

# CERTIFICATE

Issued to:  
Applicant:  
**WAGO Kontakttechnik GmbH & Co. KG**  
**Hansastraße 27**  
**32423 Minden/westfalen, Germany**

Licensee:  
**WAGO Kontakttechnik GmbH & Co. KG**  
**Hansastraße 27**  
**32423 Minden/westfalen, Germany**

Product : Splicing wire connector  
Trade name(s) : WAGO  
Type(s)/model(s) : Series 221

The product and any acceptable variation thereto is specified in the Annex to this certificate and the documents therein referred to.

DEKRA hereby declares that the above-mentioned product has been certified on the basis of:

- a type test according to the standard EN 60998-1:2004 and EN 60998-2-2:2004
- an inspection of the production location according to CENELEC Operational Document CIG 021
- a certification agreement with the number 2074495

DEKRA hereby grants the right to use the ENEC certification mark.

The ENEC certification mark may be applied to the product as specified in this certificate for the duration of the ENEC certification agreement and under the conditions of the ENEC certification agreement.

This certificate is issued on 27 September 2018 and expires upon withdrawal of one of the above mentioned standards.

Certificate number: 71-105677

DEKRA Certification B.V.



drs. G.J. Zoetbrood  
Managing Director



Susan Lehner  
Certification Manager

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DUTCH ACCREDITATION  
COUNCIL



**SPECIFICATION OF THE CERTIFIED PRODUCT****Product data**

|                           |                                                                                                              |
|---------------------------|--------------------------------------------------------------------------------------------------------------|
| Product                   | : Splicing wire connector                                                                                    |
| Trade name(s)             | : WAGO                                                                                                       |
| Type(s)/model(s)          | : 221-612, 221-613, 221-615, 221-672, 221-673, 221-675,<br>221-682, 221-683 and 221-685                      |
| Material                  | : thermoplastic material                                                                                     |
| Rated connecting capacity | : 6 mm <sup>2</sup>                                                                                          |
| Connectable conductors    | : 0,5 mm <sup>2</sup> - 6 mm <sup>2</sup> rigid and flexible                                                 |
| Rated current             | : 41 A                                                                                                       |
| Rated voltage             | : 450 V                                                                                                      |
| T-rating                  | : 85 °C                                                                                                      |
| Description               | : screwless type clamping units, 1-pole, last number of the suffix<br>indicates the number of clamping units |

**Product data – type 221-612**

|                          |          |
|--------------------------|----------|
| Number of clamping units | : 2      |
| Lever colour             | : orange |

**Product data – type 221-613**

|                          |          |
|--------------------------|----------|
| Number of clamping units | : 3      |
| Lever colour             | : orange |

**Product data – type 221-615**

|                          |          |
|--------------------------|----------|
| Number of clamping units | : 5      |
| Lever colour             | : orange |

**Product data – type 221-672**

|                          |          |
|--------------------------|----------|
| Number of clamping units | : 2      |
| Lever colour             | : orange |

**Product data – type 221-673**

|                          |          |
|--------------------------|----------|
| Number of clamping units | : 3      |
| Lever colour             | : orange |

**Product data – type 221-675**

|                          |          |
|--------------------------|----------|
| Number of clamping units | : 5      |
| Lever colour             | : orange |

**Product data – type 221-682**

|                          |        |
|--------------------------|--------|
| Number of clamping units | : 2    |
| Lever colour             | : gray |

**Product data – type 221-683**

|                          |        |
|--------------------------|--------|
| Number of clamping units | : 3    |
| Lever colour             | : gray |

**Product data – type 221-685**

Number of clamping units : 5  
Lever colour : gray

**TESTS****Test requirements**

EN 60998-1:2004  
EN 60998-2-2:2004

**Test result**

The test results are laid down in DEKRA test file 223064400 and 222057300.

**Additional information**

ENEC scope: For components intended to be used only in appliances.

This certificate replaces certificate No. 71-101850 which we herewith declare invalid.

**Conclusion**

The examination proved that all requirements were met.

**Factory locations**

Wago Elwag  
Innowacyjna 2  
55-330 Wroblowice, Poland

Wago Elwag sp.z.o.o.  
ul. Piekna 58 a  
50-506 Wroclaw, Poland

Wago Pvt. Ltd.  
C-27, Sector-58, Phase III  
201301 Noida Uttar Pradesh, India

Wago Electronic (Tianjin) Co. Ltd.  
No. 5 Quanhui Road  
Wu Qing Development Area  
301700 Tianjin, China

WAGO Kontakttechnik GmbH & Co. KG  
Hansastraße 27  
32423 Minden/westfalen, Germany

WAGO Kontakttechnik GmbH & Co. KG Werk Sondershausen  
Waldstrasse 1  
99706 Sondershausen, Germany

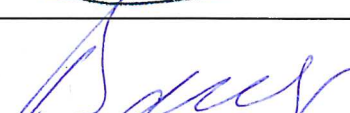
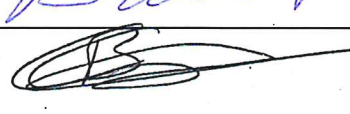
WAGO Contact S.A.  
Route de l'Industrie 19  
CP 168  
1564 Domdidier, Switzerland



Test Report issued under the responsibility of:



| <b>TEST REPORT</b><br><b>IEC 60998-2-2:2004</b><br><b>Connecting devices for low voltage circuits for household and similar purposes</b><br><b>Part 2-2: Particular requirements for connecting devices as separate entities with</b><br><b>screwless-type clamping units</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| Report Reference No.....:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2230644.50                                      |
| Date of issue.....:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2018-09-24                                      |
| Total number of page.....:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 28                                              |
| Applicant's name.....:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | WAGO Kontakttechnik GmbH & Co. KG               |
| Address.....:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Hansastraße 27, 32423 Minden/Westfalen, Germany |
| <b>Test specification:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                 |
| Standard.....:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | IEC 60998-2-2 (see also IEC 60 998-1:2002)      |
| Test procedure.....:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | CB Scheme                                       |
| Non-standard test method.....:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | N/A                                             |
| Test Report Form No. ....:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | IEC60998_2_2B                                   |
| Test Report Form(s) Originator.....:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | DEKRA certification B.V.                        |
| Master TRF.....:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Dated 2012-02                                   |
| <b>Copyright © 2011 Worldwide System for Conformity Testing and Certification of Electrotechnical Equipment and Components (IECEE), Geneva, Switzerland. All rights reserved.</b><br>This publication may be reproduced in whole or in part for non-commercial purposes as long as the IECEE is acknowledged as copyright owner and source of the material. IECEE takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.<br>If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.<br><b>This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.</b> |                                                 |
| Test item description.....:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | splicing wire connector                         |
| Trade Mark .....                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | WAGO                                            |
| Manufacturer.....:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | WAGO Kontakttechnik GmbH & Co. KG               |
| Model/Type reference .....                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 221                                             |
| Ratings .....                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 6 mm², 41 A, 450 V                              |

|                                                                                                   |                                   |                                                                                                          |
|---------------------------------------------------------------------------------------------------|-----------------------------------|----------------------------------------------------------------------------------------------------------|
| <b>Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):</b> |                                   |                                                                                                          |
| <input checked="" type="checkbox"/>                                                               | DEKRA Certification B.V.          | DEKRA Certification B.V.                                                                                 |
| Testing location/ address.....:                                                                   |                                   | Meander 1051, 6825 MJ Arnhem, The Netherlands                                                            |
| <input type="checkbox"/>                                                                          | Associated CB Testing Laboratory: |                                                                                                          |
| Testing location/ address.....:                                                                   |                                   |                                                                                                          |
| Tested by (name, function, signature).....:                                                       |                                   |                                                                                                          |
| Approved by (name, function, signature)....:                                                      |                                   |                                                                                                          |
| <input type="checkbox"/>                                                                          | Testing procedure: CTF Stage 1:   |                                                                                                          |
| Testing location/ address.....:                                                                   |                                   |                                                                                                          |
| Tested by (name, function, signature).....:                                                       |                                   |                                                                                                          |
| Approved by (name, function, signature)....:                                                      |                                   |                                                                                                          |
| <input type="checkbox"/>                                                                          | Testing procedure: CTF Stage 2:   |                                                                                                          |
| Testing location/ address.....:                                                                   |                                   |                                                                                                          |
| Tested by (name + signature) .....                                                                |                                   |                                                                                                          |
| Witnessed by (name, function, signature)..:                                                       |                                   |                                                                                                          |
| Approved by (name, function, signature)....:                                                      |                                   |                                                                                                          |
| <input checked="" type="checkbox"/>                                                               | Testing procedure: CTF Stage 3:   | WAGO Kontakttechnik GmbH & Co. KG                                                                        |
| <input type="checkbox"/>                                                                          | Testing procedure: CTF Stage 4:   |                                                                                                          |
| Testing location/ address.....:                                                                   |                                   | Hansastraße 27, 32423 Minden/Westfalen, Germany                                                          |
| Tested by (name, function, signature).....:                                                       |                                   | J. Olbrich<br>      |
| Witnessed by (name, function, signature)..:                                                       |                                   | H.L. Schendstok<br> |
| Approved by (name, function, signature)....:                                                      |                                   | A. Bauer<br>        |
| Supervised by (name, function, signature) :                                                       |                                   | C.C. Burger<br>     |

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

Attachment A: EN 60998-1 CENELEC COMMON MODIFICATIONS and

EN 60998-2-2 CENELEC COMMON MODIFICATIONS (2 pages)

Attachment B: EN 60998-1 SPECIAL NATIONAL CONDITIONS, United Kingdom (1 page)

**Summary of testing:****Tests performed (name of test and test clause):****First Edition, 2220573.50:**

Complete type-testing

221-615

221-675

**Second Edition, 2230644.50:**

This report replaces report 2220573.50 issued on 2017-10-31

Due to the fact that types 221-682, 221-683 and 221-685 are added.

The following tests are carried out: clause 12.1, 12.2, 13.3, 13.4, 14.101, 14.2, 16.2, 16.3, 18, 19

**Testing location:**

**WAGO Kontakttechnik GmbH & Co. KG**  
**Hansastraße 27, 32423 Minden/Westfalen,**  
**Germany**

**Summary of compliance with National Differences****List of countries addressed:**

European Group Differences

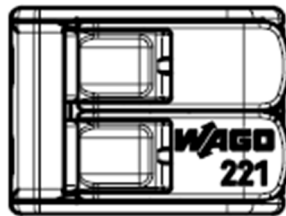
Special National Conditions United Kingdom

☒ **The product fulfils the requirements of EN 60998-2-2: 2004 in conjunction with EN 60998-1:2004.**

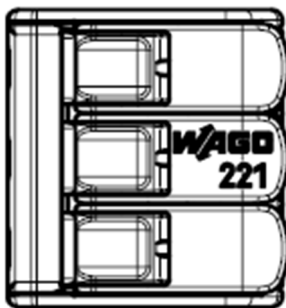
### Copy of marking plate

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

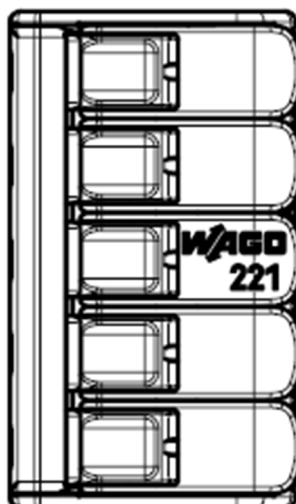
### Example:



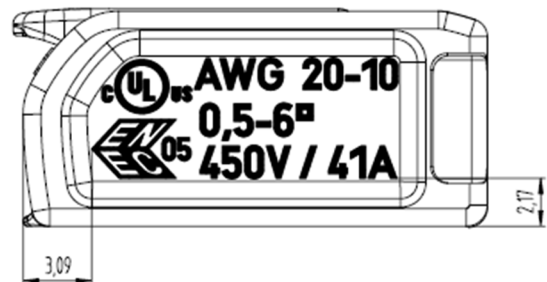
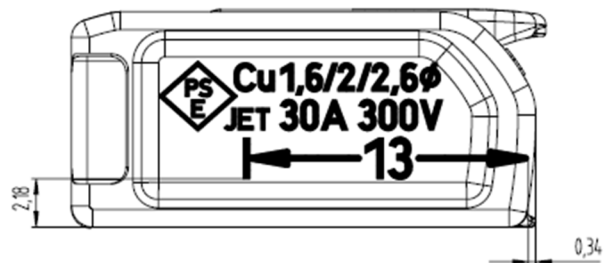
221-612  
221-672



221-613  
221-673



221-615  
221-675





**Manufacturer's Declaration per sub-clause 6.2.5 of IEC 60947-2:**

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... : ☒ Yes ☐ Not applicable

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies)..... :

**General product information:****Factory locations:**

Wago Elwag  
Innowacyjna 2  
55-330 Wroblowice  
Poland

Wago Elwag sp.z.o.o.  
ul. Piekna 58 a, 50-506, Wroclaw  
Poland

Wago Pvt. Ltd.  
C-27, Sector-58, Phase III  
201301 Noida Uttar Pradesh  
India

Wago Electronic (Tianjin) Co. Ltd.  
No. 5 Quanhui Road  
Wu Qing Development Area  
301700 Tianjin  
China

Wago-Kontakttechnik GmbH & Co. KG  
Hansastraße 27, 32423, Minden/Westfalen  
Germany

WAGO Kontakttechnik GmbH & Co. KG, Werk  
Sondershausen  
Waldstraße 1, 99706, Sondershausen  
Germany

WAGO Contact S.A.  
Route de l'Industrie 19, CP 168, 1564, Domdidier  
Switzerland

| IEC 60998-2-2 |                                                                                                                                |                                              |          |
|---------------|--------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|----------|
| Clause        | Requirement + Test                                                                                                             | Result - Remark                              | Verdict  |
| <b>8</b>      | <b>MARKING</b>                                                                                                                 |                                              |          |
| 8.1           | On main part:                                                                                                                  |                                              |          |
|               | a) rated connecting capacity (mm <sup>2</sup> ) .....                                                                          | <b>0,5 mm<sup>2</sup> - 6 mm<sup>2</sup></b> | <b>P</b> |
|               | b) rated insulation voltage (V).....                                                                                           | <b>450 V</b>                                 | <b>P</b> |
|               | c) T marking (°C) (if > 40 °C or < -5 °C) .....                                                                                | <b>85 °C</b>                                 | <b>P</b> |
|               | d) type reference .....                                                                                                        | <b>221-615 example</b>                       | <b>P</b> |
|               | e) manufacturer's or responsible vendor's name, trademark or identification mark .....                                         | <b>WAGO</b>                                  | <b>P</b> |
|               | f) IP if > IP20 .....                                                                                                          |                                              | <b>N</b> |
|               | Small devices: only d) and e) indicated on device                                                                              |                                              | <b>N</b> |
|               | All marks visible on smallest package unit                                                                                     |                                              | <b>P</b> |
| 8.101         | Type of acceptable conductor "s" "r" or "f"                                                                                    |                                              | <b>P</b> |
| 8.102         | Marking indicating the length of insulation to be removed before insertion of the conductor                                    |                                              | <b>P</b> |
| 8.2           | Multiway terminal devices: at least two adjacent                                                                               |                                              | <b>N</b> |
| 8.3           | When symbols are used they shall be as follow:<br>V for volts<br>mm <sup>2</sup> or □ for square millimetres<br>T for T-rating |                                              | <b>P</b> |
| 8.4           | Marking: durable and easily legible; 15 s water; 15 s hexane                                                                   |                                              | <b>P</b> |
| <b>9</b>      | <b>PROTECTION AGAINST ELECTRIC SHOCK</b>                                                                                       |                                              |          |
|               | Live parts not accessible                                                                                                      |                                              | <b>P</b> |

| IEC 60998-2-2 |                                                                                                                                           |                                              |          |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|----------|
| Clause        | Requirement + Test                                                                                                                        | Result - Remark                              | Verdict  |
| <b>10</b>     | <b>CONNECTION OF CONDUCTORS</b>                                                                                                           |                                              |          |
| 10.1          | Connecting devices allow correct connection of conductors                                                                                 |                                              | <b>P</b> |
| 10.101        | Connection or disconnection: use a general tool or simple insertion                                                                       | lever operated                               | <b>P</b> |
|               | Disconnection operation other than a pull                                                                                                 | lever operated                               | <b>P</b> |
| 10.102        | Terminals accept two or more conductors of same or different nominal cross-sectional areas; see table 101 (as specified by manufacturer): |                                              | <b>P</b> |
|               | Universal terminals shall accept rigid(solid or stranded) and flexible unprepared conductors                                              |                                              | <b>P</b> |
|               | Non-universal terminals shall accept the types of conductors declared by the manufacturer                                                 |                                              | <b>P</b> |
|               | Rated connecting capacity (mm <sup>2</sup> ) .....                                                                                        | <b>0,5 mm<sup>2</sup> - 6 mm<sup>2</sup></b> | <b>P</b> |
|               | Suitable for connecting cross-sectional areas (mm <sup>2</sup> ) .....                                                                    | <b>0,5 mm<sup>2</sup> - 6 mm<sup>2</sup></b> | <b>P</b> |
| 10.103        | Terminals accept rigid and flexible conductors (table 101), unless otherwise specified (see 8.1)                                          |                                              | <b>P</b> |
|               | Smallest diameter (mm); largest diameter (mm)....                                                                                         | <b>0,9 mm; 3,0 mm</b>                        | <b>P</b> |
|               | During the test: terminals show no damage                                                                                                 |                                              | <b>P</b> |
| 10.104        | Terminals clamp the conductor without undue damage:                                                                                       |                                              |          |
| 10.104.1      | Connection/disconnection 5 times: smallest diameter (mm) .....                                                                            | <b>0,5 mm<sup>2</sup></b>                    | <b>P</b> |
|               | Connection/disconnection 5 times: largest diameter (mm) .....                                                                             | <b>6 mm<sup>2</sup></b>                      | <b>P</b> |
|               | After the test, terminal not damaged                                                                                                      |                                              | <b>P</b> |
| 10.104.2      | Rated cross-sectional area (mm <sup>2</sup> ) .....                                                                                       | <b>6 mm<sup>2</sup></b>                      | <b>P</b> |
|               | Type .....                                                                                                                                | <b>rigid / flexible</b>                      | <b>P</b> |
|               | After the test, no wire of conductor escaped outside the terminal                                                                         |                                              | <b>P</b> |
| 10.105        | Secureness test:                                                                                                                          |                                              |          |
|               | during the test: the conductor does not slip out, no break near clamping unit and no damage                                               | See appended table 10.105                    | <b>P</b> |
| 10.106        | Pull test:                                                                                                                                |                                              |          |
|               | - during the test the conductor does not come out                                                                                         | See appended table 10.106                    | <b>P</b> |

| IEC 60998-2-2 |                                                                                                                                |                                              |          |
|---------------|--------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|----------|
| Clause        | Requirement + Test                                                                                                             | Result - Remark                              | Verdict  |
| <b>11</b>     | <b>CONSTRUCTION</b>                                                                                                            |                                              |          |
| 11.101        | Contact pressure not transmitted via insulating material, unless there is sufficient resiliency                                |                                              | <b>P</b> |
| 11.102        | Insertion and disconnection, in accordance with manufacturer's instructions                                                    |                                              | <b>P</b> |
|               | Openings clearly distinguishable                                                                                               |                                              | <b>P</b> |
| 11.103        | Terminals so constructed that:                                                                                                 |                                              |          |
|               | - each conductor is clamped individually                                                                                       |                                              | <b>P</b> |
|               | - conductors can be connected or disconnected at same time or separately                                                       | <b>separately</b>                            | <b>P</b> |
|               | Possible to clamp maximum number of conductors                                                                                 | <b>1</b>                                     | <b>P</b> |
| 11.104        | Inadequate insertion of conductor avoided                                                                                      |                                              | <b>P</b> |
| 11.2          | Clamping units clamp conductors reliably and between metal surfaces                                                            |                                              | <b>P</b> |
| 11.3          | Connecting devices: insulation of conductors not in contact with live parts of different polarity                              |                                              | <b>P</b> |
| 11.4          | Insulating lining: adequate mechanical strength and secured in a reliable manner                                               |                                              | <b>P</b> |
| 11.5          | Current-carrying parts: adequate mechanical strength, electrical conductivity and resistance to corrosion; type of metal.....: | <b>tin plated copper</b>                     | <b>P</b> |
|               | Current-carrying parts not made with electroplated coating if subjected to mechanical wear                                     |                                              | <b>N</b> |
| 11.6          | Terminals: possible to connect number of conductors as specified by the manufacturer:                                          |                                              |          |
|               | - number of conductors.....:                                                                                                   | <b>1</b>                                     | <b>P</b> |
|               | - rigid, cross-sectional area (mm <sup>2</sup> ) .....                                                                         | <b>0,5 mm<sup>2</sup> - 6 mm<sup>2</sup></b> | <b>P</b> |
|               | - flexible, cross-sectional area (mm <sup>2</sup> ) .....                                                                      | <b>0,5 mm<sup>2</sup> - 6 mm<sup>2</sup></b> | <b>P</b> |
| 11.7          | Fixing means of bases do not serve any other purpose                                                                           |                                              | <b>P</b> |

| IEC 60998-2-2 |                    |                 |         |
|---------------|--------------------|-----------------|---------|
| Clause        | Requirement + Test | Result - Remark | Verdict |

|           |                                                                                                                                                  |                                                                                               |          |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|----------|
| <b>12</b> | <b>RESISTANCE TO AGEING, TO HUMIDITY CONDITIONS, TO INGRESS OF SOLID OBJECTS AND TO HARMFUL INGRESS OF WATER</b><br><b>Type 221-615, 221-685</b> |                                                                                               |          |
| 12.1      | Connecting devices resistant to ageing; after the test (168 h): no cracks visible, not sticky or greasy, no damage; test temperature (°C).....:  | <input type="checkbox"/> 85 °C <input checked="" type="checkbox"/><br><b>T + 30 °C=115 °C</b> | <b>P</b> |
| 12.2      | After humidity test (91-95%): no damage; test duration (168 h for connecting devices > IPx2, 48 h for all other).....:                           | <b>48 h</b>                                                                                   | <b>P</b> |
| 12.3      | IP test (IEC 60529).....:                                                                                                                        | IP__                                                                                          | <b>N</b> |
|           | After the test, electric strength test as 13.4, and by inspection                                                                                | IP__                                                                                          | <b>N</b> |
|           | no appreciable entry of water                                                                                                                    |                                                                                               | <b>N</b> |

|           |                                                                                                                         |                         |          |
|-----------|-------------------------------------------------------------------------------------------------------------------------|-------------------------|----------|
| <b>13</b> | <b>INSULATION RESISTANCE AND ELECTRIC STRENGTH</b><br><b>Type 221-615, 221-675, 221-685</b>                             |                         |          |
| 13.1      | Insulated connecting devices provided with adequate insulation resistance and electric strength                         |                         | <b>P</b> |
| 13.2      | Insulation between the connected conductors and the external surface is adequate for all the combinations of conductors |                         | <b>P</b> |
| 13.3      | Insulation resistance measured 1 min after application of 500 V d.c.                                                    | See appended table 13.3 | <b>P</b> |
| 13.4      | Electric strength test                                                                                                  | See appended table 13.4 | <b>P</b> |

|           |                                                                                                                                                                                                                   |                           |          |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|----------|
| <b>14</b> | <b>MECHANICAL STRENGTH</b><br><b>Type 221-615, 221-685</b>                                                                                                                                                        |                           |          |
| 14.101    | the test conductor, properly inserted into a clamping unit of the connection devices shall be allowed to be bent (deflected) in all 12 directions each of them differing from the adjacent directions by 30° ± 5° |                           |          |
|           | Deflection test (principle of test apparatus shown in figure 103a):                                                                                                                                               |                           |          |
|           | - requirement: ≤ 2,5 mV                                                                                                                                                                                           | See appended table 14.101 | <b>P</b> |
|           | max measured voltage drop (mV)                                                                                                                                                                                    | <b>0,84 mV</b>            | <b>P</b> |
| 14.2      | Tumbling barrel (for < 50 g): 50 falls; after the test no damage                                                                                                                                                  | <b>6,95 g</b>             | <b>P</b> |
| 14.3      | Impact test (for > 50 g): 10 blows:                                                                                                                                                                               |                           |          |
|           | - height of fall: 7,5 cm                                                                                                                                                                                          |                           | <b>N</b> |
|           | - height of fall: 10 cm                                                                                                                                                                                           |                           | <b>N</b> |
|           | - height of fall: 20 cm                                                                                                                                                                                           |                           | <b>N</b> |
|           | - height of fall: 25 cm                                                                                                                                                                                           |                           | <b>N</b> |

| IEC 60998-2-2 |                                                                      |                 |          |
|---------------|----------------------------------------------------------------------|-----------------|----------|
| Clause        | Requirement + Test                                                   | Result - Remark | Verdict  |
|               | After the test, no damage and live parts shall not become accessible |                 | <b>N</b> |

|           |                                                                                                                        |                           |          |
|-----------|------------------------------------------------------------------------------------------------------------------------|---------------------------|----------|
| <b>15</b> | <b>TEMPERATURE RISE</b>                                                                                                |                           |          |
|           | requirement: $\leq 45K$                                                                                                |                           | <b>P</b> |
|           | max measured temperature rise (K)                                                                                      | See appended table 15     | <b>P</b> |
| 15.101    | 192 temperature cycles test, each cycle with a duration of 1 h, with the test current as defined in Table 2 of Part I  |                           | <b>P</b> |
|           | Cabinet temperature (°C).....: <input type="checkbox"/> 40 <input checked="" type="checkbox"/> T-marking: <b>85 °C</b> |                           | <b>P</b> |
|           | Maximum voltage drop did not exceed 22,5 mV or 1,5 times 24 <sup>th</sup> cycle value                                  | See appended table 15.101 | <b>P</b> |

|           |                                                                                                                                            |                          |          |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|----------|
| <b>16</b> | <b>RESISTANCE TO HEAT</b>                                                                                                                  |                          |          |
| 16.1      | Connecting devices are sufficiently resistant to heat                                                                                      |                          | <b>P</b> |
| 16.2      | Heating cabinet test                                                                                                                       | See appended table 16.2  | <b>P</b> |
|           | After the test: no changes impairing further use and markings still legible                                                                |                          | <b>P</b> |
| 16.3      | Ball-pressure test (IEC 60695-10-2) for parts necessary to retain current-carrying parts and parts of the earthing circuit in position     | See appended table 16.3A | <b>P</b> |
|           | Impression diameter not exceed 2 mm                                                                                                        |                          | <b>P</b> |
|           | Ball-pressure test (IEC 60695-10-2) for parts not necessary to retain current-carrying parts and parts of the earthing circuit in position | See appended table 16.3B | <b>N</b> |
|           | Impression diameter not exceed 2 mm                                                                                                        |                          | <b>N</b> |
| <b>17</b> | <b>CLEARANCES AND CREEPAGE DISTANCES</b>                                                                                                   |                          | <b>P</b> |
|           | Creepage distances, clearances and distances through sealing compound                                                                      | See appended table 17    | <b>P</b> |

|           |                                                                                          |                       |          |
|-----------|------------------------------------------------------------------------------------------|-----------------------|----------|
| <b>18</b> | <b>RESISTANCE OF INSULATING MATERIAL TO ABNORMAL HEAT AND FIRE</b>                       |                       |          |
|           | Glow-wire test (clauses 4 to 10 of IEC 60695-2-10)                                       | See appended table 18 | <b>P</b> |
|           | No visible flames and no sustained glowing or flame and glowing extinguished within 30 s |                       | <b>P</b> |
|           | No ignition of the tissue paper or scorching of the board                                |                       | <b>P</b> |

|           |                                                            |                       |          |
|-----------|------------------------------------------------------------|-----------------------|----------|
| <b>19</b> | <b>RESISTANCE OF INSULATING MATERIAL TO TRACKING</b>       |                       |          |
|           | Tracking test (IEC 60112): PTI 175 V, 50 drops, solution A | See appended table 19 | <b>P</b> |

| IEC 60998-2-2 |                    |                 |         |
|---------------|--------------------|-----------------|---------|
| Clause        | Requirement + Test | Result - Remark | Verdict |

|                            |                                                             |                |                         |               |                               |   |
|----------------------------|-------------------------------------------------------------|----------------|-------------------------|---------------|-------------------------------|---|
| 10.105                     | TABLE: Clamping securement and damage to the conductor test |                |                         |               |                               |   |
|                            | Model/type reference.....:                                  |                | 221-615                 |               |                               |   |
| No of sample               | Conductor cross-sectional area (mm²)                        | Conductor type | Mass for conductor (kg) | Height H (mm) | Diameter of bushing hole (mm) |   |
| 1 - 3                      | 0,5                                                         | rigid flexible | 0,3                     | 260           | 6,5                           | P |
| 1-3                        | 6                                                           | rigid flexible | 1,4                     | 280           | 9,5                           | P |
| 3                          |                                                             |                |                         |               |                               |   |
| 4                          |                                                             |                |                         |               |                               |   |
| 5                          |                                                             |                |                         |               |                               |   |
| 6                          |                                                             |                |                         |               |                               |   |
| Supplementary information: |                                                             |                |                         |               |                               |   |

|                            |                                      |                |         |                |  |   |
|----------------------------|--------------------------------------|----------------|---------|----------------|--|---|
| 10.106                     | TABLE: Pull-out test                 |                |         |                |  |   |
|                            | Model/type reference.....:           |                | 221-615 |                |  |   |
| No of sample               | Conductor cross-sectional area (mm²) | Conductor type |         | Pull force (N) |  |   |
| 1 - 3                      | 0,5                                  | rigid flexible |         | 20             |  | P |
| 1 - 3                      | 6                                    | rigid flexible |         | 80             |  | P |
| 3                          |                                      |                |         |                |  |   |
| 4                          |                                      |                |         |                |  |   |
| 5                          |                                      |                |         |                |  |   |
| 6                          |                                      |                |         |                |  |   |
| Supplementary information: |                                      |                |         |                |  |   |

| IEC 60998-2-2 |                    |                 |         |
|---------------|--------------------|-----------------|---------|
| Clause        | Requirement + Test | Result - Remark | Verdict |

|                                            |                                                         |                         |                      |
|--------------------------------------------|---------------------------------------------------------|-------------------------|----------------------|
| <b>13.3</b>                                | <b>TABLE: Insulation resistance</b>                     |                         |                      |
|                                            | <b>Model/type reference.....:</b>                       | <b>221-615</b>          |                      |
|                                            | <b>Smallest cross-sectional area (mm<sup>2</sup>) :</b> | <b>0,5</b>              |                      |
|                                            | <b>Largest cross-sectional area (mm<sup>2</sup>) :</b>  | <b>6 mm<sup>2</sup></b> |                      |
| <b>Test voltage applied between</b>        |                                                         | <b>Measured (MΩ)</b>    | <b>Required (MΩ)</b> |
| All clamping units together and the body   |                                                         | <b>&gt;500 MΩ</b>       | <b>5 MΩ</b>          |
| Each clamping unit and all others together |                                                         |                         |                      |
|                                            |                                                         |                         |                      |
|                                            |                                                         |                         |                      |
| <b>Supplementary information:</b>          |                                                         |                         |                      |

|                                            |                                                         |                                                        |                      |
|--------------------------------------------|---------------------------------------------------------|--------------------------------------------------------|----------------------|
| <b>13.3</b>                                | <b>TABLE: Insulation resistance</b>                     |                                                        |                      |
|                                            | <b>Model/type reference.....:</b>                       | <b>221-685</b>                                         |                      |
|                                            | <b>Smallest cross-sectional area (mm<sup>2</sup>) :</b> | <b>0,5 mm<sup>2</sup> "f" / 0,5 mm<sup>2</sup> "r"</b> |                      |
|                                            | <b>Largest cross-sectional area (mm<sup>2</sup>) :</b>  | <b>6 mm<sup>2</sup> "r" / 6 mm<sup>2</sup> "f"</b>     |                      |
| <b>Test voltage applied between</b>        |                                                         | <b>Measured (MΩ)</b>                                   | <b>Required (MΩ)</b> |
| All clamping units together and the body   |                                                         | <b>&gt;20 MΩ</b>                                       | <b>5 MΩ</b>          |
| Each clamping unit and all others together |                                                         |                                                        |                      |
|                                            |                                                         |                                                        |                      |
|                                            |                                                         |                                                        |                      |
| <b>Supplementary information:</b>          |                                                         |                                                        |                      |

|                                            |                                           |                         |                                           |
|--------------------------------------------|-------------------------------------------|-------------------------|-------------------------------------------|
| <b>13.4</b>                                | <b>TABLE: Electric strength test</b>      |                         |                                           |
|                                            | <b>Model/type reference.....:</b>         | <b>221-615</b>          |                                           |
|                                            | <b>Rated insulation voltage (V).....:</b> | <b>450 V</b>            |                                           |
| <b>Test voltage applied between</b>        |                                           | <b>Test voltage (V)</b> | <b>Flashover /<br/>breakdown (Yes/No)</b> |
| All clamping units together and the body   |                                           | <b>2500 V</b>           | <b>No</b>                                 |
| Each clamping unit and all others together |                                           |                         |                                           |
| <b>Supplementary information:</b>          |                                           |                         |                                           |

| IEC 60998-2-2                     |                                            |                         |                                           |
|-----------------------------------|--------------------------------------------|-------------------------|-------------------------------------------|
| Clause                            | Requirement + Test                         | Result - Remark         | Verdict                                   |
| <b>13.4</b>                       | <b>TABLE: Electric strength test</b>       |                         |                                           |
|                                   | <b>Model/type reference.....:</b>          | <b>221-685</b>          |                                           |
|                                   | <b>Rated insulation voltage (V).....:</b>  | <b>450 V</b>            |                                           |
|                                   | <b>Test voltage applied between</b>        | <b>Test voltage (V)</b> | <b>Flashover /<br/>breakdown (Yes/No)</b> |
|                                   | All clamping units together and the body   | <b>2500 V</b>           | <b>No</b>                                 |
|                                   | Each clamping unit and all others together |                         |                                           |
| <b>Supplementary information:</b> |                                            |                         |                                           |

|        |                                                                    |                     |      |      |   |
|--------|--------------------------------------------------------------------|---------------------|------|------|---|
| 14.101 | TABLE: Mechanical strength<br>Type 221-615                         |                     |      |      |   |
|        | 0,1 times the test current (A) ..... :                             | 0,6 A               |      |      | P |
|        | smallest cross-sectional area (mm <sup>2</sup> ) 10.103 ..... :    | 0,5 mm <sup>2</sup> |      |      | P |
|        | force (N) (table 104) ..... :                                      | 0,09 N              |      |      | P |
|        | Distance (mm) (table 104) ..... :                                  | 100 mm              |      |      | P |
|        | -screwless terminal number                                         | 1                   | 2    | 3    | - |
|        | - voltage drop measured (mV) (1 <sup>st</sup> deflection) ..... :  | 0,50                | 0,59 | 0,52 | P |
|        | - voltage drop measured (mV) (2 <sup>nd</sup> deflection) ..... :  | 0,54                | 0,58 | 0,52 | P |
|        | - voltage drop measured (mV) (3 <sup>rd</sup> deflection) ..... :  | 0,53                | 0,59 | 0,52 | P |
|        | - voltage drop measured (mV) (4 <sup>th</sup> deflection) ..... :  | 0,50                | 0,59 | 0,55 | P |
|        | - voltage drop measured (mV) (5 <sup>th</sup> deflection) ..... :  | 0,51                | 0,58 | 0,59 | P |
|        | - voltage drop measured (mV) (6 <sup>th</sup> deflection) ..... :  | 0,52                | 0,58 | 0,55 | P |
|        | - voltage drop measured (mV) (7 <sup>th</sup> deflection) ..... :  | 0,55                | 0,57 | 0,51 | P |
|        | - voltage drop measured (mV) (8 <sup>th</sup> deflection) ..... :  | 0,54                | 0,58 | 0,52 | P |
|        | - voltage drop measured (mV) (9 <sup>th</sup> deflection) ..... :  | 0,54                | 0,58 | 0,51 | P |
|        | - voltage drop measured (mV) (10 <sup>th</sup> deflection) ..... : | 0,54                | 0,57 | 0,52 | P |
|        | - voltage drop measured (mV) (11 <sup>th</sup> deflection) ..... : | 0,51                | 0,54 | 0,58 | P |
|        | - voltage drop measured (mV) (12 <sup>th</sup> deflection) ..... : | 0,52                | 0,57 | 0,55 | P |
|        | - requirement: ≤ 2,5 mV                                            |                     |      |      | P |

| IEC 60998-2-2 |                                                                  |                         |             |             |
|---------------|------------------------------------------------------------------|-------------------------|-------------|-------------|
| Clause        | Requirement + Test                                               | Result - Remark         |             |             |
| <b>14.101</b> | <b>TABLE: Mechanical strength<br/>Type 221-615</b>               |                         |             |             |
|               | 0,1 times the test current (A) .....                             | <b>3,2 A</b>            |             |             |
|               | smallest cross-sectional area (mm <sup>2</sup> ) 10.103 .....    | <b>4 mm<sup>2</sup></b> |             |             |
|               | force (N) (table 104) .....                                      | <b>2 N</b>              |             |             |
|               | Distance (mm) (table 104) .....                                  | <b>100 mm</b>           |             |             |
|               | -screwless terminal number                                       | 1                       | 2           | 3           |
|               | - voltage drop measured (mV) (1 <sup>st</sup> deflection) .....  | <b>0,79</b>             | <b>0,80</b> | <b>0,75</b> |
|               | - voltage drop measured (mV) (2 <sup>nd</sup> deflection) .....  | <b>0,82</b>             | <b>0,81</b> | <b>0,70</b> |
|               | - voltage drop measured (mV) (3 <sup>rd</sup> deflection) .....  | <b>0,82</b>             | <b>0,81</b> | <b>0,71</b> |
|               | - voltage drop measured (mV) (4 <sup>th</sup> deflection) .....  | <b>0,83</b>             | <b>0,81</b> | <b>0,71</b> |
|               | - voltage drop measured (mV) (5 <sup>th</sup> deflection) .....  | <b>0,84</b>             | <b>0,83</b> | <b>0,72</b> |
|               | - voltage drop measured (mV) (6 <sup>th</sup> deflection) .....  | <b>0,83</b>             | <b>0,83</b> | <b>0,79</b> |
|               | - voltage drop measured (mV) (7 <sup>th</sup> deflection) .....  | <b>0,82</b>             | <b>0,81</b> | <b>0,77</b> |
|               | - voltage drop measured (mV) (8 <sup>th</sup> deflection) .....  | <b>0,78</b>             | <b>0,79</b> | <b>0,71</b> |
|               | - voltage drop measured (mV) (9 <sup>th</sup> deflection) .....  | <b>0,78</b>             | <b>0,79</b> | <b>0,80</b> |
|               | - voltage drop measured (mV) (10 <sup>th</sup> deflection) ..... | <b>0,78</b>             | <b>0,79</b> | <b>0,71</b> |
|               | - voltage drop measured (mV) (11 <sup>th</sup> deflection) ..... | <b>0,78</b>             | <b>0,83</b> | <b>0,70</b> |
|               | - voltage drop measured (mV) (12 <sup>th</sup> deflection) ..... | <b>0,77</b>             | <b>0,80</b> | <b>0,74</b> |
|               | - requirement: ≤ 2,5 mV                                          |                         |             |             |

| IEC 60998-2-2 |                                                                   |                   |      |      |         |
|---------------|-------------------------------------------------------------------|-------------------|------|------|---------|
| Clause        | Requirement + Test                                                | Result - Remark   |      |      | Verdict |
| 14.101        | TABLE: Mechanical strength<br>Type 221-615                        |                   |      |      |         |
|               | 0,1 times the test current (A) .....:                             | 4,1 A             |      |      | P       |
|               | smallest cross-sectional area (mm <sup>2</sup> ) 10.103 .....:    | 6 mm <sup>2</sup> |      |      | P       |
|               | force (N) (table 104) .....:                                      | 3 N               |      |      | P       |
|               | Distance (mm) (table 104) .....:                                  | 100 mm            |      |      | P       |
|               | -screwless terminal number                                        | 1                 | 2    | 3    | -       |
|               | - voltage drop measured (mV) (1 <sup>st</sup> deflection) .....:  | 0,61              | 0,61 | 0,61 | P       |
|               | - voltage drop measured (mV) (2 <sup>nd</sup> deflection) .....:  | 0,60              | 0,61 | 0,62 | P       |
|               | - voltage drop measured (mV) (3 <sup>rd</sup> deflection) .....:  | 0,63              | 0,62 | 0,61 | P       |
|               | - voltage drop measured (mV) (4 <sup>th</sup> deflection) .....:  | 0,58              | 0,58 | 0,59 | P       |
|               | - voltage drop measured (mV) (5 <sup>th</sup> deflection) .....:  | 0,57              | 0,58 | 0,58 | P       |
|               | - voltage drop measured (mV) (6 <sup>th</sup> deflection) .....:  | 0,58              | 0,58 | 0,57 | P       |
|               | - voltage drop measured (mV) (7 <sup>th</sup> deflection) .....:  | 0,60              | 0,59 | 0,59 | P       |
|               | - voltage drop measured (mV) (8 <sup>th</sup> deflection) .....:  | 0,61              | 0,60 | 0,60 | P       |
|               | - voltage drop measured (mV) (9 <sup>th</sup> deflection) .....:  | 0,61              | 0,61 | 0,60 | P       |
|               | - voltage drop measured (mV) (10 <sup>th</sup> deflection) .....: | 0,59              | 0,60 | 0,59 | P       |
|               | - voltage drop measured (mV) (11 <sup>th</sup> deflection) .....: | 0,62              | 0,61 | 0,60 | P       |
|               | - voltage drop measured (mV) (12 <sup>th</sup> deflection) .....: | 0,59              | 0,59 | 0,58 | P       |
|               | - requirement: ≤ 2,5 mV                                           |                   |      |      | P       |

| IEC 60998-2-2 |                                                                   |                           |      |      |         |
|---------------|-------------------------------------------------------------------|---------------------------|------|------|---------|
| Clause        | Requirement + Test                                                | Result - Remark           |      |      | Verdict |
| 14.101        | TABLE: Mechanical strength<br>Type 221-685                        |                           |      |      |         |
|               | 0,1 times the test current (A) .....:                             | 0,6 A                     |      |      | P       |
|               | smallest cross-sectional area (mm <sup>2</sup> ) 10.103 .....:    | 0,5 mm <sup>2</sup> solid |      |      | P       |
|               | force (N) (table 104) .....:                                      | 0,09 N                    |      |      | P       |
|               | Distance (mm) (table 104) .....:                                  | 100 mm                    |      |      | P       |
|               | -screwless terminal number                                        | 1                         | 2    | 3    | -       |
|               | - voltage drop measured (mV) (1 <sup>st</sup> deflection) .....:  | 0,50                      | 0,59 | 0,52 | P       |
|               | - voltage drop measured (mV) (2 <sup>nd</sup> deflection) .....:  | 0,54                      | 0,58 | 0,52 | P       |
|               | - voltage drop measured (mV) (3 <sup>rd</sup> deflection) .....:  | 0,53                      | 0,59 | 0,52 | P       |
|               | - voltage drop measured (mV) (4 <sup>th</sup> deflection) .....:  | 0,50                      | 0,59 | 0,55 | P       |
|               | - voltage drop measured (mV) (5 <sup>th</sup> deflection) .....:  | 0,51                      | 0,58 | 0,59 | P       |
|               | - voltage drop measured (mV) (6 <sup>th</sup> deflection) .....:  | 0,52                      | 0,58 | 0,55 | P       |
|               | - voltage drop measured (mV) (7 <sup>th</sup> deflection) .....:  | 0,55                      | 0,57 | 0,51 | P       |
|               | - voltage drop measured (mV) (8 <sup>th</sup> deflection) .....:  | 0,54                      | 0,58 | 0,52 | P       |
|               | - voltage drop measured (mV) (9 <sup>th</sup> deflection) .....:  | 0,54                      | 0,58 | 0,51 | P       |
|               | - voltage drop measured (mV) (10 <sup>th</sup> deflection) .....: | 0,54                      | 0,57 | 0,52 | P       |
|               | - voltage drop measured (mV) (11 <sup>th</sup> deflection) .....: | 0,51                      | 0,54 | 0,58 | P       |
|               | - voltage drop measured (mV) (12 <sup>th</sup> deflection) .....: | 0,52                      | 0,57 | 0,55 | P       |
|               | - requirement: ≤ 2,5 mV                                           |                           |      |      | P       |

| IEC 60998-2-2 |                                                                  |                               |      |      |
|---------------|------------------------------------------------------------------|-------------------------------|------|------|
| Clause        | Requirement + Test                                               | Result - Remark               |      |      |
| <b>14.101</b> | <b>TABLE: Mechanical strength<br/>Type 221-685</b>               |                               |      |      |
|               | 0,1 times the test current (A) .....                             | <b>3,2 A</b>                  |      |      |
|               | smallest cross-sectional area (mm <sup>2</sup> ) 10.103 .....    | <b>4 mm<sup>2</sup> solid</b> |      |      |
|               | force (N) (table 104) .....                                      | <b>2 N</b>                    |      |      |
|               | Distance (mm) (table 104) .....                                  | <b>100 mm</b>                 |      |      |
|               | -screwless terminal number                                       | 1                             | 2    | 3    |
|               | - voltage drop measured (mV) (1 <sup>st</sup> deflection) .....  | 0,79                          | 0,80 | 0,75 |
|               | - voltage drop measured (mV) (2 <sup>nd</sup> deflection) .....  | 0,82                          | 0,81 | 0,70 |
|               | - voltage drop measured (mV) (3 <sup>rd</sup> deflection) .....  | 0,82                          | 0,81 | 0,71 |
|               | - voltage drop measured (mV) (4 <sup>th</sup> deflection) .....  | 0,83                          | 0,81 | 0,71 |
|               | - voltage drop measured (mV) (5 <sup>th</sup> deflection) .....  | 0,84                          | 0,83 | 0,72 |
|               | - voltage drop measured (mV) (6 <sup>th</sup> deflection) .....  | 0,83                          | 0,83 | 0,79 |
|               | - voltage drop measured (mV) (7 <sup>th</sup> deflection) .....  | 0,82                          | 0,81 | 0,77 |
|               | - voltage drop measured (mV) (8 <sup>th</sup> deflection) .....  | 0,78                          | 0,79 | 0,71 |
|               | - voltage drop measured (mV) (9 <sup>th</sup> deflection) .....  | 0,78                          | 0,79 | 0,80 |
|               | - voltage drop measured (mV) (10 <sup>th</sup> deflection) ..... | 0,78                          | 0,79 | 0,71 |
|               | - voltage drop measured (mV) (11 <sup>th</sup> deflection) ..... | 0,78                          | 0,83 | 0,70 |
|               | - voltage drop measured (mV) (12 <sup>th</sup> deflection) ..... | 0,77                          | 0,80 | 0,74 |
|               | - requirement: ≤ 2,5 mV                                          |                               |      |      |

| IEC 60998-2-2 |                                                                   |                         |      |      |         |
|---------------|-------------------------------------------------------------------|-------------------------|------|------|---------|
| Clause        | Requirement + Test                                                | Result - Remark         |      |      | Verdict |
| 14.101        | TABLE: Mechanical strength<br>Type 221-685                        |                         |      |      |         |
|               | 0,1 times the test current (A) .....:                             | 4,1 A                   |      |      | P       |
|               | smallest cross-sectional area (mm <sup>2</sup> ) 10.103 .....:    | 6 mm <sup>2</sup> solid |      |      | P       |
|               | force (N) (table 104) .....:                                      | 3 N                     |      |      | P       |
|               | Distance (mm) (table 104) .....:                                  | 100 mm                  |      |      | P       |
|               | -screwless terminal number                                        | 1                       | 2    | 3    | -       |
|               | - voltage drop measured (mV) (1 <sup>st</sup> deflection) .....:  | 0,61                    | 0,61 | 0,61 | P       |
|               | - voltage drop measured (mV) (2 <sup>nd</sup> deflection) .....:  | 0,60                    | 0,61 | 0,62 | P       |
|               | - voltage drop measured (mV) (3 <sup>rd</sup> deflection) .....:  | 0,63                    | 0,62 | 0,61 | P       |
|               | - voltage drop measured (mV) (4 <sup>th</sup> deflection) .....:  | 0,58                    | 0,58 | 0,59 | P       |
|               | - voltage drop measured (mV) (5 <sup>th</sup> deflection) .....:  | 0,57                    | 0,58 | 0,58 | P       |
|               | - voltage drop measured (mV) (6 <sup>th</sup> deflection) .....:  | 0,58                    | 0,58 | 0,57 | P       |
|               | - voltage drop measured (mV) (7 <sup>th</sup> deflection) .....:  | 0,60                    | 0,59 | 0,59 | P       |
|               | - voltage drop measured (mV) (8 <sup>th</sup> deflection) .....:  | 0,61                    | 0,60 | 0,60 | P       |
|               | - voltage drop measured (mV) (9 <sup>th</sup> deflection) .....:  | 0,61                    | 0,61 | 0,60 | P       |
|               | - voltage drop measured (mV) (10 <sup>th</sup> deflection) .....: | 0,59                    | 0,60 | 0,59 | P       |
|               | - voltage drop measured (mV) (11 <sup>th</sup> deflection) .....: | 0,62                    | 0,61 | 0,60 | P       |
|               | - voltage drop measured (mV) (12 <sup>th</sup> deflection) .....: | 0,59                    | 0,59 | 0,58 | P       |
|               | - requirement: ≤ 2,5 mV                                           |                         |      |      | P       |

| IEC 60998-2-2 |                    |                 |         |
|---------------|--------------------|-----------------|---------|
| Clause        | Requirement + Test | Result - Remark | Verdict |

|                                       |                                          |                                                                              |                              |   |
|---------------------------------------|------------------------------------------|------------------------------------------------------------------------------|------------------------------|---|
| 15                                    | TABLE: Temperature rise                  |                                                                              |                              |   |
|                                       | Model/type reference.....:               | 221-615                                                                      |                              |   |
|                                       | Terminal .....                           | <input checked="" type="checkbox"/> single <input type="checkbox"/> multiway |                              | — |
|                                       | T marking (°C) .....                     | <input checked="" type="checkbox"/> Yes (85°C):                              |                              | — |
|                                       | Largest cross-sectional area (mm²).....: | 6 mm²                                                                        |                              |   |
|                                       | Conductors .....                         | rigid and flexible                                                           |                              |   |
|                                       | Rated connecting capacity (mm²).....:    | 6 mm²                                                                        |                              |   |
|                                       | Test current (A).....:                   | 41 A                                                                         |                              |   |
| Thermocouple Locations                |                                          | max. temperature measured, (°C)                                              | max. temperature limit, (°C) |   |
| On conductor in the terminal T1 “s”   |                                          | 27 K                                                                         | 45 K                         |   |
| On conductor in the terminal T2 “s”   |                                          | 27 K                                                                         | 45 K                         |   |
| On conductor in the terminal T3 “s”   |                                          | 28 K                                                                         | 45 K                         |   |
| On conductor in the terminal T4 “s”   |                                          | 27 K                                                                         | 45 K                         |   |
| On conductor in the terminal T5 “s”   |                                          | 26 K                                                                         | 45 K                         |   |
| On conductor in the terminal T1 “f”   |                                          | 30 K                                                                         | 45 K                         |   |
| On conductor in the terminal T2 “f”   |                                          | 32 K                                                                         | 45 K                         |   |
| On conductor in the terminal T3 “f”   |                                          | 32 K                                                                         | 45 K                         |   |
| On conductor in the terminal T4 “f”   |                                          | 30 K                                                                         | 45 K                         |   |
| On conductor in the terminal T5 “f”   |                                          | 30 K                                                                         | 45 K                         |   |
| On conductor in the terminal T1 “str” |                                          | 22 K                                                                         | 45 K                         |   |
| On conductor in the terminal T2 “str” |                                          | 22 K                                                                         | 45 K                         |   |
| On conductor in the terminal T3 “str” |                                          | 22 K                                                                         | 45 K                         |   |
| On conductor in the terminal T4 “str” |                                          | 22 K                                                                         | 45 K                         |   |
| On conductor in the terminal T5 “str” |                                          | 22 K                                                                         | 45 K                         |   |
| Supplementary information:            |                                          |                                                                              |                              |   |

| IEC 60998-2-2 |                    |                 |         |
|---------------|--------------------|-----------------|---------|
| Clause        | Requirement + Test | Result - Remark | Verdict |

|                                                              |                                                        |                                     |          |          |   |
|--------------------------------------------------------------|--------------------------------------------------------|-------------------------------------|----------|----------|---|
| 15.101                                                       | TABLE: Temperature-cycling test                        |                                     |          |          |   |
|                                                              | Model/type reference .....                             | 221-615                             |          |          |   |
|                                                              | Smallest cross-sectional area (mm <sup>2</sup> ) ..... | 0,5 mm <sup>2</sup> rigid, flexible |          |          |   |
|                                                              | Test current (Table 2) (A).....                        | 6 A                                 |          |          |   |
| Measured voltage drop of:                                    |                                                        | Measured voltage drop (mV)          |          |          |   |
|                                                              |                                                        | Sample 1                            | Sample 2 | Sample 3 |   |
| Solid conductors (after 24 cycles)                           |                                                        | 10,6                                | 11,2     | 10,7     |   |
| Stranded conductors (after 24 cycles)                        |                                                        |                                     |          |          |   |
| Flexible conductors (after 24 cycles)                        |                                                        | 14,6                                | 12,2     | 14,1     | P |
| Solid conductors (1,5 times 24 <sup>th</sup> cycle value)    |                                                        | 15,9                                | 16,8     | 16,05    |   |
| Stranded conductors (1,5 times 24 <sup>th</sup> cycle value) |                                                        |                                     |          |          |   |
| Flexible conductors (1,5 times 24 <sup>th</sup> cycle value) |                                                        | 21,9                                | 18,3     | 21,15    | P |
| Solid conductors (after 192 cycles)                          |                                                        | 10,8                                | 11,6     | 10,2     |   |
| Stranded conductors (after 192 cycles)                       |                                                        |                                     |          |          |   |
| Flexible conductors (after 192 cycles)                       |                                                        | 14,6                                | 12,5     | 14,6     | P |
|                                                              | Largest cross-sectional area (mm <sup>2</sup> ) .....  | 6 mm <sup>2</sup> rigid flexible    |          |          |   |
|                                                              | Test current (Table 2) (A).....                        | 41 A                                |          |          |   |
| Measured voltage drop of:                                    |                                                        | Measured voltage drop (mV)          |          |          |   |
|                                                              |                                                        | Sample 1                            | Sample 2 | Sample 3 |   |
| Solid conductors (after 24 cycles)                           |                                                        | 18,3                                | 18,4     | 21,3     | P |
| Stranded conductors (after 24 cycles)                        |                                                        | 17,7                                | 15,5     | 15,3     | P |
| Flexible conductors (after 24 cycles)                        |                                                        | 24,2                                | 22,6     | 21,9     | P |
| Solid conductors (1,5 times 24 <sup>th</sup> cycle value)    |                                                        | 27,45                               | 27,6     | 31,95    | P |
| Stranded conductors (1,5 times 24 <sup>th</sup> cycle value) |                                                        | 26,55                               | 23,25    | 22,95    | P |
| Flexible conductors (1,5 times 24 <sup>th</sup> cycle value) |                                                        | 36,3                                | 33,9     | 32,85    | P |
| Solid conductors (after 192 cycles)                          |                                                        | 18,4                                | 18,5     | 21,5     | P |
| Stranded conductors (after 192 cycles)                       |                                                        | 17,6                                | 15,6     | 15,7     | P |
| Flexible conductors (after 192 cycles)                       |                                                        | 24,4                                | 22,8     | 21,7     | P |
| Supplementary information:                                   |                                                        |                                     |          |          |   |

| IEC 60998-2-2 |                    |                 |         |
|---------------|--------------------|-----------------|---------|
| Clause        | Requirement + Test | Result - Remark | Verdict |

|                            |                                    |                                                                                      |          |          |
|----------------------------|------------------------------------|--------------------------------------------------------------------------------------|----------|----------|
| <b>16.2</b>                | <b>TABLE: Heating cabinet test</b> |                                                                                      |          |          |
|                            | <b>Test temperature (°C).....:</b> | <input type="checkbox"/> 85°C<br><input checked="" type="checkbox"/> T + 45 = 130 °C |          |          |
|                            | Model/type reference               | Sample 1                                                                             | Sample 2 | Sample 3 |
|                            | <b>221-615</b>                     | <b>P</b>                                                                             | <b>P</b> | <b>P</b> |
|                            | <b>221-685</b>                     | <b>P</b>                                                                             | <b>P</b> | <b>P</b> |
| Supplementary information: |                                    |                                                                                      |          |          |

|                            |                                                          |                                                                                     |                          |          |
|----------------------------|----------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------|----------|
| <b>16.3A</b>               | <b>TABLE: Ball pressure test of insulating materials</b> |                                                                                     |                          |          |
|                            | <b>Test temperature (°C).....:</b>                       | <input type="checkbox"/> 125<br><input checked="" type="checkbox"/> T + 45 = 130 °C |                          |          |
|                            | Part under test                                          | Material designation / manufacturer                                                 | Impression diameter (mm) |          |
|                            | <b>Housing (transparent)</b>                             | <b>PC (V2)</b>                                                                      | <b>1,0</b>               | <b>P</b> |
|                            | <b>Housing (white)</b>                                   | <b>PC (V0)</b>                                                                      | <b>1,0</b>               | <b>P</b> |
|                            | <b>Lever (orange)</b>                                    | <b>PBT</b>                                                                          | <b>1,0</b>               | <b>P</b> |
|                            | <b>Lever grey</b>                                        | <b>Polyamide</b>                                                                    | <b>0,8 mm</b>            | <b>P</b> |
| Supplementary information: |                                                          |                                                                                     |                          |          |

| IEC 60998-2-2              |                                                          |                                                               |          |
|----------------------------|----------------------------------------------------------|---------------------------------------------------------------|----------|
| Clause                     | Requirement + Test                                       | Result - Remark                                               | Verdict  |
| <b>16.3B</b>               | <b>TABLE: Ball pressure test of insulating materials</b> |                                                               |          |
|                            | <b>Test temperature (°C).....:</b>                       | <input type="checkbox"/> 70 <input type="checkbox"/> T + 40 = |          |
| Part under test            | Material designation / manufacturer                      | Impression diameter (mm)                                      | <b>N</b> |
|                            |                                                          |                                                               |          |
|                            |                                                          |                                                               |          |
| Supplementary information: |                                                          |                                                               |          |

|                                                                                     |                                                 |                           |                  |                  |                   |
|-------------------------------------------------------------------------------------|-------------------------------------------------|---------------------------|------------------|------------------|-------------------|
| <b>17</b>                                                                           | <b>TABLE: Clearances and creepage distances</b> |                           |                  |                  |                   |
|                                                                                     | Rated insulation voltage (V) .....              | 450 V                     |                  |                  | <b>P</b>          |
| Clearance cl, creepage distance cr and distance through sealing compound tsc at/of: |                                                 | Required cl, cr, tsc (mm) | Measured cl (mm) | Measured cr (mm) | Measured tsc (mm) |
| <b>Between clamping units</b>                                                       |                                                 |                           |                  |                  |                   |
| <b>Clamping units - surface</b>                                                     |                                                 | <b>4</b>                  | <b>&gt;4,21</b>  | <b>&gt;4,21</b>  | <b>-</b>          |
|                                                                                     |                                                 |                           |                  |                  |                   |
| Supplementary information:                                                          |                                                 |                           |                  |                  |                   |

|                                  |                       |                                     |                       |                                                  |
|----------------------------------|-----------------------|-------------------------------------|-----------------------|--------------------------------------------------|
| 18                               | TABLE: Glow-wire test |                                     |                       |                                                  |
| Part under test                  |                       | Material designation / manufacturer | Test temperature (°C) | Time of extinguish of flames and glowing, if any |
| housing                          |                       | PC (V2)                             | 850 °C                | flame extinguished immediately after removal.    |
| housing                          |                       | PC (V0)                             |                       |                                                  |
| lever                            |                       | PBT                                 |                       |                                                  |
| housing and lever (type 221-685) |                       | PC / Polyamide                      | 850°C                 | flame extinguished immediately after removal.    |
| Supplementary information:       |                       |                                     |                       |                                                  |

| IEC 60998-2-2 |                    |                 |         |
|---------------|--------------------|-----------------|---------|
| Clause        | Requirement + Test | Result - Remark | Verdict |

| <b>19</b>                  | <b>TABLE: Tracking</b>              |                  |          |
|----------------------------|-------------------------------------|------------------|----------|
| Part under test            | Material designation / manufacturer | Test voltage (V) | Remarks  |
| <b>housing</b>             | <b>PC (V2)</b>                      | <b>250 V</b>     | <b>P</b> |
| <b>housing</b>             | <b>PC (V0)</b>                      |                  | <b>P</b> |
| <b>Lever orange</b>        | <b>PBT</b>                          |                  | <b>P</b> |
| <b>Lever grey</b>          | <b>Polyamide</b>                    | <b>600 V</b>     | <b>P</b> |
| Supplementary information: |                                     |                  |          |

| Annex A IEC 60998-2-2 |                    |                 |         |
|-----------------------|--------------------|-----------------|---------|
| Clause                | Requirement + Test | Result - Remark | Verdict |

**ATTACHMENT TO TEST REPORT IEC 60998-2-2  
EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES**

**Connecting devices for low voltage circuits for household and similar purposes  
Part 2-2: Particular requirements for connecting devices as separate entities with  
screwless-type clamping units**

**Differences according to** .....: EN 60998-1 : 2004 and EN 60998-2-2 : 2004 in conjunction with  
IEC 60998-1 : 2002 and IEC 60998-2-2 : 2002

**Attachment Form No.**.....: [EU\\_GD\\_IEC60998\\_2\\_2B](#)

**Attachment Originator**.....: DEKRA certification B.V.

**Master Attachment** .....: [Date \(2013-02\)](#)

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| EN 60998-1<br>CENELEC COMMON MODIFICATIONS |                                                           |  |          |
|--------------------------------------------|-----------------------------------------------------------|--|----------|
|                                            |                                                           |  |          |
| <b>1</b>                                   | <b>Scope</b>                                              |  |          |
| delete                                     | In the first paragraph ", and equivalent AWG conductors". |  | <b>P</b> |
| <b>6.2</b>                                 | <b>Main characteristics</b>                               |  |          |
| delete                                     | NOTE 1                                                    |  | <b>P</b> |
| <b>8.3</b>                                 | <b>Marking</b>                                            |  |          |
| delete                                     | the NOTE                                                  |  | <b>P</b> |
| <b>11.6</b>                                | <b>Construction</b>                                       |  |          |
| delete                                     | ", or equivalent AWG conductors".                         |  | <b>P</b> |
| <b>15.4</b>                                | <b>Temperature rise</b>                                   |  |          |
| delete                                     | the NOTE                                                  |  | <b>P</b> |
| <b>Annex</b>                               | <b>B</b>                                                  |  |          |
| delete                                     | The whole annex                                           |  | <b>P</b> |

| Annex A IEC 60998-2-2 |                                                                                                                                                     |                 |          |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------|
| Clause                | Requirement + Test                                                                                                                                  | Result - Remark | Verdict  |
|                       | <b>EN 60998-2-2<br/>CENELEC COMMON MODIFICATIONS</b>                                                                                                |                 |          |
|                       |                                                                                                                                                     |                 |          |
| <b>10.103</b>         | <b>Connection of conductors</b>                                                                                                                     |                 |          |
| delete                | NOTE 1                                                                                                                                              |                 | <b>P</b> |
| delete                | In Table 101, NOTE 2, "and for AWG conductors, on ASTM B172-71, ICEA publication S-19-81, ICEA Publication S-66-524 and ICEA Publication S-65-516." |                 |          |
| <b>10.105</b>         |                                                                                                                                                     |                 |          |
| delete                | NOTE 1 and NOTE 2                                                                                                                                   |                 | <b>P</b> |
| <b>10.106</b>         |                                                                                                                                                     |                 |          |
| delete                | NOTE 1 and NOTE 2                                                                                                                                   |                 | <b>P</b> |
| <b>14.101</b>         | <b>Mechanical strength</b>                                                                                                                          |                 |          |
| delete                | the NOTE                                                                                                                                            |                 | <b>P</b> |
| <b>Annex</b>          | <b>BB</b>                                                                                                                                           |                 |          |
| delete                | The whole annex                                                                                                                                     |                 | <b>P</b> |

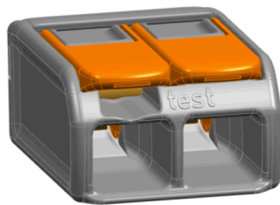
| Annex B IEC 60998-2-2 |                    |                 |         |
|-----------------------|--------------------|-----------------|---------|
| Clause                | Requirement + Test | Result - Remark | Verdict |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                            |  |          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------|
| <p style="text-align: center;"><b>ANNEX ZB</b><br/>(normative)<br/><b>SPECIAL NATIONAL CONDITIONS</b><br/>(EN 60998-1)</p>                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                            |  |          |
| <p><b>Special national condition: National characteristic or practice that cannot be changed even over a long period, e.g. climatic conditions, electrical earthing conditions.</b></p> <p><b>NOTE</b> If it affects harmonization, it forms part of the European Standard.</p> <p><b>For the countries in which the relevant special national conditions apply these provisions are normative, for other countries they are informative.</b></p> |                                                                                                                                                                                                                                                                                                                                                                            |  |          |
| <b>Clause</b>                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                            |  |          |
| <b>6.2</b>                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>United Kingdom</b>                                                                                                                                                                                                                                                                                                                                                      |  |          |
| Replace                                                                                                                                                                                                                                                                                                                                                                                                                                           | <p>The entire subclause by:</p> <p>6.2 The standard rated connecting capacities are 0,2 mm<sup>2</sup>, 0,34 mm<sup>2</sup>, 0,5 mm<sup>2</sup>, 0,75 mm<sup>2</sup>, 1 mm<sup>2</sup>, 1,25mm<sup>2</sup>, 1,5 mm<sup>2</sup>, 2,5 mm<sup>2</sup>, 4 mm<sup>2</sup>, 6 mm<sup>2</sup>, 10 mm<sup>2</sup>, 16 mm<sup>2</sup>, 25 mm<sup>2</sup>, and 35 mm<sup>2</sup></p> |  | <b>P</b> |

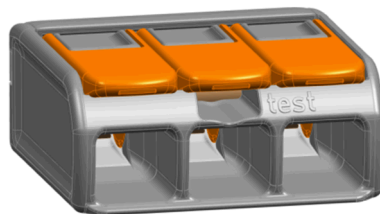
Remarks

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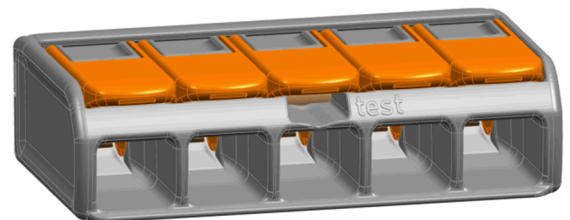
**Illustrations:**



221-612  
221-672



221-613  
221-673



221-615  
221-675



Type: 221-682



Type: 221-683



Type: 221-685