 750 | 10 | 300 |
| SVQ1100(F) | 1540 | 1100 | 9 | 333 |
| SVQ1500(F) | 2100 | 1500 | 22 | 270 |
| SVQ1500A | 2100 | 1500 | 18 | 466 |
| SVQ2200(F) | 3080 | 2200 | 17 | 700 |
| SVQ2200A | 3080 | 2200 | 16 | 870 |
| SVD750F | 1050 | 750 | 7.5 | 250 |
| SVD1100(F) | 1540 | 1100 | 10 | 270 |
| SVD1300(F) | 1820 | 1300 | 12 | 300 |
| SVD1800(F) | 2520 | 1800 | 10 | 400 |
| SVD2200(F) | 3080 | 2200 | 11 | 600 |
| SWVSD55(F) | 770 | 550 | 10 | 300 |

| | | | | |
|---|---|---|---|---|
| SWVSD75(F) | 1050 | 750 | 12 | 350 |
| SWVSD110(F) | 1540 | 1100 | 13 | 450 |
| SWVSD55A | 770 | 550 | 13 | 300 |
| SWVSD75A | 1050 | 750 | 15 | 334 |
| SWVS75(F) | 1050 | 750 | 12 | 350 |
| SWVS110(F) | 1540 | 1100 | 12 | 450 |
| SWVS75A | 1050 | 750 | 12 | 350 |
| SVSC25-10-2.2 | 3080 | 2200 | 18 | 483 |
| SVSC35-10-3 | 4200 | 3000 | 20 | 666 |
| SWQ10-10-0.75G | 1050 | 750 | 15 | 334 |
| SWQ12-10-1.1G | 1540 | 1100 | 17 | 367 |
| SWQ15-15-1.5G | 2100 | 1500 | 23 | 500 |
| SWQ25-10-1.5G | 2100 | 1500 | 23 | 501 |
| SWQ9-22-2.2G | 3080 | 2200 | 22 | 635 |
| SWQ25-15-2.2G | 3080 | 2200 | 24 | 785 |
| SWQ45-9-2.2G | 3080 | 2200 | 25 | 785 |
| SWQ20-22-3G | 4200 | 3000 | 32 | 635 |
| SWQ35-15-3G | 4200 | 3000 | 25 | 635 |
| SWQ43-13-3G | 4200 | 3000 | 23 | 1002 |
| SWQ25-22-4G | 5600 | 4000 | 28 | 1169 |
| SWQ45-17-4G | 5600 | 4000 | 28 | 1269.2 |
| SWQ45-20-5.5G | 7700 | 5500 | 31 | 1503 |
| SWQ65-15-5.5G | 7700 | 5500 | 32 | 1744 |
| SWQ20-40-7.5G | 10500 | 7500 | 49 | 1002 |
| SWQ45-22-7.5(F) | 10500 | 7500 | 32 | 1666 |
| SWQ45-25-7.5G | 10500 | 7500 | 32 | 1670 |
| SWQ100-15-7.5G | 10500 | 7500 | 34 | 2505 |
| SWQ10-10-0.75T | 1050 | 750 | 14 | 334 |
| SWQ12-10-1.1T | 1540 | 1100 | 16 | 400 |
| SWQ15-15-1.5T | 2100 | 1500 | 21 | 600 |
| SWQ25-15-2.2G | 3080 | 2200 | 22 | 935 |
| SWQ35-15-3T | 4200 | 3000 | 25 | 1169 |
| SWQ45-17-4T | 4200 | 3000 | 27 | 1453 |
| SWQD6-12-0.55(F) | 770 | 550 | 14 | 267 |
| SWQD6-16-0.75(F) | 1050 | 750 | 18 | 367 |
| SWQD10-10-0.75(F) | 1050 | 750 | 18 | 367 |
| SWQD15-9-1.1(F) | 1540 | 1100 | 14 | 400 |
| SWQD7-15-1.1(F) | 1540 | 1100 | 18 | 367 |
| SWQ6-16-0.75 | 1050 | 750 | 14 | 267 |

| | | | | |
|---|---|---|---|---|
| SWQ10-10-0.75 | 1050 | 750 | 16 | 267 |
| SWQ7-15-1.1 | 1540 | 1100 | 18 | 367 |
| SWQ18-15-1.5 | 2100 | 1500 | 20 | 700 |
| SWQ25-7-1.5 | 2100 | 1500 | 14 | 635 |
| SWQ9-22-2.2 | 3080 | 2200 | 26 | 534 |
| SWQ25-15-2.2 | 3080 | 2200 | 19 | 885 |
| SWQ42-9-2.2 | 3080 | 2200 | 18 | 868 |
| SWQ15-30-3 | 4200 | 3000 | 34 | 567 |
| SWQ25-20-3 | 4200 | 3000 | 25 | 768 |
| SWQ43-13-3 | 4200 | 3000 | 18 | 1453 |
| SWQ50-10-3 | 4200 | 3000 | 19 | 1453 |
| SWQ40-15-4 | 5600 | 4000 | 22 | 1536 |
| SWQ60-10-4 | 5600 | 4000 | 19 | 1586.5 |
| SWQ15-40-5.5 | 7700 | 5500 | 25 | 735 |
| SWQ30-30-5.5 | 7700 | 5500 | 37 | 701 |
| SWQ65-15-5.5 | 7700 | 5500 | 26 | 1937 |
| SWQ65-20-7.5 | 10500 | 7500 | 27 | 2338 |
| SWQ80-15-7.5 | 10500 | 7500 | 21 | 2488 |
| SWQ100-10-7.5 | 15400 | 11000 | 20 | 2388 |
| SWQ100-25-11 | 15400 | 11000 | 29 | 2923 |
| SWQ130-15-11 | 15400 | 11000 | 22 | 5511 |
| SWQ150-13-11 | 15400 | 11000 | 18 | 5344 |
| SWQ180-11-11 | 15400 | 11000 | 20 | 5010 |
| SWQ300-7-11 | 15400 | 11000 | 13 | 7348 |
| SWQ360-6-11 | 15400 | 11000 | 10 | 9018 |
| SWQ100-30-15 | 21000 | 15000 | 33 | 3173 |
| SWQ150-17-15 | 21000 | 15000 | 25 | 5845 |
| SWQ180-15-15 | 21000 | 15000 | 23 | 5344 |
| SWQ250-11-15 | 21000 | 15000 | 20 | 5678 |
| SWQ400-7-15 | 25900 | 18500 | 14 | 10354 |
| SWQ100-35-18.5 | 25900 | 18500 | 37 | 3740 |
| SWQ180-20-18.5 | 25900 | 18500 | 28 | 6680 |
| SWQ250-15-18.5 | 25900 | 18500 | 22 | 6680 |
| SWQ350-10-18.5 | 30800 | 22000 | 17 | 8684 |
| SWQ100-40-22 | 30800 | 22000 | 44 | 4158 |
| SWQ130-30-22 | 30800 | 22000 | 35 | 5344 |
| SWQ180-25-22 | 30800 | 22000 | 32 | 5678 |
| SWQ250-18-22 | 30800 | 22000 | 27 | 7515 |
| SWQ400-10-22 | 30800 | 22000 | 18 | 10521 |

| | | | | |
|---|---|---|---|---|
| SWQ18-15-1.5(F) | 2100 | 1500 | 20 | 684 |
| SVP180(F) | 252 | 180 | 7 | 133 |
| SVP250(F) | 350 | 250 | 8.5 | 150 |
| SVP370(F) | 518 | 370 | 7 | 110 |
| SPP2.5-26/3-0.55F | 770 | 550 | 32 | 95 |
| SPP2-5.5-0.18F | 252 | 180 | 6.5 | 110 |
| SPP2-4.5-0.1 | 140 | 100 | 6 | 70 |
| SPP100(F) | 140 | 100 | 6 | 50 |
| SPP120 | 168 | 120 | 6 | 50 |
| SPP250(F) | 350 | 250 | 6 | 65 |
| SPP370B | 518 | 370 | 7 | 130 |
| SPP250A(F) | 350 | 250 | 6 | 65 |
| SPP370A(F) | 518 | 370 | 7 | 130 |
| SPP370(F) | 518 | 370 | 7 | 130 |
| PVX10 | 770 | 550 | 7.3 | 300 |
| PVX10T | 770 | 550 | 7.3 | 300 |
| PVX10-1(F) | 770 | 550 | 7.3 | 350 |
| PVX10-1T(F) | 770 | 550 | 7.3 | 350 |
| PVX12-1(F) | 1050 | 750 | 9.5 | 350 |
| PVX12-1T(F) | 1050 | 750 | 9.5 | 350 |
| PCMD-12S(F) | 770 | 550 | 12 | 300 |
| PCMD-12T(F) | 770 | 550 | 12 | 300 |
| PCMD-14S(F) | 1050 | 750 | 14 | 300 |
| PCMD-14T(F) | 1050 | 750 | 14 | 300 |
| PCMD-17S | 1540 | 1100 | 17 | 350 |
| PCMD-17T(F) | 1540 | 1100 | 17 | 350 |
| PCMD-20S(F) | 2100 | 1500 | 14.1 | 400 |
| PCMD-20T(F) | 2100 | 1500 | 14.1 | 400 |
| PCMD-14S | 1050 | 750 | 14 | 300 |
| PCMD-14T | 1050 | 750 | 14 | 300 |
| 75TMP-2.15 | 210 | 150 | 3.2 | 471 |
| 75TMP-2.25 | 350 | 250 | 3.2 | 471 |
| 100TMP-2.4 | 560 | 400 | 3.2 | 661 |
| 50TPS(F)-2.12 | 168 | 120 | 4.5 | 200 |
| 50TPS(F)-2.15 | 210 | 150 | 5.5 | 250 |
| 50TPS(F)-2.4 | 560 | 400 | 9.6 | 310 |
| SVS700F | 98 | 70 | 10 | 380 |
| SVSP1100 | 1540 | 1100 | 28 | 233 |
| S95C-1500(T) | 2100 | 1500 | 15 | 300 |

| | | | | |
|---|---|---|---|---|
| SNQ200 | 280 | 200 | 5.5 | 58 |
| SNQ250 | 350 | 250 | 6 | 67 |
| SPA200 | 280 | 200 | 5.5 | 58 |
| SPA250 | 350 | 250 | 6 | 83 |
| SPA350 | 490 | 350 | 6.5 | 100 |
| SPA400 | 560 | 400 | 7 | 116 |
| SPA500 | 700 | 500 | 7.5 | 145 |
| SPA550 | 770 | 550 | 8 | 158 |
| SPA750 | 1050 | 750 | 9 | 183 |
| SPA900 | 1260 | 900 | 9.5 | 200 |
| SPB250 | 350 | 250 | 4.5 | 100 |
| SPB400 | 560 | 400 | 5 | 125 |
| SPB500 | 700 | 500 | 6 | 150 |
| SPB550 | 770 | 550 | 7 | 175 |
| SPB650 | 910 | 650 | 7.5 | 190 |
| SPB750 | 1050 | 750 | 8 | 225 |
| SPB900 | 1260 | 900 | 9 | 250 |
| SPB1100 | 1540 | 1100 | 9.5 | 260 |
| SGP250 | 350 | 250 | 6 | 80 |
| SGP400 | 560 | 400 | 6.5 | 116 |
| SGP500 | 700 | 500 | 6 | 150 |
| SGPS500 | 700 | 500 | 6 | 150 |
| SGP550 | 770 | 550 | 7.5 | 158 |
| SGP750 | 1050 | 750 | 8.5 | 180 |
| SGP900 | 1260 | 900 | 9 | 208 |
| SGW400 | 560 | 400 | 5 | 125 |
| SGW550 | 770 | 550 | 7 | 175 |
| SGW750 | 1050 | 750 | 8 | 225 |
| SGW900 | 1260 | 900 | 9 | 250 |
| SGW1100 | 1540 | 1100 | 9.5 | 260 |
| SGW400N-1 | 560 | 400 | 5 | 125 |
| SGW550N-1 | 770 | 550 | 7 | 175 |
| SGW750N-1 | 1050 | 750 | 8 | 225 |
| SGW900N-1 | 1260 | 900 | 9 | 250 |
| SGW1100N-1 | 1540 | 1100 | 9.5 | 260 |
| SGW400N-2 | 560 | 400 | 5 | 125 |
| SGW550N-2 | 770 | 550 | 7 | 175 |
| SGW750N-2 | 1050 | 750 | 8 | 225 |
| SGW900N-2 | 1260 | 900 | 9 | 250 |

| | | | | |
|---|---|---|---|---|
| SGW1100N-2 | 1540 | 1100 | 9.5 | 260 |
| SGW400-P | 560 | 400 | 5 | 125 |
| SGW550-P | 770 | 550 | 7 | 175 |
| SGW750-P | 1050 | 750 | 8 | 225 |
| SGW900-P | 1260 | 900 | 9 | 250 |
| SGW1100-P | 1540 | 1100 | 9.5 | 260 |
| SPA200N | 280 | 200 | 5.5 | 58 |
| SPA250N | 350 | 250 | 6 | 83 |
| SPA350N | 490 | 350 | 6.5 | 100 |
| SPA400N | 560 | 400 | 7 | 116 |
| SPA500N | 700 | 500 | 7.5 | 145 |
| SPA550N | 770 | 550 | 8 | 158 |
| SPA750N | 1050 | 750 | 9 | 183 |
| SPA900N | 1260 | 900 | 9.5 | 200 |
| SPA1100N | 1540 | 1100 | 9.5 | 200 |
| SPB400N | 560 | 400 | 5 | 125 |
| SPB550N | 770 | 550 | 7 | 175 |
| SPB750N | 1050 | 750 | 8 | 225 |
| SPB900N | 1260 | 900 | 9 | 250 |
| SPB1100N | 1540 | 1100 | 9.5 | 260 |
| SGW400N | 560 | 400 | 5 | 125 |
| SGW550N | 770 | 550 | 7 | 175 |
| SGW750N | 1050 | 750 | 8 | 225 |
| SGW900N | 1260 | 900 | 9 | 250 |
| SGW1100N | 1540 | 1100 | 9.5 | 260 |
| SPW400N | 560 | 400 | 5 | 125 |
| SPW550N | 770 | 550 | 7 | 175 |
| SPW750N | 1050 | 750 | 8 | 225 |
| SPW900N | 1260 | 900 | 9 | 250 |
| SPW1100N | 1540 | 1100 | 9.5 | 260 |
| SPW400 | 560 | 400 | 5 | 125 |
| SPW550 | 770 | 550 | 7 | 175 |
| SPW750 | 1050 | 750 | 8 | 225 |
| SPW900 | 1260 | 900 | 9 | 250 |
| SPW1100 | 1540 | 1100 | 9.5 | 260 |
| SPWS400 | 560 | 400 | 5 | 125 |
| SPWS550 | 770 | 550 | 7 | 175 |
| SPWS650 | 910 | 650 | 7.5 | 190 |
| SPWS750 | 1050 | 750 | 8 | 225 |

| | | | | |
|---|---|---|---|---|
| SPWS810 | 1134 | 810 | 8.5 | 240 |
| SPWS900 | 1260 | 900 | 9 | 250 |
| SPWS1100 | 1540 | 1100 | 9.5 | 260 |
| SPU400 | 560 | 400 | 5 | 125 |
| SPU550 | 770 | 550 | 7 | 175 |
| SPU750 | 1050 | 750 | 8 | 208 |
| SPU900 | 1260 | 900 | 8.5 | 300 |
| SPU1100 | 1540 | 1100 | 9.5 | 333 |
| SPM250 | 350 | 250 | 5 | 125 |
| SPM400 | 560 | 400 | 5 | 125 |
| SPM500 | 700 | 500 | 7 | 175 |
| SPM750 | 1050 | 750 | 8 | 208 |
| SPM900 | 1260 | 900 | 9 | 230 |
| SPM1100 | 1540 | 1100 | 9.5 | 250 |
| SSM400 | 560 | 400 | 5 | 125 |
| SSM550 | 770 | 550 | 7 | 175 |
| SSM750 | 1050 | 750 | 8 | 208 |
| SSM900 | 1260 | 900 | 9 | 230 |
| SSM1100 | 1540 | 1100 | 9.5 | 250 |
| SQ250AN | 350 | 250 | 6 | 80 |
| SQ400AN | 560 | 400 | 6.5 | 116 |
| SQ550AN | 770 | 550 | 7.5 | 140 |
| SQ750AN | 1050 | 750 | 8.5 | 175 |
| SQ900AN | 1260 | 900 | 9 | 190 |
| SQ1100AN | 1540 | 1100 | 9.5 | 208 |
| SQ2501A | 350 | 250 | 5.5 | 100 |
| SQ4001A | 560 | 400 | 7.5 | 116 |
| SQ5001A | 700 | 500 | 8 | 116 |
| SQ5501A | 770 | 550 | 8 | 180 |
| SQ7501A | 1050 | 750 | 8.5 | 208 |
| SQ4001B | 560 | 400 | 5 | 130 |
| SQ5501B | 770 | 550 | 6.5 | 168 |
| SQ7501B | 1050 | 750 | 7.5 | 216 |
| SQ9001B | 1260 | 900 | 7.5 | 216 |
| SQ45013 | 630 | 450 | 5 | 130 |
| SQ250 | 350 | 250 | 5.5 | 100 |
| SQ400 | 560 | 400 | 7.5 | 116 |
| SQ2501A | 350 | 250 | 5.5 | 100 |
| SQ9001A | 1260 | 900 | 9 | 190 |

| | | | | |
|---|---|---|---|---|
| SQ11001A | 1540 | 1100 | 9.5 | 208 |
| SQ11001B | 1540 | 1100 | 7.5 | 216 |
| SKQ30HM | 1260 | 900 | 30 | 80 |
| SKQ35HM | 1540 | 1100 | 35 | 90 |
| SKQ90015 | 1260 | 900 | 30 | 80 |
| SNR350-1 | 490 | 350 | 12 | 40 |
| SNR350-2 | 490 | 350 | 12 | 40 |
| SPA250S | 350 | 250 | 6 | 90 |
| SPA400S | 560 | 400 | 7.5 | 120 |
| SPA550S | 770 | 550 | 8.5 | 190 |
| SPA750S | 1050 | 750 | 9.5 | 210 |
| SPA900S | 1260 | 900 | 10 | 250 |
| SPB400S | 560 | 400 | 5 | 125 |
| SPB550S | 770 | 550 | 7 | 175 |
| SPB750S | 1050 | 750 | 8 | 208 |
| SPB900S | 1260 | 900 | 8.5 | 230 |
| SPB1100S | 1540 | 1100 | 9 | 258 |
| SPA250SD | 350 | 250 | 5 | 75 |
| SPA400SD | 560 | 400 | 5.5 | 80 |
| SQ110035HM | 1540 | 1100 | 35 | 90 |
| SQ30HM | 1260 | 900 | 30 | 80 |
| SQ35HM | 1540 | 1100 | 35 | 90 |
| SHS1000-IN | 1400 | 1000 | 30 | 90 |
| SHS1200 -IN | 1680 | 1200 | 40 | 100 |
| SHP1000-IN | 1400 | 1000 | 30 | 90 |
| SHP1200 -IN | 1680 | 1200 | 40 | 100 |
| SHP1000 | 1400 | 1000 | 30 | 90 |
| SHP1200 | 1680 | 1200 | 40 | 100 |
| SHO1000 | 1400 | 1000 | 30 | 90 |
| SHO1200 | 1680 | 1200 | 40 | 100 |
| 2SP | 252 | 180 | 30 | 16 |
| 2.5SP | 252 | 180 | 33 | 40 |
| 3SQ3 | 350 | 250 | 30 | 50 |
| 3SP(T)2 | 252 | 180 | 35 | 45 |
| 3SP(T)3 | 350 | 250 | 32 | 60 |
| 3SP(T)4 | 350 | 250 | 23 | 90 |
| 3SP2-15B | 518 | 370 | 65 | 45 |
| 3SP2-21B | 770 | 550 | 91 | 45 |
| 3SP2-27B | 1050 | 750 | 117 | 45 |

| | | | | |
|---|---|---|---|---|
| 3SP2-38B | 1540 | 1100 | 164 | 45 |
| 3SP2.5-11B | 518 | 370 | 44 | 60 |
| 3SP2.5-16B | 770 | 550 | 64 | 60 |
| 3SP2.5-21B | 1050 | 750 | 84 | 60 |
| 3SP2.5-26B | 1288 | 920 | 104 | 60 |
| 3SP2.5-37B | 2100 | 1500 | 148 | 60 |
| 3SPC2-15 | 770 | 550 | 65 | 45 |
| 3SPC2-21 | 770 | 550 | 91 | 45 |
| 3SPC2-33 | 1540 | 1100 | 143 | 45 |
| 3SPC2-21B | 1050 | 750 | 91 | 45 |
| 3SPC2-33B | 1540 | 1100 | 143 | 45 |
| 3.5SP(T)2 | 350 | 250 | 47 | 55 |
| 3.5SP(T)3 | 350 | 250 | 33 | 80 |
| 3.5SP(T)4 | 518 | 370 | 40 | 100 |
| 3.5SP(T)6 | 518 | 370 | 27 | 140 |
| 4SPC4-10 | 1050 | 750 | 72 | 80 |
| 4SPC4-13 | 1288 | 920 | 93 | 80 |
| 4SP(T)2 | 350 | 250 | 49 | 55 |
| 4SP(T)3 | 350 | 250 | 36 | 80 |
| 4SP(T)4 | 518 | 370 | 44 | 100 |
| 4SP(T)6 | 518 | 370 | 35 | 140 |
| 4SP(T)8 | 770 | 550 | 32 | 180 |
| 4SP(T)10 | 1050 | 750 | 31 | 240 |
| 4SP(T)12 | 1050 | 750 | 25 | 270 |
| 5SP(T)10 | 1540 | 1100 | 53 | 240 |
| 5SP(T)15 | 2100 | 1500 | 55 | 320 |
| 5SP(T)22 | 3080 | 2200 | 43 | 450 |
| 5SP(T)30 | 3080 | 2200 | 30 | 450 |
| 6SP(T)15 | 3080 | 2200 | 52 | 350 |
| 6SP(T)25 | 3080 | 2200 | 39 | 550 |
| 6SP(T)35 | 4200 | 3000 | 39 | 750 |
| 6SP(T)45 | 5600 | 4000 | 38 | 1000 |
| 4SG(T)2 | 518 | 370 | 36 | 55 |
| 4SG(T)3 | 518 | 370 | 39 | 70 |
| 4SG(T)5 | 518 | 370 | 25 | 110 |
| 4SG(T)8 | 1050 | 750 | 30 | 100 |
| 4SG(T)14 | 1820 | 1300 | 28 | 300 |
| 6CS(S)17 | 3080 | 2200 | 43 | 400 |
| 6CS(S)30 | 4200 | 3000 | 35 | 700 |

| | | | | |
|---|---|---|---|---|
| 6CS(S)46 | 5600 | 4000 | 41 | 1100 |
| 6CS(S)60 | 7700 | 5500 | 42 | 1300 |
| 8CS77 | 10500 | 7500 | 40 | 1600 |
| 8CS95 | 10500 | 7500 | 32 | 2000 |
| 6SR(T)18 | 3080 | 2200 | 60 | 450 |
| 6SR(T)30 | 4200 | 3000 | 45 | 667 |
| 6SR(T)45 | 5600 | 4000 | 43 | 1000 |
| 6SR(T)60 | 7700 | 5500 | 36 | 1200 |
| SCM3 | 770 | 550 | 38 | 100 |
| SCM5 | 1288 | 920 | 64 | 100 |
| SCM6 | 1540 | 1100 | 77 | 100 |
| SCM8 | 2100 | 1500 | 102 | 100 |
| SCM7A | 1820 | 1300 | 89 | 100 |
| SCM8A | 2100 | 1500 | 102 | 100 |
| SCM4 | 1050 | 750 | 51 | 100 |
| 5SM208 | 1540 | 1100 | 87.5 | 75 |
| 3SKM75 | 770 | 550 | 39 | 35 |
| 3SKM100 | 1050 | 750 | 55 | 35 |
| 4SKM100 | 1050 | 750 | 58 | 45 |
| 4SKM150 | 1540 | 1100 | 100 | 45 |
| 4SKM200 | 2100 | 1500 | 110 | 45 |
| 3SNK(M) | 1050 | 750 | 55 | 35 |
| 4SNK(M) | 1050 | 750 | 58 | 45 |
| SQGDA | 518 | 370 | 80 | 30 |
| 3SQGD | 518 | 370 | 84 | 20 |
| 4SQGD | 518 | 370 | 95 | 30 |
| SVPM180 | 252 | 180 | 44 | 14 |
| SVPM280 | 392 | 280 | 70 | 18 |
| SVPM350 | 490 | 350 | 70 | 19 |
| SVPM350-2 | 490 | 350 | 72 | 20 |
| WL | 840 | 600 | 10 | 200 |
| WL600A | 840 | 600 | 9.5 | 150 |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| **5** | **GENERAL CONDITIONS FOR THE TESTS** | | — |
| | Tests performed according to cl. 5, e.g. nature of supply, sequence of testing, etc. | | P |
| **6** | **CLASSIFICATION** | | — |
| 6.1 | Protection against electric shock:<br>Class 0, 0I, I, II, III .....: | Class I | P |
| EN 60335-2-41 | Submersible pumps for use in swimming pools, when persons are in the pool, shall be class III with a rated voltage not exceeding 12 V. | | N/A |
| | Table fountain pumps for indoor use may also be class II as long as their rated power input does not exceed 25 W. | | N/A |
| | Portable pumps for cleaning and other maintenance of swimming pools shall be class I or class III | | N/A |
| 6.2 | Protection against harmful ingress of water | IPX8 | P |
| EN 60335-2-41 | Submersible pumps shall be IPX8. | | N/A |
| **7** | **MARKING AND INSTRUCTIONS** | | — |
| 7.1 | Rated voltage or voltage range (V).....: | 220-240 | P |
| | Nature of supply .....: | | N/A |
| | Rated frequency (Hz) .....: | 50/60Hz | P |
| | Rated power input (W): .....: | 3080W | P |
| | Rated current (A) .....: | | N/A |
| | Manufacturer's or responsible vendor's name, trademark or identification mark .....: | | P |
| | Model or type reference .....: | SVQ2200(F) | P |
| | Symbol 5172 of IEC 60417, for Class II appliances | | N/A |
| | IP number, other than IPX0 .....: | IPX8 | P |
| EN60335-2-41 | Pumps having a rated power input exceeding 50W shall be marked with: | Pass muster | P |
| | - the minimum total head, in metres | | N/A |
| | - the maximum operating depth, in metres | 5m | P |
| | - the direction of rotation | | P |
| | Pumps shall be marked with the maximum liquid temperature, which shall not be less than 35℃. | 40℃ | P |
| | If the maximum liquid temperature exceeds 35℃, pumps shall be marked with the maximum period of operation, unless | | N/A |
| | they intended for continuous operation | | P |
| 7.2 | Warning for stationary appliances for multiple supply | Not this appliances | N/A |
| | Warning placed in vicinity of terminal cover | | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 7.3 | Range of rated values marked with the lower and upper limits separated by a hyphen | | P |
| | Different rated values marked with the values separated by an oblique stroke | | P |
| 7.4 | Appliances adjustable for different rated voltages, the voltage setting is clearly discernible | | N/A |
| 7.5 | Appliances with more than one rated voltage or one or more rated voltage ranges, marked with rated input or rated current for each rated voltage or range, unless | | N/A |
| | the power input is related to the mean value of the rated voltage range | | P |
| | 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 | Correct | P |
| | Symbol for nature of supply placed next to rated voltage | | N/A |
| | Symbol for class II appliances placed unlikely to be confused with other marking | | N/A |
| | Units of physical quantities and their symbols according to international standardized system | | P |
| 7.7 | Connection diagram fixed to appliances to be connected to more than two supply conductors and appliances for multiple supply,unless | | N/A |
| | correct mode of connection is obvious | | N/A |
| 7.8 | Except for type Z attachment, terminals for connection to the supply mains indicated as follows: | | P |
| | - marking of terminals exclusively for the neutral conductor (N) | | N/A |
| | - marking of protective earthing terminals (symbol 5019 of IEC 60417) |  | P |
| | - marking not placed on removable parts | | N/A |
| 7.9 | Marking or placing of switches which may cause a hazard | | P |
| 7.10 | Indications of switches on stationary appliances and controls on all appliances by use of figures, letters or other visual means .....: | Marking or placing of switches which may cause a hazard | P |
| | The figure 0 indicates only OFF position, unless no confusion with the OFF position | | P |
| 7.11 | Indication for direction of adjustment of controls | | N/A |
| 7.12 | Instructions for safe use provided | English instruction | P |
| EN60335-2-41 | - the pump must not be used when people are in the water. | | P |
| | - the pump must be supplied through a residual current device (RCD) having a rated residual operating current not exceeding 30mA. | | N/A |
| | The instructions for pumps marked with a temperature exceeding 35℃ shall state,unless | | N/A |

| EN 60335-2-41+ EN 60335-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | pump is intended for continuous operation at this temperature | Continuous operation | P |
| | This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.<br>Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision. | See the instructions | P |
| | The instructions for appliances having a part of class III construction supplied from a detachable power supply unit shall state that the appliance is only to be used with the power supply unit provided with the appliance. | | N/A |
| | The instructions for class III appliances shall state that it must only be supplied at safety extra low voltage corresponding to the marking on the appliance. This instruction is not necessary for battery-operated appliances if the battery is a primary battery or secondary battery charged outside of the appliance. | | N/A |
| | The specific instructions related to the safe operation of this appliance (as given in 7.12 of this standard) shall be collated together in the front section of the user instructions.<br>The height of the characters, measured on the capital letters, shall be at least 3 mm.<br>These instructions shall also be available in an alternative format | | N/A |
| 7.12.1 | Sufficient details for installation supplied | | P |
| EN60335-2-41 | - the maximum total head, in metres. | 17m | P |
| | - pollution of the could occur due to leakage of lubricants. | | P |
| | - a protective device is to be installed in the fixed wiring and its characteristics are to be specified. | | N/A |
| | For pumps intended to be used in outdoor fountains and similar places shall state | | N/A |
| | For class I pumps for swimming pools shall state | Not for swimming pools | N/A |
| | For class III pumps intended to be installed in zone 1 of a swimming pool shall state | | N/A |
| | For class II pumps intended to be fixed in zone 1 of a swimming pool or similar place shall state | | 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 | Plug assembled | N/A |
| 7.12.3 | Insulation of the fixed wiring in contact with parts exceeding 50 K during clause 11; instructions stating | | N/A |

| EN 60335-2-41+ EN 60335-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | that the fixed wiring must be protected | | |
| 7.12.4 | Instructions for built-in appliances: (Not built-in appliance) | | N/A |
| | - dimensions of space | No built-in appliances | N/A |
| | - dimensions and position of supporting means | | N/A |
| | - distances between parts and surrounding structure | | N/A |
| | - dimensions of ventilation openings and arrangement | | N/A |
| | - connection to supply mains and interconnection of separate components | | N/A |
| | - plug accessible after installation, unless | | N/A |
| | a switch complying with 24.3 | | N/A |
| 7.12.5 | Replacement cord instructions, type X attachment with a specially prepared cord | | N/A |
| | Replacement cord instructions, type Y attachment | | P |
| | Replacement cord instructions, type Z attachment | | N/A |
| 7.12.6 | If a non-self-resetting thermal cut-out is required in order to comply with the standard then the instructions for appliances incorporating a non-self-resetting thermal cutout that is reset by disconnection of the supply mains shall contain the substance of the following:<br>CAUTION: In order to avoid a hazard due to inadvertent resetting of the thermal cut-out, this appliance must not be supplied through an external switching device, such as a timer, or connected to a circuit that is regularly switched on and off by the utility. | | N/A |
| 7.12.7 | The instructions for fixed appliances shall state how the appliance is to be fixed to its support. The method of fixing stated is not to depend on the use of adhesives since they are not considered to be a reliable fixing means. | | P |
| 7.12.8 | The instructions for appliances connected to the water mains shall state<br>the maximum inlet water pressure, in pascals;<br>the minimum inlet water pressure, in pascals, if this is necessary for the correct operation of the appliance.<br>The instructions for appliances connected to the water mains by detachable hose-sets shall state that the new hose-sets supplied with the appliance are to be used and that old hose-sets should not be reused. | Refer to manual | P |
| 7.13 | Instructions and other texts in an official language | English | P |
| 7.14 | Marking clearly legible and durable | Legible and durable | P |
| 7.15 | Marking on a main part | | P |
| | Marking clearly discernible from the outside, if necessary after removal of a cover | | N/A |

| EN 60335-2-41+ EN 60335-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | For portable appliances, cover can be removed or opened without a tool | | N/A |
| | For stationary appliances, name, trademark or identification mark and model or type reference visible after installation | | N/A |
| | For fixed appliances, name, trademark or identification mark and model or type reference visible after installation according to the instructions | | N/A |
| | Indications for switches and controls placed on or near the components. Marking not on parts which can be positioned or repositioned in such a way that the marking is misleading | Pass muster | P |
| 7.16 | Marking of a possible replaceable thermal link or fuse link clearly visible with regard to replacing the link | | P |
| **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 | | P |
| | Insertion or removal of lamps, protection against contact with live parts of the lamp cap | | N/A |
| | Use of test probe B of IEC 61032: no contact with live parts | | P |
| 8.1.2 | Use of test probe 13 of IEC 61032 through openings in class 0 appliances and class II appliances/ constructions: no contact with live parts | | 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 |
| 8.1.3 | For appliances other than class II, use of test probe 41 of IEC 61032: no contact with live parts of visible glowing heating elements | | N/A |
| 8.1.4 | Accessible part not considered live if: | | N/A |
| | - safety extra-low a.c. voltage: peak value not exceeding 42.4 V | | N/A |
| | - safety extra-low d.c. voltage: not exceeding 42.4 V | | N/A |
| | - or separated from live parts by protective impedance | | N/A |
| | If protective impedance: d.c. current not exceeding 2 mA, and | | N/A |
| | a.c. peak value not exceeding 0.7 mA | | N/A |
| | - for peak values over 42.4 V up to and including 450 V, capacitance not exceeding 0,1 μF | | N/A |
| | - for peak values over 450 V up to and including 15 kV, discharge not exceeding 45 μC | | N/A |
| 8.1.5 | Live parts protected at least by basic insulation before installation or assembly: | | N/A |
| | - built-in appliances | | N/A |
| | - fixed appliances | | N/A |

| EN 60335-2-41+ EN 60335-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - appliances delivered in separate units | | N/A |
| 8.2 | Class II appliances and constructions constructed so that there is adequate protection against accidental contact with basic insulation and metal parts separated from live parts by basic insulation only | | P |
| | Only possible to touch parts separated from live parts by double or reinforced insulation | | P |
| **10** | **POWER INPUT AND CURRENT** | | — |
| 10.1 | Power input at normal operating temperature, rated voltage and normal operation not deviating from rated power input by more than shown in table 1 | | P |
| 10.2 | Current at normal operating temperature, rated voltage and normal operation not deviating from rated current by more than shown in table 2 | (see appended table) | N/A |
| **11** | **HEATING** | | — |
| 11.1 | No excessive temperatures in normal use | (See appended table)<br>In normal position of use | P |
| 11.2 | Hand-held appliances are held in their normal position of use. | Fixed according to the instructions | P |
| 11.3 | Temperature rises, other than of windings, determined by thermocouples | (See appended table) | P |
| | Temperature rises of windings determined by resistance method, unless | | P |
| | the windings makes it difficult to make the necessary connections | | N/A |
| 11.4 | Heating appliances operated under normal operation at 1.15 times rated power input .....: | Not this appliance | N/A |
| 11.5 | Motor-operated appliances operated under normal operation at most unfavourable voltage between 0.94 and 1.06 times rated voltage .....: | 206.8 V and 254.4 V | P |
| 11.6 | Combined appliances operated under normal operation at most unfavourable voltage between 0.94 and 1.06 times rated voltage .....: | | N/A |
| 11.7 | Pumps operated with liquid maintained at temperature marked on pump | 40℃ | P |
| EN60335-2-41 | They operated until steady conditions established unless | | 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 | | N/A |
| | Shower-boost pumps also supplied with cold water operated with cold water at 15℃±2℃ | | N/A |
| | 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 | | N/A |
| 11.8 | Temperature rises not exceeding values in table 3 | (see appended tables) | P |
| | Protective devices do not operate | | P |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | components in protective electronic circuits tested for the number of cycles specified in 24.1.4 (IEC/EN 60335-1/A1) | | P |
| | Sealing compound does not flow out | | P |
| **13** | **LEAKAGE CURRENT AND ELECTRIC STRENGTH AT OPERATING TEMPERATURE** | | — |
| 13.1 | Leakage current not excessive and electric strength adequate | | P |
| | Heating appliances operated at 1.15 times rated power input .....: | | N/A |
| | Motor-operated appliances and combined appliances supplied at 1.06 times rated voltage ..: | | P |
| | Protective impedance and radio interference filters disconnected before carrying out the tests | | N/A |
| 13.2 | Leakage current measured by means of the circuit described in figure 4 of IEC 60990 | | P |
| | Leakage current measurements | (see appended table) | P |
| 13.3 | Electric strength tests according to table 4 | (see appended table) | P |
| | No breakdown during the tests | No breakdown | P |
| **14** | **TRANSIENT OVERVOLTAGES** | | — |
| | Appliances withstand the transient overvoltages to which they may be subjected | | N/A |
| | Clearances having a value less than specified in table 16 subjected to an impulse voltage test, the test voltage specified in table 6 | (see appended table) | N/A |
| | No flashover during the test, unless of functional insulation | | N/A |
| | In case of flashover of functional insulation, 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 | | P |
| | No trace of water on insulation which can result in a reduction of clearances and creepage distances below values specified in clause 29 | | P |
| 15.1.1 | Appliances, other than IPX0, subjected to tests as specified in IEC 60529 .....: | IPX8 | P |
| 15.1.2 | Hand-held appliance turned continuously through the most unfavourable positions during the test | | N/A |
| | Built-in appliances installed according to the instructions | | N/A |
| | Appliances placed or used on the floor or table placed on a horizontal unperforated support | | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Appliances normally fixed to a wall and appliances with pins for insertion into socket-outlets are mounted on a wooden board | | N/A |
| | For IPX3 appliances, the base of wall mounted appliances is placed at the same level as the pivot axis of the oscillating tube | | N/A |
| | For IPX4 appliances, the horizontal centre line of the appliance is aligned with the pivot axis of the oscillating tube | | N/A |
| | However, for appliances normally used on the floor or table, the movement is limited to two times 90° for a period of 5 min, the support being placed at the level of the pivot axis of the oscillating tube | | N/A |
| | Wall-mounted appliances, take into account the distance to the floor stated in the instructions | | N/A |
| | Appliances with type X attachment fitted with a flexible cord as described | | N/A |
| | Detachable parts tested as specified | | N/A |
| EN60335-2-41 | Pumps classified IPX4 are tested with the inlet connected to the outlet by means of a tube filled with water. | | N/A |
| | Submersible pumps are immersed for 24h in water containing approximately 1% NaCl and having a temperature of 30 ℃±5 ℃. The water pressure on the enclosure is equal to: | | P |
| | - 1,5 times the pressure occurring at the maximum operating depth, when this depth does not exceed 10m. | | P |
| | - 1,3 times the pressure occurring at 15m or at the maximum operating depth, whichever is greater, when this depth exceeds 10m. | | N/A |
| 15.2 | Spillage of liquid does not affect the electrical insulation | | N/A |
| | Appliances with type X attachment fitted with a flexible cord as described | | N/A |
| | Appliances incorporating an appliance inlet tested with or without an connector, whichever is most unfavourable | | N/A |
| | Detachable parts removed | | N/A |
| | Overfilling test with additional amount of water, over a period of 1 min (l) .....: | | N/A |
| | The appliance withstands the electric strength test of 16.3 | | N/A |
| | No trace of water on insulation that can result in a reduction of clearances and creepage distances below values specified in clause 29 | | N/A |
| 15.3 | Appliances proof against humid conditions | | N/A |
| | Humidity test for 48 h in a humidity cabinet | | N/A |
| | The appliance withstands the tests of clause 16 | | N/A |

| EN 60335-2-41+ EN 60335-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| **16** | **LEAKAGE CURRENT AND ELECTRIC STRENGTH** | | — |
| 16.1 | Leakage current not excessive and electric strength adequate | (see appended table) | P |
| | Protective impedance disconnected from live parts before carrying out the tests | Not applicable | N/A |
| 16.2 | Single-phase appliances: test voltage 1.06 times rated voltage.....: | | P |
| | Three-phase appliances: test voltage 1.06 times rated voltage divided by √3 .....: | | N/A |
| | Leakage current measurements | (see appended table) | P |
| 16.3 | Electric strength tests according to table 7 | (see appended table) | P |
| | No breakdown during the tests | No breakdown | 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) | N/A |
| | Appliance supplied with 1.06 or 0.94 times rated voltage and the most unfavourable short-circuit or overload likely to occur in normal use applied.....: | | N/A |
| | Temperature rise of insulation of the conductors of safety extra-low voltage circuits not exceeding the relevant value specified in table 3 by more than 15 K | | N/A |
| | Temperature of the winding not exceeding the value specified in table 8, | | N/A |
| | however limits do not apply to fail-safe transformers complying with sub-clause 15.5 of IEC 61558-1 | | N/A |
| **18** | **ENDURANCE** | | — |
| | Requirements and tests are specified in part 2 when necessary | Not applicable | N/A |
| **19** | **ABNORMAL OPERATION** | | — |
| 19.1 | The risk of fire or mechanical damage under abnormal or careless operation obviated | Can avoid these risks | P |
| | Electronic circuits so designed and applied that a fault will not render the appliance unsafe | | N/A |
| | Pumps are also subjected to the tests of 19.101 and 19.102. | | P |
| 19.2 | Test of appliance with heating elements with restricted heat dissipation; test voltage (V): power input of 0.85 times rated power input .....: | No heating elements | N/A |
| 19.3 | Test of 19.2 repeated; test voltage (V): power input of 1.24 times rated power input.....: | | N/A |
| 19.4 | Test conditions as in cl. 11, any control limiting the temperature during tests of cl. 11 short-circuited | | N/A |
| 19.5 | Test of 19.4 repeated on Class 0I and I appliances with tubular sheathed or embedded heating elements. No short-circuiting, but one end of the element connected to the elements sheath | | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | The test repeated with reversed polarity and the other end of the heating element connected to the sheath | | N/A |
| | The test is not carried out on appliances intended to be permanently connected to fixed wiring and on appliances where an all-pole disconnection occurs during the test of 19.4 | | N/A |
| 19.6 | Appliances with PTC heating elements tested at rated voltage, establishing steady conditions | 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 | | N/A |
| 19.7 | Stalling test by locking the rotor if the locked rotor torque is smaller than the full load torque or locking moving parts of other appliances | | P |
| | Locked rotor, motor capacitors open-circuited or short-circuited, if required | | P |
| | Locked rotor, capacitors open-circuited one at a time | | N/A |
| | Test repeated with capacitors short-circuited one at a time, if required | | N/A |
| | Appliances with timer or programmer supplied with rated voltage for each of the tests, for a period equal to the maximum period allowed | | N/A |
| | Other appliances supplied with rated voltage for a period as specified | | P |
| | Winding temperatures not exceeding values specified in table 8 | (see appended table) | P |
| 19.8 | Three-phase motors operated at rated voltage with one phase disconnected | | N/A |
| 19.9 | A running overload test is carried out on appliances incorporating motors that are intended to be remotely or automatically controlled or liable to be operated continuously. | | N/A |
| 19.10 | Series motor operated at 1.3 times rated voltage for 1 min .....: | | 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 they comply with the conditions specified in 19.11.1 | | N/A |
| 19.11.1 | Before applying the fault conditions a) to f) in 19.11.2, it is checked if circuits or parts of circuit meet both of the following conditions: | | N |
| | - the electronic circuit is a low-power circuit, that is, the maximum power at low-power points does not exceed 15 W according to the tests specified | | N/A |
| | - the protection against electric shock, fire hazard, mechanical hazard or dangerous malfunction in 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 operated under conditions specified in cl. 11, but supplied at rated voltage, the duration of the tests as specified: | | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | a) short circuit of functional insulation if clearances or creepage distances are less than the values specified in 29 | | N/A |
| | b) open circuit at the terminals of any component | | N/A |
| | c) short circuit of capacitors, unless they comply with IEC 60384-14 | | N/A |
| | d) short circuit of any two terminals of an electronic component, other than integrated circuits. This fault condition is not applied between the two circuits of an optocoupler | | N/A |
| | e) failure of triacs in the diode mode | | N/A |
| | f) failure of an integrated circuit. The possible hazardous situations of the appliance are assessed to ensure that safety does not rely on the correct functioning of such a component | | N/A |
| 19.11.3 | If the appliance incorporates a protective electronic circuit which operates to ensure compliance with clause 19, the relevant test is repeated with a single fault simulated, as indicated in a) to f) of 19.11.2 | | N/A |
| | During and after each test the following is checked: | | N/A |
| | - the temperature rise of the windings do not exceed the values specified in table 8 | | N/A |
| | - the appliance complies with the conditions specified in 19.13 | | N/A |
| | - any current flowing through protective impedance not exceeding the limits specified in 8.1.4 | | N/A |
| | If a conductor of a printed board becomes open-circuited, the appliance is considered to have withstood the particular test, provided all three of the following conditions are met: | | N/A |
| | - the material of the printed circuit board withstands the burning test of annex E | | N/A |
| | - any loosened conductor does not reduce the clearances or creepage distances between live parts and accessible metal parts below the values specified in cl. 29 | | N/A |
| | - the appliance withstands the tests of 19.11.2 with open-circuited conductor bridged | | N/A |
| 19.12 | If the safety of the appliance for any of the fault conditions specified in 19.11.2 depends on the operation of a miniature fuse-link complying with IEC 60127, the test is repeated, measuring the current flowing through the fuse-link; measured current (A); rated current of the fuse-link (A) .....: | | N/A |
| 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 | | P |
| | Enclosures not deformed to such an extent that compliance with cl. 8 is impaired | | P |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | If the appliance can still be operated it complies with 20.2 | | P |
| | Insulation, other than of class III appliance, withstand the electric strength test of 16.3, the test voltage specified in table 4: | | P |
| | - 1000 V basic insulation.....: | No breakdown | P |
| | - 1750 V supplementary insulation .....: | No breakdown | P |
| | - 3000 V reinforced insulation.....: | No breakdown | P |
| 19.14 | Appliances operated under the conditions of Clause 11. Contactors or relays contacts operating under the conditions of clause 11 short-circuited (IEC/EN 60335-1/A2) | | N/A |
| 19.15 | For appliances incorporating a mains voltage selector switch, this switch is set to the lowest rated voltage position and the highest value of rated voltage is applied. | | N/A |
| 19.101 EN60335-2-41 | Pumps are supplied at rated voltage and operated at approximately half the maximum total head for 5 min, | | P |
| | after which the inlet is removed from the liquid and the operation continued for 7 h. | | P |
| | Pumps are then operated again for 5 min at approximately half the maximum total head. | | P |
| | If the pump becomes inoperable during the test, it is disconnected from the supply and filled with water. | | P |
| 19.102 EN60335-2-41 | Pumps marked with a maximum period of operation are supplied at rated voltage and operated under normal operation until steady conditions are established. | | N/A |
| **20** | **STABILITY AND MECHANICAL HAZARDS** | | — |
| 20.1 | Adequate stability | Have adequate stability | P |
| | Tilting test through an angle of 10° (appliance placed on an inclined plane/horizontal plane); appliance does not overturn | Don't overturn | P |
| | Tilting test repeated on appliances with heating elements, angle of inclination increased to 15° | | N/A |
| | Possible heating test in overturned position; temperature rise does not exceed values shown in table 9 | | N/A |
| 20.2 | Moving parts adequately arranged or enclosed as to provide protection against personal injury | | P |
| | Protective enclosures, guards and similar parts are non-detachable | | P |
| | Adequate mechanical strength and fixing of protective enclosures | | P |
| | Self-resetting thermal cut-outs and overcurrent protective devices not causing a hazard, by unexpected reclosure | | N/A |
| | Not possible to touch dangerous moving parts with test probe | | P |
| **21** | **MECHANICAL STRENGTH** | | — |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 21.1 | Appliance has adequate mechanical strength and is constructed as to withstand rough handling | Have an adequate mechanical strength | P |
| | The appliance is rigidly supported and three blows are applied to every point of the enclosure | | P |
| | No damage after three blows applied to various parts of the enclosure, impact energy 0,5 ± 0,04 J | No damage. | N/A |
| | Pumps, other than shower-boost pumps, impact energy is increased to 1,0 J | | P |
| | If necessary, supplementary or reinforced insulation subjected to the electric strength test of 16.3 | | N/A |
| | If necessary, repetition of groups of three blows on a new sample | | N/A |
| 21.2 | Accessible parts of solid insulation having strength to prevent penetration by sharp implements (IEC/EN 60335-1/A1) | | N/A |
| | The insulation is tested as specified, unless (IEC/EN 60335-1/A1) | | N/A |
| | the thickness of supplementary insulation is at least 1 mm and reinforced insulation is at least 2 mm (IEC/EN 60335-1/A1) | Supplementary insulation: Electric connector box enclosure: min. thickness 2.12 mm | P |
| **22** | **CONSTRUCTION** | | — |
| 22.1 | Appliance marked with the first numeral of the IP system, relevant requirements of IEC 60529 are fulfilled | IPX8 | P |
| 22.2 | Stationary appliance: means to provide all-pole disconnection from the supply provided, the following means being available: | | P |
| | - a supply cord fitted with a plug | | P |
| | - a switch complying with 24.3 | | N/A |
| | - 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 |
| | Singe-pole switches and single-pole protective devices for the disconnection of heating elements in single-phase permanently connected class I appliances, connected in the phase conductor | | N/A |
| 22.3 | Appliance provided with pins: no undue strain on socket-outlets | Not this appliance | N/A |
| | Applied torque not exceeding 0.25 Nm | | N/A |
| | Pull force of 50N to each pin after the appliance has being placed in the heating cabinet; when cooled to room temperature the pins are not displaced by more than 1mm | | N/A |
| | Each pin subjected to a torque of 0.4Nm; the pins are not rotating unless rotating does not impair compliance with the standard | | N/A |
| 22.4 | Appliance for heating liquids and appliance causing | | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | undue vibration not provided with pins for insertion into socket-outlets | | |
| 22.5 | Appliances intended to connect the supply mains by means of a plug shall be no risk of electric shock when the pins of the plug are touched. | No danger. | P |
| | One second after disconnection, the voltage between the pins of the plug shall not exceed 34 V. | 3.6V after 1s | P |
| 22.6 | Electrical insulation not affected by condensing water or leaking liquid | | P |
| | Electrical insulation of Class II appliances not affected in case of a hose rupture or seal leak | | N/A |
| EN60335-2-41 | The seal is removed from the shaft of class II pumps. The pumps is supplied at rated voltage and operated for 10min with the maximum head that can be achieved. | | N/A |
| 22.7 | Adequate safeguards against the risk of excessive pressure in appliances provided with steam-producing devices | Not this appliance | N/A |
| 22.8 | Electrical connections not subject to pulling during cleaning of compartments to which access can be gained without the aid of a tool, and that are likely to be cleaned in normal use | | N/A |
| 22.9 | Insulation, internal wiring, windings, commutators and slip rings not exposed to oil, grease or similar substances | | P |
| | Adequate insulating properties of oil or grease to which insulation is exposed | | N/A |
| 22.10 | Location or protection of reset buttons of non-self-resetting controls is so 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 | | P |
| | Obvious locked position of snap-in devices used for fixing such parts | | P |
| | 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 | | P |
| 22.12 | Handles, knobs etc. fixed in a reliable manner | | P |
| | Fixing in wrong position of handles, knobs etc. indicating position of switches or similar components not possible | | P |
| | Axial force 15 N applied to parts, the shape being so that an axial pull is unlikely to be applied | | N/A |
| | Axial force 30 N applied to parts, the shape being so that an axial pull is likely to be applied | | P |
| 22.13 | Unlikely that handles, when gripped as in normal use, make the operators hand touch parts having a temperature rise exceeding the value specified for handles which are held for short periods only | | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 22.14 | No ragged or sharp edges creating a hazard for the user in normal use, or during user maintenance | No sharp edges or ragged | P |
| | No exposed pointed ends of self tapping screws etc., liable to be touched by the user in normal use or during user maintenance | No exposed pointed ends | P |
| 22.15 | Storage hooks and the like for flexible cords smooth and well rounded | No storage hooks | N/A |
| 22.16 | Automatic cord reels cause no undue abrasion or damage to the sheath of the flexible cord, no breakage of conductors strands, no undue wear of contacts | No automatic cord reels | N/A |
| | Cord reel tested with 6000 operations, as specified | | N/A |
| | Electric strength test of 16.3, voltage of 1000 V applied | | N/A |
| 22.17 | Spacers not removable from the outside by hand or by means of a screwdriver or a spanner | No such components | N/A |
| 22.18 | Current-carrying parts and other metal parts resistant to corrosion under normal conditions of use | | P |
| 22.19 | Driving belts not used as electrical insulation | No such components | N/A |
| 22.20 | Direct contact between live parts and thermal insulation effectively prevented, unless material used is non-corrosive, non-hygroscopic and non-combustible | | N/A |
| | Compliance is checked by inspection and, if necessary, by appropriate test | | N/A |
| 22.21 | Wood, cotton, silk, ordinary paper and fibrous or hygroscopic material not used as insulation, unless impregnated | | P |
| 22.22 | Appliances not containing asbestos | No asbestos | P |
| 22.23 | Oils containing polychlorinated biphenyl (PCB) not used | | P |
| 22.24 | Bare heating elements adequately supported | | N/A |
| | In case of rupture, the heating conductor is unlikely to come in contact with accessible metal parts | | N/A |
| 22.25 | Sagging heating conductors cannot come into contact with accessible metal parts | | N/A |
| 22.26 | The insulation between parts operating at safety extra-low voltage and other live parts complies with the requirements for double or reinforced insulation | | N/A |
| 22.27 | Parts connected by protective impedance separated by double or reinforced insulation | | N/A |
| 22.28 | Metal parts of Class II appliances conductively connected to gas pipes or in contact with water: separated from live parts by double or reinforced insulation | | N/A |
| 22.29 | Class II appliances permanently connected to fixed wiring so constructed that the required degree of access to live parts is maintained after installation | | N/A |
| 22.30 | Parts serving as supplementary or reinforced insulation fixed so that they cannot be removed without being seriously damaged, or | | P |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | so constructed that they cannot be replaced in an incorrect position, and so that if they are omitted, the appliance is rendered inoperable or manifestly incomplete | | P |
| 22.31 | Clearances and creepage distances over supplementary and reinforced insulation not reduced below values specified for supplementary insulation | | P |
| | Creepage distances and clearances over supplementary or reinforced insulation not reduced to less than 50% of values specified in 29 if wires, screws etc. becomes loose | | P |
| 22.32 | Supplementary and reinforced insulation designed or protected against deposition of dirt or dust | | 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 | | N/A |
| | Ceramic material not tightly sintered, similar material or beads alone not used as supplementary or reinforced insulation | | N/A |
| | Oxygen bomb test at 70 ℃ for 96 h and 16 h at room temperature | | N/A |
| 22.33 | Conductive liquids that are or may become accessible in normal use are not in direct contact with live parts | | P |
| | Electrodes not used for heating liquids | | N/A |
| | For class II constructions, conductive liquids that are or may become accessible in normal use, not in direct contact with basic or reinforced insulation | | N/A |
| | For class II constructions, conductive liquids which are in contact with live parts, not in direct contact with reinforced insulation | | N/A |
| 22.34 | Shafts of operating knobs, handles, levers etc. not live, unless the shaft is not accessible when the part is removed | | N/A |
| 22.35 | Handles, levers and knobs, held or actuated in normal use, not becoming live in the event of an insulation fault | | N/A |
| | Such parts being of metal, and their shafts or fixings are likely to become live in the event of an insulation fault, they are either adequately covered by insulation material, or their accessible parts are separated from their shafts or fixings by supplementary insulation | | N/A |
| | This requirement does not apply to handles, levers and knobs on stationary appliances other than those of electrical components, provided they are either reliably connected to an earthing terminal or earthing contact, or separated from live parts by earthed metal | | N/A |
| 22.36 | Handles continuously held in the hand in normal use are so constructed that when gripped as in normal use, the operators hand is not likely to touch metal parts, unless they are separated from live parts by double or reinforced insulation | | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 22.37 | Capacitors in Class II appliances not connected to accessible metal parts, unless complying with 22.42 | | N/A |
| | Metal casings of capacitors in Class II appliances separated from accessible metal parts by supplementary insulation, unless complying with 22.42 | | N/A |
| 22.38 | Capacitors not connected between the contacts of a thermal cut-out | | P |
| 22.39 | Lamp holders used only for the connection of lamps | | N/A |
| 22.40 | Motor-operated appliances and combined appliances intended to be moved while in operation, or having accessible moving parts, fitted with a switch to control the motor. The actuating member of the switch being easily visible and accessible | | N/A |
| EN60335-2-41 | The requirement is not applicable to submersible pumps and vertical wet pit pumps. | | P |
| 22.41 | No components, other than lamps, containing mercury | | P |
| 22.42 | Protective impedance consisting of at least two separate components | | N/A |
| | Values specified in 8.1.4 not exceeded if any one of the components are short-circuited or open-circuited | | N/A |
| 22.43 | Appliances adjustable for different voltages, accidental changing of the setting of the voltage unlikely to occur | Not this appliance | N/A |
| 22.44 | Appliances are not allowed to have an enclosure that is shaped and decorated so that the appliance is likely to be treated as a toy by children | Can't be treated as a toy by children | P |
| 22.45 | When air is used as reinforced insulation, clearances not reduced below the values specified in 29.1.4 due to deformation as a result of an external force applied to the enclosure | | N/A |
| 22.46 | If programmable protective electronic circuits are used to ensure compliance with this standard, the software shall contain measures to control the fault/error conditions specified in Table R.1. | | N/A |
| 22.47 | Appliances intended to be connected to the water mains shall withstand the water pressure expected in normal use. | | N/A |
| 22.48 | Appliances intended to be connected to the water mains shall be constructed to prevent backsiphonage of non-potable water into the water mains. | | N/A |
| 22.49 | For remote operation, the duration of operation shall be set before the appliance can be started unless the appliance switches off automatically at the end of a cycle or it can operate continuously without giving rise to a hazard. | | N/A |
| 22.50 | Controls incorporated in the appliance, if any, shall take priority over controls actuated by remote operation. | | N/A |
| 22.51 | A control on the appliance shall be manually adjusted to the setting for remote operation before the | | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | appliance can be operated in this mode. There shall be a visual indication on the appliance showing that the appliance is adjusted for remote operation. | | |
| 22.52 | Socket-outlets on appliances accessible to the user shall be in accordance with the socket-outlet system used in the country in which the appliance is sold. | | N/A |
| 22.101 | Pumps shall withstand the static pressure occurring in normal use. | | P |
| | Submersible pumps and vertical wet pit pumps are not subjected to this test. | | P |
| 22.102 | The material of the pump shall not be affected by the liquid for which the pump is intended if a hazard could result. | | P |
| 22.103 | Submersible pumps and vertical wet pit pumps shall be constructed so that pollution of the liquid by lubricants is prevented as far as possible. | | P |
| 22.104 | Submersible pumps, and vertical wet pit pumps, having a mass exceeding 3 kg shall be constructed so that means for hoisting can be attached. | | P |
| 22.105 | Class I submersible pumps having a plastic enclosure shall be constructed so that leakage of liquid into the motor does not result in a hazard. | | N/A |
| 22.106 | Shower-boost pumps shall be constructed so that they can be permanently connected to the water supply. | | N/A |
| | Shower-boost pumps for wall mounting shall be constructed so that they can be securely fixed independently of the connection to the water supply. | | 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 or corners | No beads. | N/A |
| | Beads inside flexible metal conduits contained within an insulating sleeve | | N/A |
| 23.3 | Electrical connections and internal conductors movable relatively to each other not exposed to undue stress | | N/A |
| | Flexible metallic tubes not causing damage to insulation of conductors | | N/A |
| | Open-coil springs not used | | N/A |
| | Adequate insulating lining provided inside a coiled spring, the turns of which touch one another | | N/A |
| | Electric strength test, 1000 V between live parts and accessible metal parts | | N/A |

| EN 60335-2-41+ EN 60335-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 23.4 | Bare internal wiring sufficiently rigid and fixed | No bare internal wiring | N/A |
| 23.5 | The insulation of internal wiring withstanding the electrical stress likely to occur in normal use | | P |
| | No breakdown when a voltage of 2000 V is applied for 15 min between the conductor and metal foil wrapped around the insulation | | P |
| 23.6 | Sleeving used as supplementary insulation on internal wiring retained in position by positive means | | N/A |
| 23.7 | The colour combination green/yellow used only for earthing conductors | | P |
| 23.8 | Aluminium wires not used for internal wiring | | P |
| 23.9 | No lead-tin soldering of stranded conductors where they are subject to contact pressure, unless | | P |
| | clamping means so constructed that there is no risk of bad contact due to cold flow of the solder | | N/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 | | N/A |
| **24** | **COMPONENTS** | | — |
| 24.1 | Components comply with safety requirements in relevant IEC standards | Pass muster | P |
| | List of components | (see appended table) | P |
| | Components not tested and found to comply with relevant IEC standard for the number of cycles specified are tested in accordance with 24.1.1 to 24.1.6 | | N/A |
| | Components not tested and found to comply with relevant IEC standard, components not marked or not used in accordance with its marking, tested under the conditions occurring in the appliance | | P |
| 24.1.1 | Capacitors likely to be permanently subjected to the supply voltage and used for radio interference suppression or for voltage dividing, complying with IEC 60384-14, or | | N/A |
| | tested according to annex F | | N/A |
| 24.1.2 | Safety isolating transformers complying with IEC 61558-2-6, or | | N/A |
| | tested according to annex G | | N/A |
| 24.1.3 | Switches complying with IEC 61058-1, the number of cycles of operation being t least 10 000, or | | N/A |
| | Current and power factor measured during switching-on and normal operation | | N/A |
| | Switch tested separately according to IEC 328 for 10000 cycles | | N/A |
| | Switches operated under no load and only with the aid of a tool and interlocked switches operated by hand not subjected to tests of 15 and 16 of IEC 328 | | N/A |

| EN 60335-2-41+ EN 60335-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 24.1.4 | Automatic controls complying with IEC 60730-1 with relevant part 2. The number of cycles of operation being: | | N/A |
| | - thermostats: 10 000 | | N/A |
| | - temperature limiters: 1 000 | | N/A |
| | - self-resetting thermal cut-outs: 300 | | P |
| | - non-self-resetting thermal cut-outs: 30 | | N/A |
| | - timers: 3 000 | | N/A |
| | - energy regulators: 10 000 | | N/A |
| 24.1.5 | Appliance couplers complying with IEC 60320-1 | | N/A |
| | However, appliances classified higher than IPX0, the appliance couplers complying with IEC 60320-2-3 | | N/A |
| 24.1.6 | Small lamp holders similar to E10 lampholders complying with IEC 60238, the requirements for E10 lampholders being applicable | | N/A |
| 24.2 | Appliances shall not be fitted with | | P |
| | switches or automatic controls in flexible cords; | | P |
| | devices that cause 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 a soldering operation, unless the solder has a melting point of at least 230 ℃. | | N/A |
| 24.3 | Switches intended for all-pole disconnection of stationary appliances are directly connected to the supply terminals and having a contact separation in all poles, providing full disconnection under overvoltage category III conditions | | N/A |
| 24.4 | Plugs and socket-outlets for extra-low voltage circuits and heating elements, not interchangeable with plugs and socket-outlets listed in IEC 60083 or IEC 60906-1 or with connectors and appliance inlets complying with the standard sheets of IEC 60320-1 | | N/A |
| 24.5 | Capacitors in auxiliary windings of motors marked with their rated voltage and capacitance and used accordingly | | N/A |
| | Capacitors in appliances for which 30.2.3 is applicable and that are permanently connected in series with a motor winding, are of class P1 or P2 of IEC 60252 | | N/A |
| | Voltage across capacitors in series with a motor winding does not exceed 1,1 times rated voltage, when the appliance is supplied at 1,1 times rated voltage under minimum load | | N/A |
| 24.6 | Working voltage of motors connected to the supply mains and having basic insulation that is inadequate for the rated voltage of the appliance, not exceeding 42V. | | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | In addition, the motors are complying with the requirements of Annex I | | N/A |
| 24.7 | Detachable hose-sets for the connection of appliances to the water mains shall comply with IEC 61770. They shall be supplied with the appliance. | | 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: | | P |
| | - supply cord fitted with a plug | | P |
| | - an appliance inlet having at least the same degree of protection against moisture as required for the appliance | | N/A |
| | - pins for insertion into socket-outlets | | N/A |
| 25.2 | Appliance not provided with more than one means of connection to the supply mains | | N/A |
| | Stationary appliance for multiple supply may be provided with more than one means of connection, provided electric strength test of 1250 V for 1 min between each means of connection causes no breakdown | | N/A |
| 25.3 | Connection of supply conductors for appliance intended to be permanently connected to fixed wiring possible after the appliance has been fixed to its support | | N/A |
| | Appliance provided with a set of terminals for the connection of cables or fixed wiring, cross-sectional areas specified in 26.6 | | N/A |
| | Appliance provided with a set of terminals allowing the connection of a flexible cord | | N/A |
| | Appliance provided with a set of supply leads accommodated in a suitable compartment | | N/A |
| | Appliance provided with a set of terminals and cable entries, conduit entries, knock-outs or glands, allowing connection of appropriate type of cable or conduit | | N/A |
| 25.4 | Cable and conduit entries, rated current of appliance not exceeding 16 A, dimensions according to table 10 | | N/A |
| | Introduction of conduit or cable does not reduce clearances or creepage distances below values specified in 29 | | N/A |
| 25.5 | Method for assemble supply cord with the appliance: | | P |
| | - type X attachment | | N/A |
| | - type Y attachment | type Y | P |
| | Type X attachment, other than those with a specially prepared cord, not used for flat twin tinsel cords | | N/A |
| EN60335-2-41 | Type X attachment shall not be used for flat twin tinsel cord. | | N/A |
| | Type X attachment is not allowed for submersible | | P |

| EN 60335-2-41+ EN 60335-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | pumps. | | |
| | Type Z attachment is allowed for: | | N/A |
| | - pumps having a rated power input not exceeding 100W. | | N/A |
| | pumps for garden ponds. | | N/A |
| 25.6 | Plugs fitted with only one flexible cord | | P |
| 25.7 | Supply cord not lighter than: | | P |
| | - braided cord (60245 IEC 51) | | N/A |
| | - ordinary tough rubber sheathed cord (60245 IEC 53) | | N/A |
| | - flat twin tinsel cord (60227 IEC 41) | | N/A |
| | - light polyvinyl chloride sheathed cord (60227 IEC 52), appliance not exceeding 3 kg | | N/A |
| | - ordinary polyvinyl chloride sheathed cord (60227 IEC 53), appliance exceeding 3 kg | | N/A |
| | Temperature rise of external metal parts exceeding 75 K, PVC cord not used, unless | | N/A |
| | appliance so constructed that the supply cord is not likely to touch external metal parts in normal use, or | | N/A |
| | the supply cord is appropriate for higher temperatures, type Y or type Z attachment used | | N/A |
| EN60335-2-41 | For pumps intended for outdoor use and pumps intended for use in swimming pools, other than class III pumps, the supply cord shall be polychloroprene sheathed or equivalent synthetic elastomer and not be lighter than heavy polychloroprene sheathed cord (code designation 60245 IEC 66). | | N/A |
| | Fixed pumps having a rated power input not exceeding 1 kW and portable pumps having a mass not exceeding 5 kg may be fitted with ordinary polychloroprene sheathed cord (code designation 60245 IEC 57) | | P |
| | For pumps intended for indoor use, except table fountain pumps, aquarium pumps and class III pumps, the supply cord shall be polychloroprene sheathed or equivalent synthetic elastomer and not be lighter than ordinary polychloroprene sheathed cord (code designation 60245 IEC 57) | | N/A |
| 25.8 | Nominal cross-sectional area of supply cords according to table 11; rated current (A); cross-sectional area ($mm^2$) .....: | 1#1.5$mm^2$ 10.1A<br>2#1.0$mm^2$ 2.67A | P |
| EN60335-2-41 | The supply cord of submersible pumps intended for outdoor use, other than class III pumps, shall have a length of at least 10m. | 10m | P |
| 25.9 | Supply cord not in contact with sharp points or edges | | P |
| 25.10 | Green/yellow core for earthing purposes in Class I appliance | | P |

| EN 60335-2-41+ EN 60335-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 25.11 | Conductors of supply cords not consolidated by lead-tin soldering where they are subject to contact pressure, unless | | P |
| | clamping means so constructed that there is no risk of bad contacts due to cold flow of the solder | | N/A |
| 25.12 | Moulding the cord to part of the enclosure does not damage the insulation of the supply cord | | N/A |
| 25.13 | Inlet opening so shaped as to prevent damage to the supply cord | | P |
| | Unless the enclosure at the inlet opening is of insulation material, a non-detachable lining or bushing complying with 29.3 for supplementary insulation provided | | P |
| | If unsheathed supply cord, a similar additional bushing or lining is required, unless | | N/A |
| | the appliance is class 0 | | N/A |
| 25.14 | Supply cords adequately protected against excessive flexing | | P |
| | Flexing test: | | P |
| | - applied force (N).....: | 10N | P |
| | - number of flexings.....: | 10000 | P |
| | The test does not result in: | | P |
| | - short circuit between the conductors | | P |
| | - breakage of more than 10% of the strands of any conductor | | P |
| | - separation of the conductor from its terminal | | P |
| | - loosening of any cord guard | | P |
| | - damage, within the meaning of the standard, to the cord or the cord guard | | P |
| | - broken strands piercing the insulation and becoming accessible | | P |
| 25.15 | Conductors of the supply cord relieved from strain, twisting and abrasion by use of cord anchorage | | P |
| | Cord or internal parts of appliance not damaged when cord pushed into the appliance | | P |
| | Pull force applied 25 times to supply cord ..... : | | P |
| | Torque applied to supply cord (Nm)..... : | 0.35Nm 100N | P |
| | Torque test not performed (automatic cord reel) | | N/A |
| | No damage of the cord | | P |
| | Max. 2 mm displacement of cord; conductors not moved more than 1 mm in the terminals | Cord displacement: Max. 1,0 mm | P |
| 25.16 | Cord anchorages for type X attachments constructed and located so that: | | N/A |
| | - replacement of the cord is easily possible | | N/A |

| EN 60335-2-41+ EN 60335-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - it is clear how the relief from strain and the prevention of twisting are obtained | | N/A |
| | - they are suitable for different types of cord | | N/A |
| | - cord cannot touch the clamping screws of cord anchorage if these screws are accessible, unless 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 part of a specially prepared cord | | N/A |
| | - screws which have to be operated when replacing the cord do not fix any other component, if applicable | | 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 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 if of metal, they are insulated from accessible metal parts by supplementary insulation | | N/A |
| 25.17 | Adequate cord anchorages for type Y and Z attachment | | P |
| 25.18 | Cord anchorages only accessible with the aid of a tool, or | | P |
| | so constructed 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 | | N/A |
| | Tying the cord into a knot or tying the cord with string not used | | N/A |
| 25.20 | Conductors of the supply cord for type Y and Z attachment adequately additionally insulated | type Y | 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, no risk of damage to the conductors when fitting the cover, no contact with accessible metal parts if a conductor becomes loose, etc. | | N/A |
| | For portable appliances, the uninsulated end of a conductor prevented from any contact with accessible metal parts, unless the end of the cord is such that the conductors are unlikely to slip free | | N/A |
| 25.22 | Appliance inlet: | | N/A |
| | - live parts not accessible during insertion or removal | | N/A |
| | - connector can be inserted without difficulty | | N/A |
| | - the appliance is not supported by the connector | | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - is not for cold conditions if temp. rise of external metal parts exceeds 75 K, unless the supply cord is not likely to touch such metal parts | | N/A |
| 25.23 | Interconnection cords comply with the requirements for the supply cord, except as specified | | 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 the standard is impaired when they are disconnected | | N/A |
| 25.25 | Dimensions of pins compatible with the dimensions of the relevant socket-outlet. Dimensions of pins and engagement face in accordance with the relevant plug in IEC 60083 | | N/A |
| **26** | **TERMINALS FOR EXTERNAL CONDUCTORS** | | — |
| 26.1 | Appliances provided with terminals or equally effective devices for connection of external conductors | | N/A |
| | Terminals only accessible after removal of a non-detachable cover | | N/A |
| 26.2 | Appliances with type X attachment and appliances for connection to fixed wiring provided with terminals in which connections are made by means of screws, nuts or similar devices, unless the connections are soldered | | N/A |
| | Screws and nuts serve only to clamp supply conductors, except | | N/A |
| | 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 | | N/A |
| | Soldering alone used, barriers provided, clearances and creepage distances satisfactory if the conductor becomes free at the soldered joint | | N/A |
| 26.3 | Terminals for type X attachment and for connection to fixed wiring so constructed that the conductor is clamped between metal surfaces with sufficient contact pressure and without damaging the conductor | | N/A |
| | Terminals for type X attachment and those for connection to fixed wiring so fixed that when tightening or loosening the clamping means: | | N/A |
| | - the terminal does not loosen | | N/A |
| | - internal wiring is not subjected to stress | | N/A |
| | - clearances and creepage distances are not reduced below the values in 29 | | N/A |
| | Compliance checked by inspection and by the test of subclause 8.6 of IEC 60999-1, the torque applied being equal to two-thirds of the torque specified. Nominal diameter of thread (mm); screw category; torque (Nm) .....: | | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 26.4 | Terminals for type X attachment, except those with a specially prepared cord, and those for connection to fixed wiring, no special preparation of conductors required, and so constructed or placed that conductors prevented from slipping out | | N/A |
| 26.5 | Terminals for type X attachment so located or shielded that if a wire of a stranded conductor escapes, no risk of accidental connection to other parts that result in a hazard | | N/A |
| | Stranded conductor test, 8 mm insulation removed | | N/A |
| | No contact between live parts and accessible metal parts and, for class II constructions, between live parts and metal parts separated from accessible metal parts by supplementary insulation only | | N/A |
| 26.6 | Terminals for type X attachment and for connection to fixed wiring suitable for connection of conductors with required cross-sectional area according to table 13; rated current (A); nominal cross-sectional area (mm²).....: | | N/A |
| | Terminals only suitable for a specially prepared cord | | N/A |
| 26.7 | Terminals for type X attachment accessible after removal of a cover or part of the enclosure | | N/A |
| 26.8 | Terminals for the connection to fixed wiring, including the earthing terminal, located close to each other | | N/A |
| 26.9 | Terminals of the pillar type constructed and located as specified | | N/A |
| 26.10 | Terminals with screw clamping and screwless terminals not used for flat twin tinsel cords, unless conductors ends fitted with a device 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 and similar connections may be used | | N/A |
| | For Class II appliances: the conductor so positioned or fixed that reliance is not placed on soldering, welding or crimping alone | | N/A |
| | For Class II appliances: soldering, welding or crimping alone used, barriers provided, clearances and creepage distances satisfactory if the conductor becomes free | | N/A |
| **27** | **PROVISION FOR EARTHING** | | — |
| 27.1 | Accessible metal parts of Class 0I and I appliances, permanently and reliably connected to an earthing terminal or contact of the appliance inlet | | P |
| | Earthing terminals not connected to neutral terminal | Not connected to neutral terminal | P |
| | Class 0, II and III appliance have no provision for earthing | | N/A |
| | Safety extra-low voltage circuits not earthed, unless protective extra-low voltage circuits | | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 27.2 | Clamping means adequately secured against accidental loosening | | P |
| | Terminals used for the connection of external equipotential bonding conductors allow connection of conductors of 2.5 to 6 mm², and | | N/A |
| | do not provide earthing continuity between different parts of the appliance | | P |
| | Conductors cannot be loosened without the aid of a tool | | P |
| 27.3 | For appliances with supply cord, current-carrying conductors become taut before earthing conductor, if the cord slips out of the cord anchorage | | P |
| 27.4 | No risk of corrosion resulting from contact between metal of earthing terminal and other metal | No corrosion risk | P |
| | Adequate resistance to corrosion of coated or uncoated parts providing earthing continuity, other than parts of a metal frame or enclosure | | P |
| | Parts of steel providing earthing continuity provided at the essential areas with an electroplated coating, thickness at least 5 μm | >>5 μm | P |
| | Adequate protection against rusting of parts of coated or uncoated steel, only intended to provide or transmit contact pressure | | P |
| | In case of aluminium alloys precautions taken to avoid risk of corrosion | No such component | 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 that clearances of basic insulation are based on the rated voltage of the appliance | | N/A |
| | Resistance not exceeding 0,1 Ω at the specified low-resistance test | 0.014Ω | P |
| 27.6 | The printed conductors of printed circuit boards not used to provide earthing continuity in hand held appliances | | N/A |
| | They may be used in other appliances if: | | N/A |
| | - at least two tracks are used with independent soldering points and the appliance complies with requirements of 27.5 for each circuit | | N/A |
| | - the material of the printed circuit board complies with IEC 60249-2-4 or IEC 60249-2-5 | | 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 | Not screws material of insulating | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Screws of insulating material not used for any electrical connection or connections providing earthing continuity | Not screws material of insulating | N/A |
| | Screws used for electrical connections or connections providing earthing continuity screw into metal | | P |
| | Screws not of insulating material if their replacement by a metal screw can impair supplementary or reinforced insulation | | N/A |
| | 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 can impair basic insulation | | N/A |
| | For screws and nuts; test as specified | (see appended table)<br>No damage | P |
| | number of times..... : | 10 | P |
| | torque (table 14) (Nm)..... : | | P |
| 28.2 | Electrical connections and connections providing earthing continuity constructed so that contact pressure not transmitted through insulating material liable to shrink or distort, unless shrinkage or distortion compensated | | P |
| | This requirement does not apply to electrical connections in circuits carrying a current not exceeding 0.5A | | N/A |
| 28.3 | Space-threaded (sheet metal) screws only used for electrical connections if they clamp the parts together | | N/A |
| | Thread-cutting (self-tapping) screws only used for electrical connections if they generate a full form standard machine screw thread | | N/A |
| | Such screws not used if they are likely to be operated by the user or installer unless the thread is formed by a swaging action | | N/A |
| | Thread-cutting and space-threaded screws may be used in connections providing earthing continuity, provided unnecessary to disturb the connection and at least two screws are used for each connection | | N/A |
| 28.4 | Screws and nuts that make mechanical connection secured against loosening if they also make electrical connections or connections providing earthing continuity | | P |
| | Rivets for electrical connections or connections providing earthing continuity secured against loosening if subjected to torsion | | N/A |
| **29** | **CLEARANCES, CREEPAGE DISTANCES AND SOLID INSULATION** | | — |
| | Clearances, creepage distances and solid insulation withstand electrical stress | | P |
| | For coatings used on printed circuits boards to protect the microenvironment or to provide basic insulation, annex J applies | | P |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 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 | (see appended table) | P |
| | The values specified may be smaller for basic insulation and functional insulation if the clearance meets the impulse voltage test of clause 14 | | N/A |
| | Lacquered conductors of windings assumed to be bare conductors, but the clearances specified in table 16 are reduced by 0.5mm for rated impulse voltages of at least 1500V | | P |
| | Appliances are in overvoltage category II | Overvoltage category II | P |
| | Clearances less than specified in table 16 not allowed for basic insulation of class 0 and class 0I appliances, | | N/A |
| | or if pollution degree 3 is applicable | | P |
| | Compliance is checked by inspection and measurements as specified | | P |
| 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 | | N/A |
| | Lacquered conductors of windings considered to be bare conductors | | P |
| 29.1.2 | Clearances of supplementary insulation not less than those specified for basic insulation in table 16 | (see appended table) | P |
| 29.1.3 | Clearances of reinforced insulation not less than those specified for basic insulation in table 16, but 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 | | P |
| 29.1.4 | For functional insulation, the values of table 16 are applicable, unless | | P |
| | the appliance complies with clause 19 with the functional insulation short-circuited | | N/A |
| | Clearances at crossover points of lacquered conductors not measured | | N/A |
| | Clearance between surfaces of PTC heating elements may be reduced to 1mm | | N/A |
| 29.1.5 | Appliances having higher working voltage than rated voltage, the voltage used for determining clearances from table 16 is the sum of the rated impulse voltage and the difference between the peak value of the working voltage and the peak value of the rated voltage | | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | 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 based on the working voltage used as the rated voltage in table 15 | | 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 | | P |
| | precautions taken to protect the insulation; pollution degree 1 | | N/A |
| | insulation subjected to conductive pollution; pollution degree 3 | | P |
| | Compliance is checked by inspection and measurements as specified | | N/A |
| 29.2.1 | Creepage distances of basic insulation not less than specified in table 17 | (see appended table) | P |
| | For pollution degree 1, 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 as specified for basic insulation in table 17 | (see appended table) | P |
| 29.2.3 | Creepage distances of reinforced insulation at least double as specified for basic insulation in table 17 | (see appended table) | P |
| 29.2.4 | Creepage distances of functional insulation not less than specified in table 18 | | N/A |
| | Creepage distances may be reduced if the appliance complies with clause 19 with the functional insulation short-circuited | | P |
| 29.3 | Supplementary and reinforced insulation have adequate thickness, or a sufficient number of layers, to withstand the electrical stresses | | P |
| | Compliance checked | | P |
| | - by measurement, in accordance with 29.3.1, or | | P |
| | - by an electric strength test in accordance with 29.3.2, or | | N/A |
| | - for insulation, other than single layer internal wiring insulation, by an assessment of the thermal quality of the material combined with an electric strength test, in accordance with 29.3.3, and | | N/A |
| | - for accessible parts of reinforced insulation consisting of a single layer, by measurement in accordance with 29.3.4, or | | N/A |
| | - by an assessment of the thermal quality of the material according to 29.3.3 combined with an electric | | N/A |

| EN 60335-2-41+ EN 60335-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | strength test in accordance with 23.5, for each single layer internal wiring insulation touching each other, or | | |
| | - as specified in subclause 6.3 of IEC 60664-4 for insulation that is subjected to any periodic voltage having a frequency exceeding 30 kHz | | N/A |
| 29.3.1 | Solid insulation having a minimum thickness of 1mm for supplementary insulation, | Electric connector box enclosure: min. thickness 3.12 mm | P |
| | and 2mm for reinforced insulation | | P |
| | This requirement does not apply if the supplementary insulation, other than mica or similar scaly material, consists of at least two layers, each of the layers withstands the electric strength test of 16.3 | | N/A |
| | This requirement does not apply if the reinforced insulation, other than mica or similar scaly material, consists of at least three layers, any two layers together withstand the electric strength test of 16.3 | | N/A |
| | This requirement also does not apply to inaccessible insulation and does not exceed the maximum permissible temperature values, or | | N/A |
| | if the insulation, after conditioning as specified, withstands the electric strength test of 16.3 | | N/A |
| **30** | **RESISTANCE TO HEAT AND FIRE** | | P |
| 30.1 | External parts of non-metallic material, | | P |
| | parts supporting live parts, and | | P |
| | thermoplastic material providing supplementary or reinforced insulation, | | P |
| | sufficiently resistant to heat | | P |
| | Ball-pressure test according to IEC 60695-10-2 | | P |
| | External parts: at 40 ℃ plus the maximum temperature rise determined during the test of clause 11, or at 75 ℃, whichever is the higher; temperature (℃).....: | | P |
| | Parts supporting live parts: at 40 ℃ plus the maximum temperature rise determined during the test of clause 11, or at 125 ℃, whichever is the higher; temperature (℃) .....: | | P |
| | Parts of thermoplastic material providing supplementary or reinforced insulation, 25 ℃plus the maximum temperature rise determined during clause 19, if higher; temperature (℃).....: | | N/A |
| 30.2 | Relevant parts of non-metallic material adequately resistant to ignition and spread of fire | | P |
| | This requirement does not apply to: | | N/A |
| | parts having a mass not exceeding 0,5 g, provided the cumulative effect is unlikely to propagate flames that originate inside the appliance by propagating flames from one part to another, or | | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | decorative trims, knobs and other parts unlikely to be ignited or to propagate flames that originate inside the appliance | | N/A |
| | Compliance checked by the test of 30.2.1, and in addition: | | P |
| | - for attended appliances, 30.2.2 applies | | N/A |
| | - for unattended appliances, 30.2.3 applies | | P |
| | For appliances for remote operation, 30.2.3 applies | | N/A |
| | For base material of printed circuit boards, 30.2.4 applies | | N/A |
| 30.2.1 | Parts of non-metallic material subjected to the glow-wire test of IEC 60695-2-11 at 550 ℃ | | 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 ℃, or | | N/A |
| | the material is classified at least HB40 according to IEC 60695-11-10 | | N/A |
| | Parts for which the glow-wire test cannot be carried out need to meet the requirements in ISO 9772 for material classified HBF | | N/A |
| 30.2.2 | Appliances operated while attended, parts of non-metallic material supporting current-carrying connections, and | | N/A |
| | parts of non-metallic material within a distance of 3 mm of such connections, | | N/A |
| | subjected to the glow-wire test of IEC 60695-2-11 | | N/A |
| | The test severity is: | | N/A |
| | - 750 ℃, for connections carrying a current exceeding 0,5 A during normal operation | | N/A |
| | - 650 ℃, 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: | | N/A |
| | - 750 ℃, for connections carrying a current exceeding 0,5 A during normal operation | | N/A |
| | - 650 ℃, for other connections | | N/A |
| | The glow-wire test is also not carried out on small parts. These parts are to: | | N/A |
| | - comprise material having a glow-wire flammability index of at least 750 ℃, or 650 ℃ as appropriate, or | | N/A |
| | - comply with the needle-flame test of annex E, or | | N/A |
| | - comprise material classified as V-0 or V-1 according to IEC 60695-11-10 : | | N/A |
| | Glow-wire test not applicable to conditions as specified : | | N/A |

| EN 60335-2-41+ EN 60335-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 30.2.3 | Appliances operated while unattended, tested as specified in 30.2.3.1 and 30.2.3.2 | | P |
| | Test not applicable to conditions as specified | | N/A |
| 30.2.3.1 | Parts of insulating material supporting connections carrying a current exceeding 0.2A during normal operation, and | | N/A |
| | parts of insulating material within a distance of 3mm, | | N/A |
| | having a glow-wire flammability index of at least 850 ℃ according to IEC 60695-2-12 | | N/A |
| 30.2.3.2 | Parts of insulating material supporting current-carrying connections, and | Pass muster | P |
| | parts of insulating material within a distance of 3mm, | | P |
| | subjected to glow-wire test of IEC 60695-2-11 | | P |
| | Test not carried out on material having a glow-wire ignition temperature according to IEC 60695-2-13 as specified | | N/A |
| | Glow-wire test of IEC 60695-2-11, the temperature being: | | N/A |
| | -750 ℃, for connections carrying a current exceeding 0,2A during normal operation | | P |
| | -650 ℃, for other connections | | N/A |
| | Parts that during the test produce a flame persisting longer than 2 s, tested as specified | | N/A |
| | If a flame persists longer than 2 s during the test, parts above the connection, as specified, subjected to the needle-flame test of annex E, unless | <2 s | N/A |
| | the material is 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 needle-flame test of annex E | | N/A |
| | Test not applicable to conditions as specified | | N/A |
| **31** | **RESISTANCE TO RUSTING** | | — |
| | Relevant ferrous parts adequately protected against rusting | | P |
| **32** | **RADIATION, TOXICITY AND SIMILAR HAZARDS** | | — |
| | Appliance does not emit harmful radiation | | P |
| | Appliance does not present a toxic or similar hazard | | P |

| | | | |
|---|---|---|---|
| **A** | **ANNEX A (INFORMATIVE)<br>ROUTINE TESTS** | | — |
| | Description of routine tests to be carried out by the manufacturer | | N/A |
| **B** | **ANNEX B (NORMATIVE)<br>APPLIANCES POWERED BY RECHARGEABLE BATTERIES** | | — |

| EN 60335-2-41+ EN 60335-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | The following modifications to this standard are applicable for appliances powered by batteries that are recharged in the appliance | | N/A |
| | This annex does not apply to battery chargers | | N/A |
| | Three forms of construction covered: | | N/A |
| | a) Appliance supplied directly from the supply mains or a renewable energy source, the battery charging circuitry and other supply unit circuitry incorporated within the appliance | | N/A |
| | b) The part of the appliance incorporating the battery is supplied from the supply mains or a renewable energy source, via a detachable supply unit. The battery charging circuitry is incorporated within the part of the appliance containing the battery | | N/A |
| | c) The part of the appliance incorporating the battery is supplied from the supply mains or a renewable energy source, via a detachable supply unit. The battery charging circuitry is incorporated within the detachable supply unit | | N/A |
| 3.1.9 | Appliance operated under the following conditions: | | N/A |
| | - the appliance, supplied by its fully charged battery, operated as specified in relevant part 2 | | N/A |
| | - the battery is charged, the battery being initially discharged to such an extent that the appliance cannot operate | | N/A |
| | - f possible, the appliance is supplied from the supply mains through its battery charger, the battery being initially discharged to such an extent that the appliance cannot operate. The appliance is operated as specified in relevant part 2 | | N/A |
| | - if the appliance incorporates inductive coupling between two parts that are detachable from each other, the appliance is supplied from the supply mains with the detachable part removed | | N/A |
| 3.6.2 | Part to be removed in order to discard the battery is not considered to be detachable | | N/A |
| 5.B.101 | Appliances supplied from the supply mains tested as specified for motor-operated appliances | | N/A |
| 7.1 | Battery compartment for batteries intended to be replaced by the user, marked with battery voltage and polarity of the terminals | | N/A |
| | The positive terminal indicated by symbol IEC 60417-5005 and the negative terminal by symbol IEC 60417-5006 | | N/A |
| | Appliances intending to be supplied from a detachable supply unit marked with symbol IEC 60417-6181 and its type reference along with symbol ISO 7000-0790 (2004-01), or | | N/A |
| | use only with <model designation> supply unit | | N/A |
| 7.6 | Symbols 60417-5005 and IEC 60417-5006 | | N/A |

| EN 60335-2-41+ EN 60335-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 7.12 | The instructions give information regarding charging | | N/A |
| | The instructions for appliances incorporating batteries intended to be replaced by the user includes required information | | N/A |
| | Details about how to remove batteries containing materials hazardous to the environment given | | N/A |
| | Instructions for appliances containing non user-replaceable batteries state the substance of the following: | | N/A |
| | This appliance contains batteries that are only replaceable by skilled persons | | N/A |
| | Instructions for appliances containing non-replaceable batteries shall state the substance of the following: | | N/A |
| | This appliance contains batteries that are non-replaceable | | N/A |
| | For appliances intending to be supplied from a detachable supply unit for the purposes of recharging the battery, the type reference of the detachable supply unit is stated along with the following: | | N/A |
| | WARNING: For the purposes of recharging the battery, only use the detachable supply unit provided with this appliance | | N/A |
| | If the symbol for detachable supply unit is used, its meaning is explained | | N/A |
| 7.15 | Markings placed on the part of the appliance connected to the supply mains | | N/A |
| | The type reference of the detachable supply unit is placed in close proximity to the symbol | | N/A |
| 8.2 | Appliances having batteries that according to the instruction may be replaced by the user need only have basic insulation between live parts and the inner surface of the battery compartment | | N/A |
| | If the appliance can be operated without batteries, double or reinforced insulation required | | N/A |
| 11.7 | The battery is charged for the period stated in the instructions or 24 h : | | N/A |
| 11.8 | Temperature rise of the battery surface does not exceed the limit in the battery manufacturer's specification; measured (K); limit (K) : | | N/A |
| | If no limit specified, the temperature rise does not exceed 20 K; measured (K) : | | N/A |
| 19.1 | Appliances subjected to tests of 19.B.101, 19.B.102 and 19.B.103 | | N/A |
| 19.10 | Not applicable | | N/A |
| 19.B.101 | Appliances supplied at rated voltage for 168 h, the battery being continually charged | | N/A |
| 19.B.102 | For appliances having batteries that can be removed without the aid of a tool, short-circuit of the terminals of the battery, the battery being fully charged, | | N/A |
| 19.B.103 | Appliances having batteries replaceable by the user supplied at rated voltage under normal operation with the battery removed or in any position allowed by the construction | | N/A |

| EN 60335-2-41+ EN 60335-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 19.13 | The battery does not rupture or ignite | | N/A |
| 21.B.101 | Appliances having pins for insertion into socket-outlets have adequate mechanical strength | | N/A |
| | Part of the appliance incorporating the pins subjected to the free fall test, procedure 2, of IEC 60068-2-31, the number of falls being: | | N/A |
| | - 100, if the mass of the part does not exceed 250 g (g) : | | N/A |
| | - 50, if the mass of the part exceeds 250 g : | | N/A |
| | After the test, the requirements of 8.1, 15.1.1, 16.3 and clause 29 are met | | N/A |
| 22.3 | Appliances having pins for insertion into socket-outlets tested as fully assembled as possible | | N/A |
| 25.13 | An additional lining or bushing not required for interconnection cords in class III appliances or class III constructions operating at safety extra-low voltage not containing live parts | | N/A |
| 30.2 | For parts of the appliance connected to the supply mains during the charging period, 30.2.3 applies | | N/A |
| | For other parts, 30.2.2 applies | | N/A |
| **C** | **ANNEX C (NORMATIVE)<br>AGEING TEST ON MOTORS** | | — |
| | Tests, as described, carried out when doubt with regard to the temperature classification of the insulation of a motor winding | | N/A |
| | Test conditions as specified | | N/A |
| **D** | **ANNEX D (NORMATIVE)<br>THERMAL MOTOR PROTECTORS** | | N/A |
| | Applicable to appliances having motors that incorporate thermal motor protectors necessary for compliance with the standard | | N/A |
| | Test conditions as specified | | N/A |
| **E** | **ANNEX E (NORMATIVE)<br>NEEDLE-FLAME TEST** | | — |
| | Needle-flame test carried out in accordance with IEC 60695-11-5, with the following modifications: | | N/A |
| 7 | Severities | | N/A |
| | The duration of application of the test flame is 30 s ± 1 s | | N/A |
| 9 | Test procedure | | N/A |
| 9.1 | The specimen so arranged that the flame can be applied to a vertical or horizontal edge as shown in the examples of figure 1 | | N/A |
| 9.2 | The first paragraph does not apply | | N/A |
| | If possible, the flame is applied at least 10 mm from a corner | | N/A |
| 9.3 | The test is carried out on one specimen | | N/A |

| EN 60335-2-41+ EN 60335-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | 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 | | N/A |
| | 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)<br>CAPACITORS** | | — |
| | Capacitors likely to be permanently subjected to the supply voltage, and used for radio interference suppression or voltage dividing, comply with the following clauses of IEC 60384-14, with the following modifications: | | N/A |
| 1.5 | Terms and definitions | | N/A |
| 1.5.3 | Class X capacitors tested according to subclass X2 | | N/A |
| 1.5.4 | This subclause is applicable | | N/A |
| 1.6 | Marking | | N/A |
| | Items a) and b) are applicable | | N/A |
| 3.4 | Approval testing | | N/A |
| 3.4.3.2 | Table 3 is applicable as described | | N/A |
| 4.1 | Visual examination and check of dimensions | | N/A |
| | This subclause is applicable | | N/A |
| 4.2 | Electrical tests | | N/A |
| 4.2.1 | This subclause is applicable | | N/A |
| 4.2.5 | This subclause is applicable | | N/A |
| 4.2.5.2 | Only table 11 is applicable | | N/A |
| | Values for test A apply | | N/A |
| | However, for capacitors in heating appliances the values for test B or C apply | | N/A |
| 4.12 | Damp heat, steady state | | N/A |
| | This subclause is applicable | | N/A |
| | Only insulation resistance and voltage proof are checked | | N/A |
| 4.13 | Impulse voltage | | N/A |
| | This subclause is applicable | | N/A |
| 4.14 | Endurance | | N/A |
| | 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 |

| EN 60335-2-41+ EN 60335-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 4.17 | Passive flammability test | | N/A |
| | This subclause is applicable | | N/A |
| 4.18 | Active flammability test | | N/A |
| | This subclause is applicable | | N/A |
| **G** | **ANNEX G (NORMATIVE)<br>SAFETY ISOLATING TRANSFORMERS** | | — |
| | The following modifications to this standard are applicable for safety isolating transformers: | | N/A |
| 7 | Marking and instructions | | N/A |
| 7.1 | Transformers for specific use marked with: | | N/A |
| | -name, trademark or identification mark of the manufacturer or responsible vendor.....: | | N/A |
| | -model or type reference..... : | | N/A |
| 17 | Overload protection of transformers and associated circuits | | N/A |
| | Fail-safe transformers comply with subclause 15.5 of IEC 61558-1 | | N/A |
| 22 | Construction | | N/A |
| | Subclauses 19.1 and 19.1.2 of IEC 61558-2-6 are applicable | | N/A |
| 29 | Clearances, creepage distances and solid insulation | | N/A |
| 29.1, 29.2, 29.3 | The distances specified in items 2a, 2c and 3 in table 13 of IEC 61558-1 apply | | N/A |
| | For insulated winding wires complying with subclause 19.12.3 of IEC 61558-1 there are no requirements for clearances or creepage distances | | N/A |
| | For windings providing reinforced insulation, the distance specified in item 2c of table 13 of IEC 61558-1 is not assessed | | N/A |
| | For safety isolating transformers subjected to periodic voltages with a frequency exceeding 30 kHz, the clearances, creepage distances and solid insulation values specified in IEC 60664-4 are applicable, if greater than the values specified in items 2a, 2c and 3 in table 13 of IEC 61558-1 | | N/A |
| **H** | **ANNEX H (NORMATIVE)<br>SWITCHES** | | — |
| | Switches comply with the following clauses of IEC 61058-1, as modified below: | | N/A |
| | The tests of IEC 61058-1 carried out under the conditions occurring in the appliance | | N/A |
| | Before being tested, switches are operated 20 times without load | | N/A |
| 8 | Marking and documentation | | N/A |
| | Switches are not required to be marked | | N/A |

| EN 60335-2-41+ EN 60335-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | However, a switch that can be tested separately from the appliance marked with the manufacturer's name or trade mark and the type reference | | N/A |
| 13 | Mechanism | | N/A |
| | The tests may be carried out on a separate sample | | N/A |
| 15 | Insulation resistance and dielectric strength | | N/A |
| 15.1 | Not applicable | | N/A |
| 15.2 | Not applicable | | N/A |
| 15.3 | Applicable for full disconnection and micro-disconnection | | N/A |
| 17 | Endurance | | N/A |
| | Compliance is checked on three separate appliances or switches | | N/A |
| | For 17.2.4.4, the number of cycles declared according to 7.1.4 is 10 000, unless | | N/A |
| | otherwise specified in 24.1.3 of the relevant part 2 of IEC 60335.....: | | N/A |
| | Switches for operation under no load and which can be operated only by a tool, and | | N/A |
| | switches operated by hand that are interlocked so that they cannot be operated under load, | | N/A |
| | are not subjected to the tests | | N/A |
| | However, switches without this interlock are subjected to the test of 17.2.4.4 for 100 cycles of operation | | N/A |
| | Subclauses 17.2.2 and 17.2.5.2 not applicable | | N/A |
| | The ambient temperature during the test is that occurring in the appliance during the test of clause 11 in IEC 60335-1 | | N/A |
| | The temperature rise of the terminals not more than 30 K above the temperature rise measured in clause 11 of IEC 60335-1 (K).....: | | N/A |
| 20 | Clearances, creepage distances, solid insulation and coatings of rigid printed board assemblies | | N/A |
| | This clause is applicable to clearances and creepage distances for functional insulation, across full disconnection and micro-disconnection, asstated in table 24 | | N/A |
| | Clause 20 is applicable to clearances across full disconnection and micro-disconnection | | N/A |
| | It is also applicable to creepage distances for functional insulation, across full disconnection and micro-disconnection, as stated in Table 24 | | N/A |

| EN 60335-2-41+ EN 60335-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| **I** | **ANNEX I (NORMATIVE)<br>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: | | N/A |
| 8 | Protection against access to live parts | | N/A |
| 8.1 | Metal parts of the motor are considered to be bare live parts | | N/A |
| 11 | Heating | | N/A |
| 11.3 | The temperature rise of the body of the motor is determined instead of the temperature rise of the windings | | N/A |
| 11.8 | The temperature rise of the body of the motor, where in contact with insulating material, not exceeding values in table 3 for the relevant insulating material | | N/A |
| 16 | Leakage current and electric strength | | N/A |
| 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 | | N/A |
| 19.1 | The tests of 19.7 to 19.9 are not carried out | | N/A |
| 19.I.101 | Appliance operated at rated voltage with each of the following fault conditions: | | 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 | | N/A |
| 22.I.101 | For class I appliances incorporating a motor supplied by a rectifier circuit, the d.c. circuit being insulated from accessible parts of the appliance by double or reinforced insulation | | N/A |
| | Compliance checked by the tests specified for double and reinforced insulation | | N/A |
| **J** | **ANNEX J (NORMATIVE)<br>COATED PRINTED CIRCUIT BOARDS** | | — |
| | Testing of protective coatings of printed circuit boards carried out in accordance with IEC 60664-3 with the following modifications: | | N/A |
| 5.7 | Conditioning of the test specimens | | N/A |
| | When production samples are used, three samples of the printed circuit board are tested | | N/A |

| EN 60335-2-41+ EN 60335-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 5.7.1 | Cold | | N/A |
| | The test is carried out at -25 ℃ | | N/A |
| 5.7.3 | Rapid change of temperature | | N/A |
| | Severity 1 is specified | | N/A |
| 5.9 | Additional tests | | N/A |
| | This subclause is not applicable | | N/A |
| **K** | **ANNEX K (NORMATIVE)<br>OVERVOLTAGE CATEGORIES** | | — |
| | The information on overvoltage categories is extracted from IEC 60664-1 | | 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 | | N/A |
| | Equipment of overvoltage category III is equipment in fixed installations and for cases where the reliability and the availability of the equipment is subject to special requirements | | N/A |
| | Equipment of overvoltage category II is energy consuming equipment to be supplied from the fixed installation | | N/A |
| | If such equipment is subjected to special requirements with regard to reliability and availability, overvoltage category III applies | | N/A |
| | Equipment of overvoltage category I is equipment for connection to circuits in which measures are taken to limit transient overvoltages to an appropriate low level | | N/A |
| **L** | **ANNEX L (INFORMATIVE)<br>GUIDANCE FOR THE MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES** | | — |
| | Information for the determination of clearances and creepage distances | | N/A |
| **M** | **ANNEX M (NORMATIVE)<br>POLLUTION DEGREE** | | — |
| | The information on pollution degrees is extracted from IEC 60664-1 | | N/A |
| | Pollution | | N/A |
| | The microenvironment determines the effect of pollution on the insulation, taking into account the macroenvironment | | N/A |
| | Means may be provided to reduce pollution at the insulation by effective enclosures or similar | | N/A |
| | Minimum clearances specified where pollution may be present in the microenvironment | | N/A |

| EN 60335-2-41+ EN 60335-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Degrees of pollution in the microenvironment | | N/A |
| | For evaluating creepage distances, the following degrees of pollution in the microenvironment are established: | | N/A |
| | -pollution degree 1: no pollution or only dry, non-conductive pollution occurs. The pollution has no influence | | N/A |
| | -pollution degree 2: only non-conductive pollution occurs, except that occasionally a temporary conductivity caused by condensation is to be expected | | 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)<br>PROOF TRACKING TEST** | | — |
| | The proof tracking test is carried out in accordance with IEC 60112 with the following modifications: | | N/A |
| 7 | Test apparatus | | N/A |
| 7.3 | Test solutions | | N/A |
| | Test solution A is used | | N/A |
| 10 | Determination of proof tracking index (PTI) | | N/A |
| 10.1 | Procedure | | N/A |
| | The proof voltage is 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 | | N/A |
| | 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)<br>SELECTION AND SEQUENCE OF THE TESTS OF clause 30** | | — |
| | Description of tests for determination of resistance to heat and fire | | N/A |
| **P** | **ANNEX P (INFORMATIVE)<br>GUIDANCE FOR THE APPLICATION OF THIS STANDARD TO APPLIANCES USED IN WARM DAMP EQUABLE CLIMATES** | | — |
| | Modifications applicable for class 0 and 01 appliances having a rated voltage exceeding 150 V, intended to be used in countries having a warm damp equable climate and that are marked “with symbol IEC 60417-6332 (2015-06) | | N/A |

| EN 60335-2-41+ EN 60335-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Modifications may also be applied to class 1 appliances having a rated voltage exceeding 150 V, intended to be used in countries having a warm damp equable climate and that are marked IEC 60417-6332 (2015-06), if liable to be connected to a supply mains that excludes the protective earthing conductor | | N/A |
| 5.7 | The ambient temperature for the tests of clauses 11 and 13 is 40 +3/0 ℃ | | N/A |
| 7.1 | The appliance marked with the letters 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 warm damp equable climate, but may also be used in other countries | | N/A |
| | If symbol IEC 60417-6332 (2015-06) is used, its meaning shall be 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 ℃ | | 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)<br>SEQUENCE OF TESTS FOR THE EVALUATION OF ELECTRONIC CIRCUITS** | | — |
| | Description of tests for appliances incorporating electronic circuits | | N/A |
| **R** | **ANNEX R (NORMATIVE)<br>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 | | N/A |
| | 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 | | N/A |

| EN 60335-2-41+ EN 60335-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2 use measures to control and avoid software-related faults/errors in safety-related data and safety-related segments of the software | | N/A |
| R.2.1.1 | Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.2 have one of the following structures: | | 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: | | N/A |
| | -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 | | N/A |
| 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 |
| R.2.2.5 | For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2, detection of a fault/error occur before compliance with clause 19 is impaired | | N/A |

| EN 60335-2-41+ EN 60335-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| R.2.2.6 | The software is referenced to relevant parts of the operating sequence and the associated hardware functions | | N/A |
| R.2.2.7 | Labels used for memory locations are unique | | N/A |
| R.2.2.8 | The software is protected from user alteration of safety-related segments and data | | N/A |
| R.2.2.9 | Software and safety-related hardware under its control is initialized and terminates before compliance with clause 19 is impaired | | N/A |
| R.3 | Measures to avoid errors | | N/A |
| R.3.1 | General | | N/A |
| | 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 fault 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 | | N/A |
| 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 | | N/A |
| R.3.2.2.1 | The specification of the software architecture includes the aspects listed<br>-techniques and measures to control software faults/errors (refer to R.2.2);<br>-interactions between hardware and software;<br>-partitioning into modules and their allocation to the specified safety functions;<br>-hierarchy and call structure of the modules (control flow);<br>-interrupt handling;<br>-data flow and restrictions on data access;<br>-architecture and storage of data;<br>-time-based dependencies of sequences and data | Document ref. No: | 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 | | N/A |
| 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 |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| R.3.2.3.2 | Software code is structured | | N/A |
| R.3.2.3.3 | Coded software is validated against the module specification by static analysis | | N/A |
| | The module specification is validated against the architecture specification by static analysis | | N/A |
| R.3.3.3 | Software validation | | N/A |
| | The software is validated with reference to the requirements of the software safety requirements specification | | N/A |
| | Compliance is checked by simulation of: | | N/A |
| | -input signals present during normal operation | | N/A |
| | -anticipated occurrences | | N/A |
| | -undesired conditions requiring system action | | N/A |

| TABLE R.1 [e] – GENERAL FAULT/ERROR CONDITIONS | | | | | | |
|---|---|---|---|---|---|---|
| Component [a] | Fault/error | Acceptable measures [b, c] | Definitions | Document reference for applied measure | Document reference for applied test | Ver- dict |
| 1 CPU<br>1.1 Registers | Stuck at | Functional test, or<br>periodic self- test using either:<br>static memory test, or<br>word protection with single bit redundancy | H.2.16.5<br>H.2.16.6<br>H.2.19.6<br>H.2.19.8.2 | | | |
| 1.2 VOID | | | | | | |
| 1.3 Programme counter | Stuck at | Functional test, or<br>Periodic self- test, or<br>Independent time- slot monitoring, or<br>Logical monitoring of the programme sequence | H.2.16.5<br>H.2.16.6<br>H.2.18.10.4<br>H.2.18.10.2 | | | |
| 2 Interrupt handling and execution | No interrupt or too frequent interrupt | Functional test, or<br>time- slot monitoring | H.2.16.5<br>H.2.18.10.4 | | | |
| 3 Clock | Wrong frequency (for quartz synchronized clock: harmonics/ sub- harmonic s only) | Frequency monitoring, or<br>time slot monitoring | H.2.18.10.1<br>H.2.18.10.4 | | | |

| EN 60335-2-41+ EN 60335-1 | | | | | | |
|---|---|---|---|---|---|---|
| Clause | Requirement + Test | | Result - Remark | | | Verdict |
| 4. Memory<br>4.1 Invariable memory | All single bit faults | Periodic modified checksum, or<br>multiple checksum, or<br>word protection with single bit redundancy | H.2.19.3.1<br>H.2.19.3.2<br>H.2.19.8.2 | | | |
| 4.2 Variable memory | DC fault | Periodic static memory test, or<br>word protection with single bit redundancy | H.2.19.6<br>H.2.19.8.2 | | | |
| 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 | | | |
| 5 Internal data path | Stuck at | Word protection with single bit redundancy | H.2.19.8.2 | | | |
| 5.1 VOID | | | | | | |
| 5.2 Addressing | Wrong address | Word protection with single bit redundancy including the address | H.2.19.8.2 | | | |
| 6 External communication | Hamming distance 3 | Word protection with multi-bit redundancy, or<br>CRC – single work, or<br>Transfer redundancy, or<br>Protocol test | H.2.19.8.1<br>H.2.19.4.1<br>H.2.18.2.2<br>H.2.18.14 | | | |
| 6.1 VOID | | | | | | |
| 6.2 VOID | | | | | | |
| 6.3 Timing | Wrong point in time<br><br><br><br><br><br><br><br>Wrong sequence | Time-slot monitoring, or<br>scheduled transmission<br>Time-slot and logical monitoring, or<br>comparison of redundant communication channels by either:<br>reciprocal comparison<br>independent hardware comparator<br>Logical monitoring, or<br>time-slot monitoring, or<br>Scheduled transmission | H.2.18.10.4<br>H.2.18.18<br>H.2.18.10.3<br>H.2.18.15<br>H.2.18.3<br>H.2.18.10.2<br>H.2.18.10.4<br>H.2.18.18 | | | |

| EN 60335-2-41+ EN 60335-1 | | | | | | |
|---|---|---|---|---|---|---|
| Clause | Requirement + Test | | Result - Remark | | | Verdict |
| 7 Input/output periphery | Fault conditions specified in 19.11.2 | Plausibility check | H.2.18.13 | | | |
| 7.1 VOID | | | | | | |
| 7.2 Analog I/O 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 | | | |
| 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 | | | |
| NOTE A Stuck-at fault model denotes a fault model representing an open circuit or a non-varying signal level. A DC fault model denotes a stuck-at fault model incorporating short circuit between signal lines. | | | | | | |
| a) For fault/error assessment, some components are divided into their sub-functions.<br>b) For each sub-function in the table, the Table R.2 measure will cover the software fault/error.<br>c) Where more than one measure is given for a sub-function, these are alternatives.<br>d) To be divided as necessary by the manufacturer into sub-functions.<br>e) Table R.1 is applied according to the requirements of R.1 to R.2.2.9 inclusive. | | | | | | |
| **S** | **ANNEX S (NORMATIVE)<br>BATTERY OPERATED APPLIANCES POWERED BY BATTERIES THAT ARE NON-RECHARGEABLE OR NOT RECHARGED IN THE APPLIANCE** | | | | | **—** |
| | The following modifications to this standard are applicable for battery-operated appliances where the batteries are either non-rechargeable (primary batteries), or | | | | | N/A |
| | rechargeable batteries (secondary batteries) that are not recharged in the appliance | | | | | N/A |
| 5.8.1 | If the supply terminals for the connection of the battery have no indication of polarity, the more unfavourable polarity is applied | | | | | N/A |
| 5.S.101 | Appliances intended for use with a battery box are tested with the battery box supplied with the appliance or with the battery box recommended in the instructions | | | | | N/A |
| 5.S.102 | Appliances are tested as motor-operated appliances. | | | | | N/A |
| 7.1 | Appliances marked with the battery voltage (V) and the polarity of the terminals, unless.....: | | | | | N/A |
| | the polarity is irrelevant | | | | | N/A |
| | Appliances also marked with: | | | | | N/A |

| EN 60335-2-41+ EN 60335-1 | | | |
|---|---|---|---|
| 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 |
| | -type reference of battery or batteries.....: | | N/A |
| | If relevant, the positive terminal is indicated by the symbol IEC 60417-5005 and the negative terminal by the symbol IEC 60417-5006 | | N/A |
| | If appliances use more than one battery, they are marked to indicate correct polarity connection of the batteries | | N/A |
| 7.6 | Additional symbols | | N/A |
| 7.12 | The instructions contain the following, as applicable: | | N/A |
| | -the types of batteries that may be used.....: | | N/A |
| | -how to remove and insert the batteries | | N/A |
| | -non-rechargeable batteries are not to be recharged | | N/A |
| | -rechargeable batteries are to be removed from the appliance before being charged | | N/A |
| | -different types of batteries or new and used batteries are not to be mixed | | N/A |
| | -batteries are to be inserted with the correct polarity | | 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 are removed | | N/A |
| | -. the supply terminals are not to be short-circuited | | N/A |
| 11.5 | Appliances are supplied with the most unfavourable supply voltage between | | N/A |
| | -0,55 and 1,0 times the battery voltage, if the appliance can be used with non-rechargeable batteries | | N/A |
| | -0,75 and 1,0 times battery voltage, if the appliance is designed for use with rechargeable batteries only | | N/A |
| | The values specified in Table S.101 for the internal resistance per cell of the battery is taken into account | | N/A |
| 19.1 | The tests are carried out with the battery fully charged unless otherwise specified | | N/A |
| 19.13 | The battery does not rupture or ignite | | N/A |
| 19.S.101 | Appliances are supplied with the voltage specified in 11.5. The supply terminals having an indication of polarity are connected to the opposite polarity, unless | | N/A |
| | such a connection is unlikely to occur due to the construction of the appliance | | N/A |
| 19.S.102 | For appliances with provision for multiple batteries, one or more of the batteries are reversed and the appliance is operated, if reversal of batteries is allowed by the construction | | N/A |

| EN 60335-2-41+ EN 60335-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 25.5 | The flexible leads or flexible cord used to connect an external battery or battery box in is connected to the appliance by a type X attachment | | N/A |
| 25.13 | This requirement is not applicable to the flexible leads or flexible cord connecting external batteries or a battery box with an appliance | | N/A |
| 25.S.101 | Appliances have suitable means for connection of the battery. If the type of battery is marked on the appliance, the means of connection is suitable for this type of battery | | N/A |
| 26.5 | Terminal devices in an appliance for the connection of the flexible leads or flexible cord connecting an external battery or battery box are so located or shielded that there is no risk of accidental connection between supply terminals | | N/A |
| 30.2.3.2 | There is no battery in the area of the vertical cylinder used for the consequential needle flame test, unless | | N/A |
| | the battery is shielded by a barrier that meets the needle flame test of Annex E, or | | N/A |
| | that comprises material classified as V-0 or V-1 according to IEC 60695-11-10 | | N/A |
| **T** | **ANNEX T (NORMATIVE)**<br>**UV-C RADIATION EFFECT ON NON-METALLIC MATERIALS** | | — |
| | Requirements for non-metallic materials subject to direct or reflected UV-C radiation exposure and whose mechanical and electrical properties are relied upon for compliance with the | | N/A |
| | Does not apply to glass, ceramic and similar materials | | N/A |
| | Tested as specified in ISO 4892-1 and ISO 4892-2, with the following modifications: | | N/A |
| | Modifications to ISO 4892-1: | | N/A |
| 5.1.6 | The UV-C emitter is a low pressure mercury lamp with a quartz envelope having a continuous spectral irradiance of 10 W/m2 at 254 nm | | N/A |
| | Subclause 5.1.6.1 and Table 1 are not applicable | | N/A |
| 5.2.4 | The black-panel temperature shall be 63 ℃ +/-3 ℃ | | N/A |
| 5.3.1 | Humidification of the chamber air is specified in part 2 when necessary | | N/A |
| 9 | This clause is not applicable | | N/A |
| | Modifications to ISO 4892-2: | | N/A |
| 7.1 | At least three test specimens are tested | | N/A |
| | Ten samples of internal wiring is tested | | N/A |
| 7.2 | The specimens are attached to the specimen holders such that they are not subject to any stress | | N/A |
| 7.3 | Apparatus prepared as specified | | N/A |

| EN 60335-2-41+ EN 60335-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | The test specimens and, if used, the irradiance-measuring instrument are exposed for 1 000 h | | N/A |
| 7.4 | If used, a radiometer is mounted and calibrated such that it measures the irradiance at the exposed surface of the test specimen | | N/A |
| 7.5 | Material properties and test methods for parts providing mechanical support or impact resistance as specified in Table T.1 | | N/A |
| | Material properties and test method for electrical insulation of internal wiring as specified in Table T.2 | | N/A |
| 8 | This clause is not applicable | | N/A |

| 10.1 | TABLE: Power input deviation | | | | P |
|---|---|---|---|---|---|
| Input deviation of/at: | P rated (W) | P measured (W) | Δ P | Required Δ P | Remark |
| 230V 50Hz | 3080 | 3076.6 | -0.11% | +15% | SVQ2200(F) |
| — | — | — | — | — | — |

| 10.2 | TABLE: Current deviation | | | | N/A |
|---|---|---|---|---|---|
| Current deviation of/at: | I rated (A) | I measured (A) | Δ I | Required Δ I | Remark |
| — | — | — | — | — | — |

| 11.8 | TABLE: Heating test | | | P |
|---|---|---|---|---|
| | Test voltage (V)..... : | 206.8 | 254.4 | |
| | Ambient (°C)..... : | t2=23.2 | t2=21.7 | |

| Thermocouple locations | Max. temperature rise measured, Δ T (K) | | Max. temperature rise limit, Δ T (K) |
|---|---|---|---|
| | 206.8V | 254.4V | |
| Supply cord | 6.75 | 7.92 | 60 |
| Metal enclosure | 0.22 | 0.19 | 60 |
| Motor capacitor | 12.21 | 12.94 | 50 |
| Internal wire | 18.73 | 19.47 | 50 |
| Float switch enclosure | 3.22 | 3.67 | 60 |
| Water tempereture | 38.3℃ | | T.Max 40℃ |

| 11.8 | TABLE: Heating test, resistance method | | | | | P |
|---|---|---|---|---|---|---|
| | Test voltage (V) | | 254.4 | | | — |
| | Ambient, t1 (°C) | | 20.9 | | | — |
| | Ambient, t2 (°C) | | 21.7 | | | — |
| Temperature rise of winding | R1 (Ω) | R2 (Ω) | Δ T (K) | Max. Δ T (K) | Insulation class | |
| Motor Main winding | 0.63 | 0.79 | 64.06 | 95 | Class 130(B) | |
| Motor Auxiliary winding | 1.42 | 1.75 | 58.55 | 95 | Class 130(B) | |
| Supplementary information: — | | | | | | |

| 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): | | 254.4 | — |
| Leakage current between | | I (mA) | Max. allowed I (mA) |
| L/N and accessible unearthed parts | | 0.003 | 0.35peak |
| L/N and accessible metal enclosure | | 0.473 | 3.5 |
| Supplementary information: — | | | |

| 13.3 | TABLE: Electric strength | | P |
|---|---|---|---|
| Test voltage applied between: | | Voltage (V) | Breakdown (Yes/No) |
| Live part and earthed metal enclosure | | 1142 | No |
| Internal wire and unearthed parts | | 1892 | No |
| Live part to accessible plastic enclosure | | 3284 | No |
| Supplementary information: — | | | |

| 14 | TABLE: Transient overvoltages | | | | N/A |
|---|---|---|---|---|---|
| Clearance between: | Cl (mm) | Required Cl (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) .: | | 254.4 | — |
| Three phase appliances 1.06 x rated voltage divided by √3: .....: | | — | — |
| Leakage current between | | I (mA) | Max. allowed I (mA) |
| Live parts and surface of non-metal parts | | 0.006 | 0.25 |
| Live parts and surface of earthed metal parts | | 0.502 | 3.5 |
| Supplementary information: — | | | |

| 16.3 | TABLE: Dielectric strength | | P |
|---|---|---|---|
| Test voltage applied between: | | Voltage (V) | Breakdown (Yes/No) |
| Live part and earthed metal enclosure | | 1392 | No |
| Internal wire and unearthed parts | | 1892 | No |
| Live part to accessible plastic enclosure | | 3284 | No |

| 19 | 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 | N/A | — |

| 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 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 19.3 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 19.4 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 19.5 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 19.6 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 19.7 | Refer to clause 19.7 | No hazard | N/A | N/A | N/A | N/A | P |
| 19.8 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 19.9 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 19.10 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 19.11.2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 19.11.4.8 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 19.10.x | N/A | N/A | N/A | N/A | N/A | N/A | P |

Supplementary information: —

| 19.7 | TABLE: Abnormal operation, locked rotor/moving parts | | | | P |
|---|---|---|---|---|---|
| | Test voltage (V) ..... : | | 240 | | — |
| | Ambient, t1 (°C) .....: | | 20.2 | | — |
| | Ambient, t2 (°C) .....: | | 20.9 | | — |
| Temperature rise of winding | R1 (Ω) | R2 (Ω) | Δ T (K) | T (°C) | Max. T (°C) |
| Motor winding | - | - | - | 115.27 | 225 |

Supplementary information: —

| 19.7 | TABLE: Abnormal operation, locked rotor/moving parts(SC) | | | | P |
|---|---|---|---|---|---|
| | Test voltage (V) ..... : | | 240 | | — |
| | Ambient, t1 (°C) .....: | | 20.2 | | — |
| | Ambient, t2 (°C) .....: | | 20.5 | | — |
| Temperature rise of winding | R1 (Ω) | R2 (Ω) | Δ T (K) | T (°C) | Max. T (°C) |
| Motor winding | - | - | - | 114.57 | 225 |
| Supplementary information: — | | | | | |

| 19.7 | TABLE: Abnormal operation, locked rotor/moving parts(OC) | | | | P |
|---|---|---|---|---|---|
| | Test voltage (V) ..... : | | 240 | | — |
| | Ambient, t1 (°C) .....: | | 20.3 | | — |
| | Ambient, t2 (°C) .....: | | 20.4 | | — |
| Temperature rise of winding | R1 (Ω) | R2 (Ω) | Δ T (K) | T (°C) | Max. T (°C) |
| Motor winding | - | - | - | 111.32 | 225 |
| Supplementary information: — | | | | | |

| 19.13 | TABLE: Abnormal operation, temperature rises | P |
|---|---|---|
| Thermocouple locations | Max. temperature rise measured, Δ T (K) | Max. temperature rise limit, Δ T (K) |
| Supply cord | 12.7 | 150 |
| Metal enclosure | 84.5 | For ref. |
| Motor capacitor | 45.6 | For ref. |
| Internal wire | 61.7 | For ref. |
| Float switch enclosure | 7.6 | For ref. |
| Supplementary information: — | | |

| 21.1 | TABLE: Impact resistance | | P |
|---|---|---|---|
| Impacts per surface | Surface tested | Impact energy (J) | Comments |
| Metal enclosure | 3 | 1.0 | No damage |
| Float switch enclosure | 3 | 1.0 | No damage |
| Supplementary information: — | | | |

| 24.1 | TABLE: Critical components information | | | | P |
|---|---|---|---|---|---|
| Object / part No. | Manufacturer/ trademark | Type / model | Technical data | Standard | Mark(s) of conformity[1)] |
| Supply cord | Ningbo Qiaopu Electric Co., Ltd. | H05VV-F | 3x1.0mm$^2$<br>3x1.5 mm$^2$ | EN 50525-2-11 | VDE*<br>(40035976) |
| (Alternative) | HangZhou YongQiang Cable Co.,Ltd. | H07RN-F | 3x1.0mm$^2$<br>3x1.5 mm$^2$ | EN 50525-2-11 | VDE*<br>(40016862) |
| (Alternative) | Ningbo Qiaopu Electric Co., Ltd. | H05RN-F | 3x1.0mm$^2$<br>3x1.5 mm$^2$ | EN 50525-2-11 | VDE*<br>(40035531) |
| Plug | Ningbo Chengken Electric Appliance Co., Ltd. | ZK02-F | AC250V, 16A, IP44 | VDE 0620-2-1 | VDE*<br>(40048542) |
| (Alternative) | Ningbo JinTing Nuclear Cable Co., Ltd | FY002-F | AC250V, 16A, IP44 | VDE 0620-2-1 | VDE*<br>(40036347) |
| Motor capacitor | Zhejiang Shuangeng Electric Co., Ltd. | CBB60 | 450 V~, 50/60Hz,<br>10 μF,20 μF,25 μF,<br>30 μF,40 μF,<br>45 μF,S0 40/85/21 | EN 60252-1 | TUV*<br>(R50331520) |
| (Alternative) | WenlingXinghuo Capacitors Factory | CBB60 | AC450 V; 50/60Hz,<br>8 μF; 10μF; 12μF;<br>16μF; 40μF;<br>40/085/21;<br>40/070/21; S0 | EN 60252-1 | VDE*<br>(40017696) |
| Motor protector | Jiangsu Yi Tong Control System Co., Ltd. | 17AMG | AC 250V; 140℃ | EN 60730-2-2<br>EN 60730-1 | VDE*<br>(40022710) |
| (Alternative) | Jiangsu Yi Tong Control System Co., Ltd. | 17AMG | AC 250V; 130℃ | EN 60730-2-2<br>EN 60730-1 | VDE*<br>(40022710) |
| (Alternative) | Jiangsu Changsheng Electric Appliance Co. Ltd. | BR-A2D | AC250 V;<br>operating temp.:<br>145℃ | EN 60730-<br>EN 60730-2-2 | VDE*<br>(40015893) |
| Internal wire | Shanghai Shuntong Wire and Cable Co.,Ltd. | 3270 | 600 V, 125℃,<br>16-25 AWG | EN 60335-1<br>EN 60335-2-41 | tested with appliance |
| (Alternative) | Wenling An Tong Electric Co., Ltd. | JBF500 | 600 V, 125℃,<br>16-25 AWG | EN 60335-1<br>EN 60335-2-41 | Tested with appliance |
| (Alternative) | Shanghai Runbang Cable Co., Ltd. | JYJ150 | 600 V, 125℃,<br>16-25 AWG | EN 60335-1<br>EN 60335-2-41 | Tested with appliance |
| Motor | Tianjin Streampumps Industry Co.,Ltd | QDX | 220-240V,50Hz,<br>Class 130 | EN 60335-1<br>EN 60335-2-41 | Tested with appliance |
| Motor winding | Zhejiang Grandwall Electric Science & Technolog Co., Ltd. | xEIW/180<br>QZY-x/180 | Class 180 | EN 60335-1<br>EN 60335-2-41 | UL*<br>(E206121) +<br>tested with appliance |
| Motor bobbin | Zhejiang Wenling No 2 Insulating Materials Factory | 6640 | GWT 850/750℃ | EN 60335-1<br>EN 60335-2-41 | UL*<br>(E313361) +<br>tested with appliance |
| Insulation tube | Ningbo Guanchi Electronics Co., Ltd. | 2760 | 600 V, 200℃,<br>VW-1 | EN 60335-1<br>EN 60335-2-41 | tested with appliance |

| | | | | | |
|---|---|---|---|---|---|
| (Alternative) | Nantong City Demei Electric Glass Fiber Co., Ltd. | 2760 | 600 V, 200℃, VW-1 | EN 60335-1<br>EN 60335-2-41 | UL* (E331136) + tested with appliance |
| Crimp connector | Heavy Power Co.,Ltd. | CE2 | 150℃, 300 V | EN 60335-1<br>EN 60335-2-41 | UL* (E113650) + tested with appliance |
| Level switch enclosure | Zhejiang Meiluo Mechanical and Electrical Co., Ltd. | PFS-5,ABS | Min thickness: 2,1mm | EN 60335-1<br>EN 60335-2-41 | tested with appliance |
| (Alternative) | Zhejiang Florank Machinery Industry Co.,Ltd. | ABS | Min thickness: 2,1 mm | IEC 60335-1 (2016)<br>IEC 60335-2-41 (2012) | Tested with appliance |

| **28.1** | **TABLE: Threaded part torque test** | P |
|---|---|---|

| Threaded part identification | Diameter of thread (mm) | Column number (I, II, or III) | Applied torque ( Nm ) |
|---|---|---|---|
| Screw for earthing | 3.84 | II | 1.2 |

Supplementary information: —

| **29.1** | **TABLE: Clearances** | | P |
|---|---|---|---|
| | Overvoltage category.....: | II | |

| | | Type of insulation: | | | | — |
|---|---|---|---|---|---|---|
| Rated impulse voltage (V): | Min. cl (mm) | Basic (mm) | Functional (mm) | Supplementary (mm) | Reinforced (mm) | Verdict / Remark |
| 330 | 0.5 | --- | --- | --- | --- | N/A |
| 500 | 0.5 | --- | --- | --- | --- | N/A |
| 800 | 0.5 | --- | --- | --- | --- | N/A |
| 1 500 | 1.0 | --- | --- | --- | --- | N/A |
| 2 500 | 2.0 | × | × | --- | --- | P |
| 4 000 | 3.5 | --- | --- | --- | × | P |
| 6 000 | 6.0 | --- | --- | --- | --- | N/A |
| 8 000 | 8.5 | --- | --- | --- | --- | N/A |
| 10 000 | 11.5 | --- | --- | --- | --- | N/A |

| 29.1 | TABLE: Creepage distances, basic, supplementary and reinforced insulation | | | | | | | | | | P |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Working voltage (V) | Creepage distance (mm) Pollution degree | | | | | | | | | | |
| | 1 | 2 | | | 3 | | | Type of insulation | | | Verdict |
| | | Material group | | | Material group | | | | | | |
| | | I | II | IIIa/IIIb | I | II | IIIa/IIIb* | B** | S** | R** | |
| ≤50 | 0,18 | 0,6 | 0,85 | 1,2 | 1,5 | 1,7 | 1,9 | | — | — | N/A |
| ≤50 | 0,18 | 0,6 | 0,85 | 1,2 | 1,5 | 1,7 | 1,9 | — | | — | N/A |
| ≤50 | 0,36 | 1,2 | 1,7 | 2,4 | 3,0 | 3,4 | 3,8 | — | — | | N/A |
| 125 | 0,28 | 0,75 | 1,05 | 1,5 | 1,9 | 2,1 | 2,4 | | — | — | N/A |
| 125 | 0,28 | 0,75 | 1,05 | 1,5 | 1,9 | 2,1 | 2,4 | — | | — | N/A |
| 125 | 0,56 | 1,5 | 2,1 | 3,0 | 3,8 | 4,2 | 4,8 | | — | | N/A |
| **250** | 0,56 | 1,25 | 1,8 | 2,5 | 3,2 | 3,6 | **4,0** | B1 | | — | P |
| **250** | 0,56 | 1,25 | 1,8 | 2,5 | 3,2 | 3,6 | **4,0** | — | S1 | — | P |
| **250** | 1,12 | 2,5 | 3,6 | 5,0 | 6,4 | 7,2 | **8,0** | — | — | R1 | P |
| 400 | 1,0 | 2,0 | 2,8 | 4,0 | 5,0 | 5,6 | 6,3 | | — | — | N/A |
| 400 | 1,0 | 2,0 | 2,8 | 4,0 | 5,0 | 5,6 | 6,3 | — | | — | N/A |
| 400 | 2,0 | 4,0 | 5,6 | 8,0 | 10,0 | 11,2 | 12,6 | — | — | | N/A |
| 500 | 1,3 | 2,5 | 3,6 | 5,0 | 6,3 | 7,1 | 8,0 | | — | — | N/A |
| 500 | 1,3 | 2,5 | 3,6 | 5,0 | 6,3 | 7,1 | 8,0 | — | | — | N/A |
| 500 | 2,6 | 5,0 | 7,2 | 10,0 | 12,6 | 14,2 | 16,0 | — | — | | N/A |
| >630 and ≤800 | 1,8 | 3,2 | 4,5 | 6,3 | 8,0 | 9,0 | 10,0 | | — | — | N/A |
| >630 and ≤800 | 1,8 | 3,2 | 4,5 | 6,3 | 8,0 | 9,0 | 10,0 | — | | — | N/A |
| >630 and ≤800 | 3,6 | 6,4 | 9,0 | 12,6 | 16,0 | 18,0 | 20,0 | — | — | | N/A |
| >800 and ≤1000 | 2,4 | 4,0 | 5,6 | 8,0 | 10,0 | 11,0 | 12,5 | | — | — | N/A |
| >800 and ≤1000 | 2,4 | 4,0 | 5,6 | 8,0 | 10,0 | 11,0 | 12,5 | — | | — | N/A |
| >800 and ≤1000 | 4,8 | 8,0 | 11,2 | 16,0 | 20,0 | 22,0 | 25,0 | — | — | | N/A |
| >1000 and ≤1250 | 3,2 | 5,0 | 7,1 | 10,0 | 12,5 | 14,0 | 16,0 | | — | — | N/A |
| >1000 and ≤1250 | 3,2 | 5,0 | 7,1 | 10,0 | 12,5 | 14,0 | 16,0 | — | | — | N/A |
| >1000 and ≤1250 | 6,4 | 10,0 | 14,2 | 20,0 | 25,0 | 28,0 | 32,0 | — | — | | N/A |
| >1250 and ≤1600 | 4,2 | 6,3 | 9,0 | 12,5 | 16,0 | 18,0 | 20,0 | | — | — | N/A |
| >1250 and ≤1600 | 4,2 | 6,3 | 9,0 | 12,5 | 16,0 | 18,0 | 20,0 | — | | — | N/A |
| >1250 and ≤1600 | 8,4 | 12,6 | 18,0 | 25,0 | 32,0 | 36,0 | 40,0 | — | — | | N/A |
| >1600 and ≤2000 | 5,6 | 8,0 | 11,0 | 16,0 | 20,0 | 22,0 | 25,0 | | — | — | N/A |
| >1600 and ≤2000 | 5,6 | 8,0 | 11,0 | 16,0 | 20,0 | 22,0 | 25,0 | — | | — | N/A |
| >1600 and ≤2000 | 11,2 | 16,0 | 22,0 | 32,0 | 40,0 | 44,0 | 50,0 | — | — | | N/A |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| >2000 and ≤2500 | 7,5 | 10,0 | 14,0 | 20,0 | 25,0 | 28,0 | 32,0 | | — | — | N/A |
| >2000 and ≤2500 | 7,5 | 10,0 | 14,0 | 20,0 | 25,0 | 28,0 | 32,0 | — | | — | N/A |
| >2000 and ≤2500 | 15,0 | 20,0 | 28,0 | 40,0 | 50,0 | 56,0 | 64,0 | — | — | | N/A |
| >2500 and ≤3200 | 10,0 | 12,5 | 18,0 | 25,0 | 32,0 | 36,0 | 40,0 | | — | — | N/A |
| >2500 and ≤3200 | 10,0 | 12,5 | 18,0 | 25,0 | 32,0 | 36,0 | 40,0 | — | | — | N/A |
| >2500 and ≤3200 | 20,0 | 25,0 | 36,0 | 50,0 | 64,0 | 72,0 | 80,0 | — | — | | N/A |
| >3200 and ≤4000 | 12,5 | 16,0 | 22,0 | 32,0 | 40,0 | 45,0 | 50,0 | | — | — | N/A |
| >3200 and ≤4000 | 12,5 | 16,0 | 22,0 | 32,0 | 40,0 | 45,0 | 50,0 | — | | — | N/A |
| >3200 and ≤4000 | 25,0 | 32,0 | 44,0 | 64,0 | 80,0 | 90,0 | 100,0 | — | — | | N/A |
| >4000 and ≤5000 | 16,0 | 20,0 | 28,0 | 40,0 | 50,0 | 56,0 | 63,0 | | — | — | N/A |
| >4000 and ≤5000 | 16,0 | 20,0 | 28,0 | 40,0 | 50,0 | 56,0 | 63,0 | — | | — | N/A |
| >4000 and ≤5000 | 32,0 | 40,0 | 56,0 | 80,0 | 100,0 | 112,0 | 126,0 | — | — | | N/A |
| >5000 and ≤6300 | 20,0 | 25,0 | 36,0 | 50,0 | 63,0 | 71,0 | 80,0 | | — | — | N/A |
| >5000 and ≤6300 | 20,0 | 25,0 | 36,0 | 50,0 | 63,0 | 71,0 | 80,0 | — | | — | N/A |
| >5000 and ≤6300 | 40,0 | 50,0 | 72,0 | 100,0 | 126,0 | 142,0 | 160,0 | — | — | | N/A |
| >6300 and ≤8000 | 25,0 | 32,0 | 45,0 | 63,0 | 80,0 | 90,0 | 100,0 | | — | — | N/A |
| >6300 and ≤8000 | 25,0 | 32,0 | 45,0 | 63,0 | 80,0 | 90,0 | 100,0 | — | | — | N/A |
| >6300 and ≤8000 | 50,0 | 64,0 | 90,0 | 126,0 | 160,0 | 180,0 | 200,0 | — | — | | N/A |
| >8000 and ≤10000 | 32,0 | 40,0 | 56,0 | 80,0 | 100,0 | 110,0 | 125,0 | | — | — | N/A |
| >8000 and ≤10000 | 32,0 | 40,0 | 56,0 | 80,0 | 100,0 | 110,0 | 125,0 | — | | — | N/A |
| >8000 and ≤10000 | 64,0 | 80,0 | 112,0 | 160,0 | 200,0 | 220,0 | 250,0 | — | — | | N/A |
| >10000 and ≤12500 | 40,0 | 50,0 | 71,0 | 100,0 | 125,0 | 140,0 | 160,0 | | — | — | N/A |
| >10000 and ≤12500 | 40,0 | 50,0 | 71,0 | 100,0 | 125,0 | 140,0 | 160,0 | — | | — | N/A |
| >10000 and ≤12500 | 80,0 | 100,0 | 142,0 | 200,0 | 250,0 | 280,0 | 320,0 | — | — | | N/A |

Supplementary information:

*) Material group IIIb is allowed if the working voltage does not exceed 50 V

**) B = Basic insulation, S = Supplementary insulation, R = Reinforced insulation

B1: Between motor winding and earthed metal: Cl.= 6,6 mm

S1: Between internal wire and electric enclosure: Cl.> 5.2 mm

R1: Between live part and enclosure: Cl.>10.4 mm

| 29.2 | TABLE: Creepage distances, functional insulation | | | | | | | P |
|---|---|---|---|---|---|---|---|---|
| Working voltage (V) | Creepage distance (mm) Pollution degree | | | | | | | Verdict / Remark |
| | 1 | 2 | | | 3 | | | |
| | | Material group | | | Material group | | | |
| | | I | II | IIIa/IIIb | I | II | IIIa/IIIb* | |
| ≤10 | 0,08 | 0,4 | 0,4 | 0,4 | 1,0 | 1,0 | 1,0 | N/A |
| 50 | 0,16 | 0,56 | 0,8 | 1,1 | 1,4 | 1,6 | 1,8 | N/A |
| 125 | 0,25 | 0,71 | 1,0 | 1,4 | 1,8 | 2,0 | 2,2 | N/A |
| **250** | 0,42 | 1,0 | 1,4 | **2,0** | 2,5 | 2,8 | 3,2 | P |
| 400 | 0,75 | 1,6 | 2,2 | 3,2 | 4,0 | 4,5 | 5,0 | N/A |
| 500 | 1,0 | 2,0 | 2,8 | 4,0 | 5,0 | 5,6 | 6,3 | N/A |
| >630 and ≤800 | 1,8 | 3,2 | 4,5 | 6,3 | 8,0 | 9,0 | 10,0 | N/A |
| >800 and ≤1000 | 2,4 | 4,0 | 5,6 | 8,0 | 10,0 | 11,0 | 12,5 | N/A |
| >1000 and ≤1250 | 3,2 | 5,0 | 7,1 | 10,0 | 12,5 | 14,0 | 16,0 | N/A |
| >1250 and ≤1600 | 4,2 | 6,3 | 9,0 | 12,5 | 16,0 | 18,0 | 20,0 | N/A |
| >1600 and ≤2000 | 5,6 | 8,0 | 11,0 | 16,0 | 20,0 | 22,0 | 25,0 | N/A |
| >2000 and ≤2500 | 7,5 | 10,0 | 14,0 | 20,0 | 25,0 | 28,0 | 32,0 | N/A |
| >2500 and ≤3200 | 10,0 | 12,5 | 18,0 | 25,0 | 32,0 | 36,0 | 40,0 | N/A |
| >3200 and ≤4000 | 12,5 | 16,0 | 22,0 | 32,0 | 40,0 | 45,0 | 50,0 | N/A |
| >4000 and ≤5000 | 16,0 | 20,0 | 28,0 | 40,0 | 50,0 | 56,0 | 63,0 | N/A |
| >5000 and ≤6300 | 20,0 | 25,0 | 36,0 | 50,0 | 63,0 | 71,0 | 80,0 | N/A |
| >6300 and ≤8000 | 25,0 | 32,0 | 45,0 | 63,0 | 80,0 | 90,0 | 100,0 | N/A |
| >8000 and ≤10000 | 32,0 | 40,0 | 56,0 | 80,0 | 100,0 | 110,0 | 125,0 | N/A |
| >10000 and ≤12500 | 40,0 | 50,0 | 71,0 | 100,0 | 125,0 | 140,0 | 160,0 | N/A |

Supplementary information:

*) Material group IIIb is allowed if the working voltage does not exceed 50 V

F1: Between L/N terminals on motor winding: Cr.=4,0 mm

| 30.1 | TABLE: Ball Pressure Test of Thermoplastics | | P |
|---|---|---|---|
| Allowed impression diameter (mm) ..... : | | 2.0 | — |
| Object/ Part No./ Material | Manufacturer/ trademark | Test temperature (°C) | Impression diameter (mm) |
| Float swtich enclosure | See table 24.1 | 75 | 0.88 |
| Connection terminal | — | 125 | 1.02 |
| Motor bobbin | See table 24.1 | 125 | 1.32 |
| Supplementary information: | | | |

| 30.2 | TABLE: Resistance to heat and fire - Glow wire tests | | | | | | | P |
|---|---|---|---|---|---|---|---|---|
| Object/ Part No./ Material | Manufacturer/ trademark | Glow wire test (GWT); (℃) | | | | | | Verdict |
| | | 550 | 650 | | 750 | | 850 | |
| | | | te | ti | te | ti | | |
| Float swtich enclosure | See table 24.1 | X | — | — | — | — | — | P |
| Connection terminal | — | — | — | — | 0 | 0 | X | P |
| Motor bobbin | See table 24.1 | — | — | — | 0 | 0 | X | P |
| Object/ Part No./ Material | Manufacturer/ trademark | Glow-wire flammability index (GWFI), ℃ | | | | GW ignition temp. (GWIT), ℃ | | Verdict |
| | | 550 | 650 | 750 | 850 | 675 | 775 | |
| — | — | — | — | — | — | — | — | — |
| The test specimen passed the glow wire test (GWT) with no ignition [(te – ti) ≤ 2s] (Yes/No): | | | | | | | | No |
| If no, then surrounding parts passed the needle-flame test of annex E (Yes/No).....: | | | | | | | | Yes |
| The test specimen passed the test by virtue of most of the flaming material being withdrawn with the glow-wire (Yes/No)?..... : | | | | | | | | Yes |
| Ignition of the specified layer placed underneath the test specimen (Yes/No)..... : | | | | | | | | No |
| Supplementary information:<br>- 550 ℃ GWT not relevant (or applicable) to parts of material classified at least HB40 or if relevant HBF<br>- The GWIT pre-selection option, the 850 ℃ GWFI pre-selection option, and the 850 ℃ GWT are not relevant (or applicable) for attended appliances | | | | | | | | |

| 30.2/30.2.4 | TABLE: Needle- flame test (NFT) | | | | N/A |
|---|---|---|---|---|---|
| Object/ Part No./ Material | Manufacturer/ trademark | Duration of application of test flame (ta); (s) | Ignition of specified layer Yes/No | Duration of burning (tb) (s) | 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

# 1 – EN62233(EMF)

## 1.1 Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number |
|---|---|---|---|
| NARDA | Magnetic field probe 100vcm2 | BN 2300/90.10 | D-0008 |
| NARDA | Exposure level tester | BN 2304/03 | D-0007 |

## 1.2 Compliance Criteria

Appliances are deemed to comply with the basic restriction if the reference levels are not exceeded.

If a value exceeds the reference level, the coupling factor can be taken into account to show compliance with the basic restriction. The coupling factor has been determined to cover the worst case for the same type of appliances.

If the value still exceeds the reference level, this does not necessarily mean that the basic restriction is exceeded. Calculation methods can be used to verify whether the basic restriction is fulfilled.

## 1.3 Test Setup

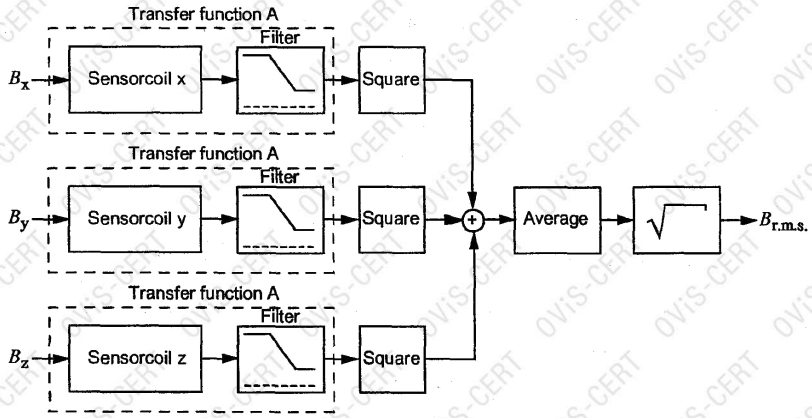
Test procedure: IEC 62233;
Frequency range : 10Hz to 400 kHz;
Limits: EN 62233;
Sensor Location: Around the EUT

## 1.4 Test Methods

Frequency range of the used field-probe is 10 Hz – 400 kHz, area of probe is 100 $cm^2$.

Directly on the enclosure of the EUT (distance = 30 cm) the maximum magnetic field strength was searched. At these points the measurements are done in the distance given by the standard. Observation time is in minimum 3 s on each point.

The schematic diagram of the reference method is as follows:




The weighted result is obtained from the following formula:

$$W = \frac{a_c(r_1)B_{r.m.s.}}{B_{RL}}$$

### 1.5 Test Conditions

Ambient Temperature : 25 ℃/ 35 ℃ (**Before Test /After Test**);

Relative Humidity: 67 %/ 67 % (**Before Test /After Test**);

Background noise level (% limit) : 0.211% (**Shielding Room**)

Measure distance : 30cm

Couple factor: N/A **(N/A=not applicable)**

Power Supply: 254.4V, 50Hz

Operating conditions: Continuously, lowest temperature setting

### 1.6 Test Data and Records

| Sensor Location | $B_{r.m.s}$ / $B_{RL}$ |
|---|---|
| Front | 1.835% |
| Rear | 1.861% |
| Left | 1.877% |
| Right | 1.842% |

*Note:*

*The limits are the reference levels taken from the EU-COUNCIL RECOMMENDATION in accordance with the requirements of the standard EN 62233.*

*$B_{r.m.s}$ is the r.m.s. value of the magnetic flux density;*

*$B_{RL}$ is the reference level of the magnetic flux density at 50 Hz.*

### 1.7 Verdict

The EUT met the requirement

Appendix I
Photo documentation
Water Pumps(Submersible Pump)
SVQ2200(F)

**Detail of:** SVQ2200(F)

View:

[ ] general

[ ] front

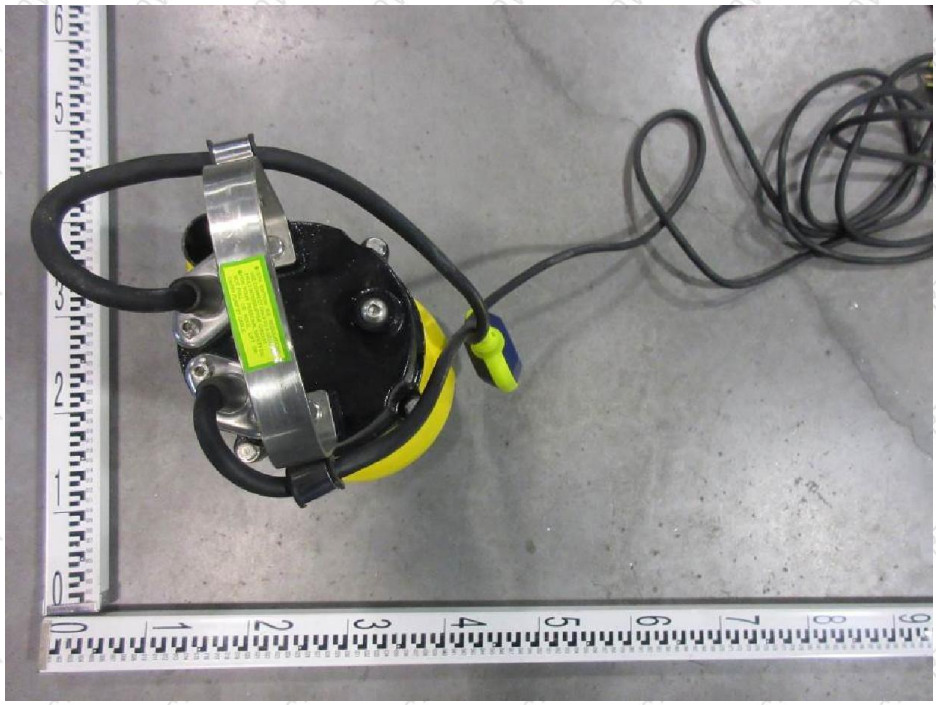
[ ] rear

[ ] right

[ ] left

**[ X ] top**

[ ] bottom



**Detail of:** SVQ2200(F)

View:

**[ X ] general**

[ ] front

[ ] rear

[ ] right

[ ] left

[ ] top

[ ] bottom

Appendix I
Photo documentation
Water Pumps(Submersible Pump)
SVQ2200(F)

**Detail of:** SVQ2200(F)

View:

**[ X ] general**

[ ] front

[ ] rear

[ ] right

[ ] left

[ ] top

[ ] bottom

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# REMARKS

1. This report is invalid without the seal of special stamp for OViS test report and invalid if altered.

2. The copy of this report is invalid without a new seal of special stamp for OViS test report and invalid if altered.

3. This report is invalid without seals or signatures of Tester,Checker and Approval.

4. If there is no special announcement in this report,the informat ion of producer and samples is not identified by OViS,the customer is responsible for truth of the samples.

5. Objections to the test report must be submitted to OViS within 15 days.

6. The test results shown in this report is only applicable for the samples supplied directly by the customer and accepted by the test organization,the customer shall not propagandize improperly without permission by OViS.

7. “P” means “pass” , “F” means “fail”, “N/A” or “—” means “not applicable” and “ / ”means “not test”.

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