

CERTIFICATE

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

Manufacturer/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 60998-2-2:2004
- 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.

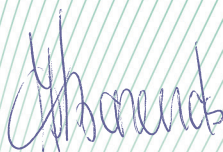
This certificate is issued on 26 October 2017 and expires upon withdrawal of one of the above mentioned standards.

Certificate number: 71-101731

DEKRA Certification B.V.



drs. G.J. Zoetbrood
Managing Director



Henk Barends
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)	: 221-412, 221-413 and 221-415
Material	: thermoplastic material
Rated connecting capacity	: 4 mm ²
Connectable conductors	: 0,14 mm ² flexible 0,2 - 4 mm ² flexible and rigid
Rated current	: 32 A
Rated voltage	: 450 V
T-rating	: 85 °C
Type	: 221 with suffixes -412, -413 and -415
Description	: screwless type clamping units, 1-pole, last number of the suffix indicates the number of clamping units

TESTS**Test requirements**

EN 60998-2-2:2004

Test result

The test results are laid down in DEKRA test file 222114100.

Additional Information

This certificate replaces certificate No. 2168803.01 which we herewith declare invalid.

Conclusion

The examination proved that all requirements were met.

Factory locations

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

Wago & Controls (India) Ltd.
C-27, Sector-58, Phase III
201 301 Noida Gautam Bugh Nagar, 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 SUMMARY

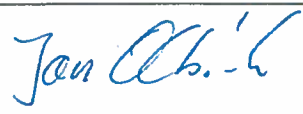
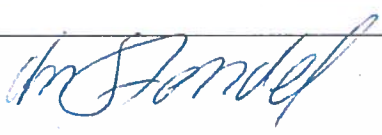
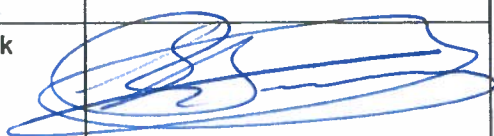
Report Reference No.....	2221141.50
Date of issue.....	2017-10-19
Tested by (name + signature)	J. Olbrich <i>J. Olbrich</i>
Witnessed by (name + signature).....	
Approved by (name + signature)	Chr. Stendel <i>Chr. Stendel</i>
Supervised by (name + signature) ...	H.L. Schendstok <i>H.L. Schendstok</i>
Testing Laboratory	DEKRA Certification B.V.
Address.....	Meander 1051, 6825 MJ Arnhem, The Netherlands
Testing procedure.....	☐ ENEC/CCA-TL ☐ IEC-IEC-TL ☐ TWP ☐ WMT ☒ CTF 3
Testing location	WAGO Kontakttechnik GmbH & Co. KG
Address.....	Hansastraße 27, 32423 Minden/Westfalen, Germany
Applicant	WAGO Kontakttechnik GmbH & Co. KG
Address.....	Hansastraße 27, 32423 Minden/Westfalen, Germany
Manufacturer	WAGO Kontakttechnik GmbH & Co. KG
Address.....	Hansastraße 27, 32423 Minden/Westfalen, Germany
Product	Splicing wire connector
Model/Type reference.....	Series 221
Trademark	WAGO
Ratings.....	450 V, 32 A, 4mm ² 0,14 mm ² flexible, 0,2 mm ² – 4 mm ² flexible and rigid
Certification Scheme	☐ ENEC ☒ CCA ☐ Other: _____
Standard(s).....	EN 60998-2-2: 2004, in conjunction with IEC 60998-1: 2002
☒ The text of the a.m. European Standard was approved by CENELEC under the Unique Acceptance Procedure and is identical with the corresponding IEC Publication. ☐ The text of the a.m. European Standard was approved by CENELEC with agreed common modifications and is <u>not</u> identical with the corresponding IEC Publication.	
This EN test report consists of the following parts:	
☒ IEC TRF No.: IEC60998-2-2	Report Reference No.....: 2221141.50
☐ CENELEC-Addendum Form No. Report Reference No. or Annex No ...: _____	
Copyright © 2013 EEPKA, Paris, France. All rights reserved.	
This ECS document together with the test report is only valid if signed by an approved ENEC or CCA Testing Laboratory and accompanied by the associated ENEC Licence or CCA Notification of Test Results, issued by a Certification Body member of ECS.	



Test Report issued under the responsibility of:



TEST REPORT IEC 60998-2-2:2004 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	
Report Reference No.....:	2221141.50
Date of issue.....:	2017-10-19
Total number of page.....:	23
Applicant's name.....:	WAGO Kontakttechnik GmbH & Co. KG
Address.....:	Hansastraße 27, 32423 Minden/Westfalen, Germany
Test specification:	
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
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Test item description.....:	splicing wire connector
Trade Mark	WAGO
Manufacturer	WAGO Kontakttechnik GmbH & Co. KG
Model/Type reference.....:	Series 221
Ratings.....:	450 V, 32 A, 4mm² 0,14 mm² flexible, 0,2 mm² – 4 mm² flexible and rigid

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☒	DEKRA Certification B.V.	DEKRA Certification B.V.
Testing location/ address.....:		Meander 1051, 6825 MJ Arnhem, The Netherlands
☐	Associated CB Testing Laboratory:	
Testing location/ address.....:		
Tested by (name, function, signature).....:		
Approved by (name, function, signature)....:		
☐	Testing procedure: CTF Stage 1:	
Testing location/ address.....:		
Tested by (name, function, signature).....:		
Approved by (name, function, signature)....:		
☐	Testing procedure: CTF Stage 2:	
Testing location/ address.....:		
Tested by (name + signature).....:		
Witnessed by (name, function, signature) ..:		
Approved by (name, function, signature)....:		
☒	Testing procedure: CTF Stage 3:	WAGO Kontakttechnik GmbH & Co. KG
☐	Testing procedure: CTF Stage 4:	
Testing location/ address.....:		Hansastraße 27, 32423 Minden/Westfalen, Germany
Tested by (name, function, signature).....:		J. Olbrich 
Witnessed by (name, function, signature) ..:		
Approved by (name, function, signature)....:		Chr. Stendel 
Supervised by (name, function, signature) :		H.L. Schendstok 

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

Summary of testing:

Tests performed (name of test and test clause):

First Edition, 2168803.50:

Complete type-testing

Tests are carried out on types

221-412, 221-413 and 221-415

Second Edition:

Due to the fact of re-verification a temperature-rise test (clause 15) on 221-415 is carried out.

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.**

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.

WAGO

Test item particulars:	
Number of terminals.....:	☒ single ☐ multiway
Protection against electric shock.....:	☒ with ☐ without
Means of fixing.....:	☐ with ☒ without
Rated temperature.....:	☐ without T marking ☒ with T marking (85°C)
IP number.....:	IP-
Type of terminals, screwless-type.....:	☒ universal non-universal ☐ push wire
Conductor type.....:	☒ rigid ☒ flexible
Rated connecting capacity.....:	☒ 0,14mm ² "F" ☒ 0,2mm ² ☒ 4mm ² ☐ 1,5mm ² ☐ 2,5mm ² ☐ 4mm ² ☐ 6mm ² ☐ 10mm ²
Conductor insulation.....:	☐ 16mm ² ☐ 25mm ² ☐ 35 mm ²
Rated voltage (V ac / V dc).....:	☒ AC ☐ DC
Classification of installation and use.....:	
Supply Connection	
.....:	
Possible test case verdicts:	
- test case does not apply to the test object.....: N/A	
- test object does meet the requirement.....: P (Pass)	
- test object does not meet the requirement.....: F (Fail)	
Testing.....:	
Date of receipt of test item: 2017-10	
Date (s) of performance of tests: 2017-10	
General remarks:	
The test results presented in this report relate only to the object tested.	
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.	
"(see Enclosure #)" refers to additional information appended to the report.	
"(see appended table)" refers to a table appended to the report.	
Throughout this report a ☒ comma / ☐ point is used as the decimal separator.	

Manufacturer's Declaration per sub-clause 6.2.5 of IECEE 02:

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

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

Name and address of factory (ies) :

General product information:**Factory locations:**

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

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

Wago & Controls (India) Ltd.
C-27, Sector-58, Phase III, 201 301, Nodia Gautam
Bugh Nagar (U.P)
India

Wago Electronic (Tianjin) Co. Ltd.
No. 5 Quanhui Road, 301700, Tianjin
China

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
8	MARKING		
8.1	On main part:		
	a) rated connecting capacity (mm ²) :	0,14 mm² "f" 0,2 mm² - 4 mm²	P
	b) rated insulation voltage (V) :	450 V	P
	c) T marking (°C) (if > 40 °C or < -5 °C) :	85 °C	P
	d) type reference :	221-415 example	P
	e) manufacturer's or responsible vendor's name, trademark or identification mark..... :	WAGO	P
	f) IP if > IP20 :		N
	Small devices: only d) and e) indicated on device		N
	All marks visible on smallest package unit		P
8.101	Type of acceptable conductor "s" "r" or "f"		P
8.102	Marking indicating the length of insulation to be removed before insertion of the conductor		P
8.2	Multiway terminal devices: at least two adjacent		N
8.3	When symbols are used they shall be as follow: V for volts mm ² or □ for square millimetres T for T-rating		P
8.4	Marking: durable and easily legible; 15 s water; 15 s hexane		P
9	PROTECTION AGAINST ELECTRIC SHOCK		
	Live parts not accessible		P

IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
10	CONNECTION OF CONDUCTORS		
10.1	Connecting devices allow correct connection of conductors		P
10.101	Connection or disconnection: use a general tool or simple insertion	lever operated	P
	Disconnection operation other than a pull	lever operated	P
10.102	Terminals accept two or more conductors of same or different nominal cross-sectional areas; see table 101 (as specified by manufacturer):		P
	Universal terminals shall accept rigid(solid or stranded) and flexible unprepared conductors		P
	Non-universal terminals shall accept the types of conductors declared by the manufacturer		P
	Rated connecting capacity (mm ²) :	0,14 mm² "f" 0,2 mm² - 4 mm²	P
	Suitable for connecting cross-sectional areas (mm ²) :	0,14 mm² "f" 0,2 mm² - 4 mm²	P
10.103	Terminals accept rigid and flexible conductors (table 101), unless otherwise specified (see 8.1)		P
	Smallest diameter (mm); largest diameter (mm).... :	0,42 mm, 2,7 mm	P
	During the test: terminals show no damage		P
10.104	Terminals clamp the conductor without undue damage:		
10.104.1	Connection/disconnection 5 times: smallest diameter (mm)..... :	0,14 mm² "f"	P
	Connection/disconnection 5 times: largest diameter (mm)..... :	4 mm²	P
	After the test, terminal not damaged		P
10.104.2	Rated cross-sectional area (mm ²) :	4 mm²	P
	Type :	rigid and flexible	P
	After the test, no wire of conductor escaped outside the terminal		P
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	P
10.106	Pull test:		
	- during the test the conductor does not come out	See appended table 10.106	P

IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
11	CONSTRUCTION		
11.101	Contact pressure not transmitted via insulating material, unless there is sufficient resiliency		P
11.102	Insertion and disconnection, in accordance with manufacturer's instructions		P
	Openings clearly distinguishable		P
11.103	Terminals so constructed that:		
	- each conductor is clamped individually		P
	- conductors can be connected or disconnected at same time or separately	separately	P
	Possible to clamp maximum number of conductors	1	P
11.104	Inadequate insertion of conductor avoided		P
11.2	Clamping units clamp conductors reliably and between metal surfaces		P
11.3	Connecting devices: insulation of conductors not in contact with live parts of different polarity		P
11.4	Insulating lining: adequate mechanical strength and secured in a reliable manner		P
11.5	Current-carrying parts: adequate mechanical strength, electrical conductivity and resistance to corrosion; type of metal	tin plated copper	P
	Current-carrying parts not made with electroplated coating if subjected to mechanical wear		N
11.6	Terminals: possible to connect number of conductors as specified by the manufacturer:		
	- number of conductors	1	P
	- rigid, cross-sectional area (mm ²)	0,2 mm² - 4 mm²	P
	- flexible, cross-sectional area (mm ²).....	0,14 mm² - 4 mm²	P
11.7	Fixing means of bases do not serve any other purpose		P

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

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

13	INSULATION RESISTANCE AND ELECTRIC STRENGTH		
13.1	Insulated connecting devices provided with adequate insulation resistance and electric strength		P
13.2	Insulation between the connected conductors and the external surface is adequate for all the combinations of conductors		P
13.3	Insulation resistance measured 1 min after application of 500 V d.c.	See appended table 13.3	P
13.4	Electric strength test	See appended table 13.4	P

14	MECHANICAL STRENGTH		
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	P
	max measured voltage drop (mV)	0,62 mV	P
14.2	Tumbling barrel (for < 50 g): 50 falls; after the test no damage	4,15 g	P
14.3	Impact test (for > 50 g): 10 blows:		
	- height of fall: 7,5 cm		N
	- height of fall: 10 cm		N
	- height of fall: 20 cm		N
	- height of fall: 25 cm		N
	After the test, no damage and live parts shall not become accessible		N

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

15	TEMPERATURE RISE		
	requirement: $\leq 45K$		P
	max measured temperature rise (K)	See appended table 15	P
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		P
	Cabinet temperature (°C) : ☐ 40 ☒ T-marking: 85 °C		P
	Maximum voltage drop did not exceed 22,5 mV or 1,5 times 24 th cycle value	See appended table 15.101	P

16	RESISTANCE TO HEAT		
16.1	Connecting devices are sufficiently resistant to heat		P
16.2	Heating cabinet test	See appended table 16.2	P
	After the test: no changes impairing further use and markings still legible		P
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	P
	Impression diameter not exceed 2 mm		P
	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	N
	Impression diameter not exceed 2 mm		N
17	CLEARANCES AND CREEPAGE DISTANCES		P
	Creepage distances, clearances and distances through sealing compound	See appended table 17	P

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

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

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			
No of sample	Conductor cross-sectional area (mm²)	Conductor type	Mass for conductor (kg)	Height H (mm)	Diameter of bushing hole (mm)	
1	0,14	Flexible	0,1	260	6,4	P
2	0,2	rigid flexible	0,1	260	6,4	P
3	4	rigid flexible	0,9	280	9,5	P
4						
5						
6						
Supplementary information:						

10.106	TABLE: Pull-out test					
	Model/type reference.....:					
No of sample	Conductor cross-sectional area (mm²)	Conductor type		Pull force (N)		
1	0,14	flexible		10		P
2	0,2	rigid flexible		10		P
3	4	rigid flexible		60		P
4						
5						
6						
Supplementary information:						

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

13.3	TABLE: Insulation resistance		
	Model/type reference.....:	221	
	Smallest cross-sectional area (mm²) :	0,14 mm² "f" / 0,2 mm² "r"	
	Largest cross-sectional area (mm²) :	4 mm² "r"	
Test voltage applied between		Measured (MΩ)	Required (MΩ)
All clamping units together and the body		>20 MΩ	5 MΩ
Each clamping unit and all others together			
Supplementary information:			

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

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

14.101	TABLE: Mechanical strength				
	0,1 times the test current (A) :	0,2 A			P
	smallest cross-sectional area (mm ²) 10.103 :	0,14 mm ²			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 st deflection) :	0,39	0,38	0,39	P
	- voltage drop measured (mV) (2 nd deflection) :	0,39	0,38	0,38	P
	- voltage drop measured (mV) (3 rd deflection) :	0,39	0,38	0,38	P
	- voltage drop measured (mV) (4 th deflection) :	0,38	0,39	0,38	P
	- voltage drop measured (mV) (5 th deflection) :	0,38	0,39	0,38	P
	- voltage drop measured (mV) (6 th deflection) :	0,39	0,39	0,38	P
	- voltage drop measured (mV) (7 th deflection) :	0,38	0,39	0,39	P
	- voltage drop measured (mV) (8 th deflection) :	0,39	0,39	0,39	P
	- voltage drop measured (mV) (9 th deflection) :	0,39	0,39	0,39	P
	- voltage drop measured (mV) (10 th deflection) :	0,38	0,39	0,39	P
	- voltage drop measured (mV) (11 th deflection) :	0,38	0,39	0,39	P
	- voltage drop measured (mV) (12 th deflection) :	0,39	0,39	0,39	P
	- requirement: ≤ 2,5 mV				P

IEC 60998-2-2				
Clause	Requirement + Test	Result - Remark		
14.101	TABLE: Mechanical strength			
	0,1 times the test current (A) :	0,4 A		
	smallest cross-sectional area (mm ²) 10.103 :	0,2 mm²		
	force (N) (table 104) :	0,09 N		
	Distance (mm) (table 104) :	100 mm		
	-screwless terminal number	1	2	3
	- voltage drop measured (mV) (1 st deflection) :	0,42	0,43	0,43
	- voltage drop measured (mV) (2 nd deflection) :	0,45	0,44	0,44
	- voltage drop measured (mV) (3 rd deflection) :	0,46	0,45	0,45
	- voltage drop measured (mV) (4 th deflection) :	0,45	0,45	0,45
	- voltage drop measured (mV) (5 th deflection) :	0,46	0,44	0,45
	- voltage drop measured (mV) (6 th deflection) :	0,46	0,45	0,45
	- voltage drop measured (mV) (7 th deflection) :	0,45	0,45	0,44
	- voltage drop measured (mV) (8 th deflection) :	0,46	0,46	0,45
	- voltage drop measured (mV) (9 th deflection) :	0,45	0,45	0,45
	- voltage drop measured (mV) (10 th deflection) :	0,46	0,46	0,45
	- voltage drop measured (mV) (11 th deflection) :	0,45	0,45	0,45
	- voltage drop measured (mV) (12 th deflection) :	0,46	0,45	0,45
	- requirement: ≤ 2,5 mV			

IEC 60998-2-2					
Clause	Requirement + Test	Result - Remark			Verdict
14.101	TABLE: Mechanical strength				
	0,1 times the test current (A)	3,2 A			P
	smallest cross-sectional area (mm ²) 10.103	4 mm²			P
	force (N) (table 104)	2 N			P
	Distance (mm) (table 104)	100 mm			P
	-screwless terminal number	1	2	3	-
	- voltage drop measured (mV) (1 st deflection)	0,62	0,57	0,60	P
	- voltage drop measured (mV) (2 nd deflection)	0,61	0,60	0,60	P
	- voltage drop measured (mV) (3 rd deflection)	0,57	0,54	0,54	P
	- voltage drop measured (mV) (4 th deflection)	0,54	0,54	0,55	P
	- voltage drop measured (mV) (5 th deflection)	0,61	0,58	0,56	P
	- voltage drop measured (mV) (6 th deflection)	0,60	0,57	0,55	P
	- voltage drop measured (mV) (7 th deflection)	0,60	0,58	0,59	P
	- voltage drop measured (mV) (8 th deflection)	0,61	0,60	0,59	P
	- voltage drop measured (mV) (9 th deflection)	0,61	0,60	0,60	P
	- voltage drop measured (mV) (10 th deflection)	0,59	0,58	0,58	P
	- voltage drop measured (mV) (11 th deflection)	0,59	0,58	0,59	P
	- voltage drop measured (mV) (12 th deflection)	0,58	0,58	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.....	221-415	
	Terminal.....	☒ single ☐ multiway	—
	T marking (°C).....	☒ Yes (85°C):	—
	Largest cross-sectional area (mm ²).....	4 mm²	
	Conductors	rigid and flexible	
	Rated connecting capacity (mm ²).....	4 mm²	
	Test current (A)	32 A	
Thermocouple Locations		max. temperature measured, (°C)	max. temperature limit, (°C)
On conductor in the terminal T1		21	45 K
On conductor in the terminal T2		22	45 K
On conductor in the terminal T3		21	45 K
On conductor in the terminal T4		22	45 K
On conductor in the terminal T5		22	45 K
	Model/type reference.....	221-415	
	Terminal.....	☒ single ☐ multiway	—
	T marking (°C).....	☒ Yes (85°C):	—
	Used cross-sectional area (mm ²)	4 mm²	
	Conductors	rigid	
	Test current (A)	32 A	
Thermocouple Locations		max. temperature measured, (°C)	max. temperature limit, (°C)
On conductor in the terminal T1		24	45 K
On conductor in the terminal T2		23	45 K
On conductor in the terminal T3		22	45 K
On conductor in the terminal T4		23	45 K
On conductor in the terminal T5		24	45 K
Supplementary information:			

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

15.101	TABLE: Temperature-cycling test			
	Model/type reference	221-415		
	Smallest cross-sectional area (mm ²)	0,14 mm² flexible		
	Test current (Table 2) (A)	2 A		
Measured voltage drop of:		Measured voltage drop (mV)		
		Sample 1	Sample 2	Sample 3
Solid conductors (after 24 cycles)				
Stranded conductors (after 24 cycles)				
Flexible conductors (after 24 cycles)		1,31	1,40	1,36
Solid conductors (1,5 times 24 th cycle value)				
Stranded conductors (1,5 times 24 th cycle value)				
Flexible conductors (1,5 times 24 th cycle value)		1,96	2,10	2,04
Solid conductors (after 192 cycles)				
Stranded conductors (after 192 cycles)				
Flexible conductors (after 192 cycles)		0,89	1,01	0,99
	Largest cross-sectional area (mm ²)	4 mm² rigid flexible		
	Test current (Table 2) (A)	32 A		
Measured voltage drop of:		Measured voltage drop (mV)		
		Sample 1	Sample 2	Sample 3
Solid conductors (after 24 cycles)		2,31	2,10	2,00
Stranded conductors (after 24 cycles)		2,12	2,23	2,10
Flexible conductors (after 24 cycles)		2,00	2,50	2,64
Solid conductors (1,5 times 24 th cycle value)		3,46	3,15	3,00
Stranded conductors (1,5 times 24 th cycle value)		3,18	3,34	3,15
Flexible conductors (1,5 times 24 th cycle value)		3,00	3,75	3,96
Solid conductors (after 192 cycles)		1,85	1,83	1,87
Stranded conductors (after 192 cycles)		1,79	1,81	1,80
Flexible conductors (after 192 cycles)		2,00	2,50	2,64
Supplementary information:				

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

15.101	TABLE: Temperature-cycling test				
	Model/type reference	221-415			
	Smallest cross-sectional area (mm ²).....	0,2 mm ² rigid flexible			
	Test current (Table 2) (A).....	4 A			
Measured voltage drop of:		Measured voltage drop (mV)			
		Sample 1	Sample 2	Sample 3	
Solid conductors	(after 24 cycles)	1,72	1,54	1,71	P
Stranded conductors	(after 24 cycles)				
Flexible conductors	(after 24 cycles)	1,79	1,79	2,10	P
Solid conductors	(1,5 times 24 th cycle value)	2,58	2,31	2,56	P
Stranded conductors	(1,5 times 24 th cycle value)				
Flexible conductors	(1,5 times 24 th cycle value)	2,68	2,68	3,15	P
Solid conductors	(after 192 cycles)	1,48	1,27	1,26	P
Stranded conductors	(after 192 cycles)				
Flexible conductors	(after 192 cycles)	1,28	1,14	1,89	P

16.2	TABLE: Heating cabinet test			
	Test temperature (°C)	☐ 85°C ☒ T + 45 = 130 °C		
Model/type reference		Sample 1	Sample 2	Sample 3
221-413		P	P	P
Supplementary information:				

16.3A	TABLE: Ball pressure test of insulating materials			
	Test temperature (°C)..... :		☐ 125 ☒ T + 45 =130 °C	
Part under test		Material designation / manufacturer	Impression diameter (mm)	
Housing		Xantar	1 mm	P
lever		Celanex	1 mm	P
lever		Ultradur	1 mm	P
Supplementary information:				

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

16.3B	TABLE: Ball pressure test of insulating materials		
	Test temperature (°C)..... :	☐ 70 ☐ T + 40 =	
Part under test	Material designation / manufacturer	Impression diameter (mm)	N
Supplementary information:			

17	TABLE: Clearances and creepage distances				
	Rated insulation voltage (V) :		450 V		P
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)
Between clamping units					
Clamping units - surface		4	4,05	4,07	-
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 and lever	Xantar / Celanex / Ultradur	850°C	flame extinguished immediately after removal.
Supplementary information:			

19	TABLE: Tracking		
Part under test	Material designation / manufacturer	Test voltage (V)	Remarks
housing	Xantar	175 V	P
lever	Celanex	175 V	P
lever	Ultradur	175 V	P
Supplementary information:			

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 CENELEC COMMON MODIFICATIONS			
1	Scope		
delete	In the first paragraph ", and equivalent AWG conductors".		P
6.2	Main characteristics		
delete	NOTE 1		P
8.3	Marking		
delete	the NOTE		P
11.6	Construction		
delete	", or equivalent AWG conductors".		P
15.4	Temperature rise		
delete	the NOTE		P
Annex	B		
delete	The whole annex		P

IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
EN 60998-2-2			
CENELEC COMMON MODIFICATIONS			
10.103	Connection of conductors		
delete	NOTE 1		P
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."		
10.105			
delete	NOTE 1 and NOTE 2		P
10.106			
delete	NOTE 1 and NOTE 2		P
14.101	Mechanical strength		
delete	the NOTE		P
Annex	BB		
delete	The whole annex		P

ANNEX ZB (normative) SPECIAL NATIONAL CONDITIONS (EN 60998-1)			
Special national condition: National characteristic or practice that cannot be changed even over a long period, e.g. climatic conditions, electrical earthing conditions. NOTE If it affects harmonization, it forms part of the European Standard. For the countries in which the relevant special national conditions apply these provisions are normative, for other countries they are informative.			
Clause			
6.2	United Kingdom		
Replace	The entire subclause by: 6.2 The standard rated connecting capacities are 0,2 mm², 0,34 mm², 0,5 mm², 0,75 mm², 1 mm², 1,25mm², 1,5 mm², 2,5 mm², 4 mm², 6 mm², 10 mm², 16 mm², 25 mm², and 35 mm²		P

Remarks

Illustrations:



Type: 221-412



Type: 221-413



Type: 221-415