Prüfbericht-Nr.: *Test Report No.*:	**NN20MVEK 001**	**Auftrags-Nr.:** *Order No.*:	190128703	Seite 1 von 1 *Page 1 of 1*
Kunden-Referenz-Nr.: *Client Reference No.*:	2043226	**Auftragsdatum:** *Order date*:	2020-10-10	
Auftraggeber: *Client*:	Zhejiang GRL Electric Co., Ltd. No. 246, Weishi Road, Economic Development Zone Yueqing City, Zhejiang Prov.325600, P. R. China			
Prüfgegenstand: *Test item*:	**Low-voltage fuse**			
Bezeichnung / Typ-Nr.: *Identification / Type*	**Fuse-link: RT16-2(NT2, NH2)** **Fuse-holder: DNF1-2, DNF2-2**			
Auftrags-Inhalt: *Order content*:	**Type test**			
Prüfgrundlage: *Test specification*:	EN 60269-1:2007+A1:2009+A2:2014 HD 60269-2:2013			
Wareneingangsdatum: *Date of sample receipt:*	2020-08-14			
Prüfmuster-Nr.: *Test sample No.*:	Engineering sample			
Prüfzeitraum: *Testing period*:	2020-08-14 to 2020-09-10			
Ort der Prüfung: *Place of testing*:	ZTME			
Prüflaboratorium: *Testing laboratory*:	TÜV Rheinland (China) Ltd.			
Prüfergebnis*: *Test result**:	Pass			

geprüft von: *tested by*:	Charles Wu	**genehmigt von:** *authorized by*:	Yang Yongming
Datum: *Date:*	2020-11-16	**Ausstellungsdatum:** *Issue date:*	2020-11-16
Stellung / *Position:*	Sachverständige(r)/Expert	**Stellung** / *Position:*	Sachverständige(r)/Expert

Sonstiges / *Other*: The report is based on CB report 1C200790 to issue TÜV Mark Approval and LVD.

Annex 1: CB report 1C200790 was issued on 02.11.2020; Annex 2: Deviation between HD 60269-2:2013 and IEC 60269-2:2013; Annex 3:Test requirements of EN 60269-1:2007/A2:2014

No deviation between EN 60269-1:2007+A1 and IEC 60269-1:2006+A1.

Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt
Condition of the test item at delivery: *Test item complete and undamaged*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
Legend:	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

Test Report issued under the responsibility of:

TÜVRheinland®

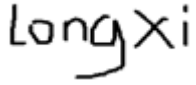
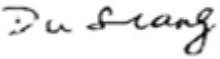
TEST REPORT
IEC 60269-1
Low-voltage fuses
Part 1: General requirements

Report Number. ..... :	**1C200790_P1**
Date of issue ..... :	**2020-11-02**
Total number of pages ..... :	**55**
Applicant's name..... :	Zhejiang GRL Electric Co., Ltd.
Address..... :	No. 246, Weishi Road, Economic Development Zone Yueqing City, Zhejiang Prov.325600, P. R. China
Test specification:	
Standard..... :	IEC 60269-1:2006 (Fourth edition)+ A1:2009
Test procedure ..... :	CB Scheme
Non-standard test method.....:	N/A
Test Report Form No..... :	IEC60269_1B
Test Report Form(s) Originator . :	EZU
Master TRF ..... :	Dated 2010-08

If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

Test item description ..... :	Low-voltage fuse
Trade Mark ..... :	GRL
Manufacturer ..... :	Zhejiang GRL Electric Co., Ltd.
Model/Type reference ..... :	Fuse-link: RT16-2(NT2, NH2)
	Fuse-holder: DNF1-2, DNF2-2
Ratings ..... :	Fuse-link: Un: 500 V AC or 690 V AC or 440 V DC
	In: 80 A, 100 A, 125 A, 160 A, 200 A, 225 A, 250 A, 315 A, 350 A, 400 A (500 V AC or 440 V DC)
	In: 80 A, 100 A, 125 A, 160 A, 200 A, 225 A, 250 A, 315 A, (690 V AC only)
	Rated breaking capacity: 120 kA(500 V AC), 50 kA(690 V AC), 100 kA(440 V DC)
	Breaking range and utilization category: gG
	Fuse-holder: Un: 500 V AC or 440 V DC, In:400 A ;
	Un: 690 V AC, In:315 A

Testing procedure and testing location:			
☒	**CB Testing Laboratory:**	**The Low Voltage Apparatus Laboratory of Zhejiang Testing & Inspection Institute for Mechanical and Electrical Products Quality (ZTME)**	
Testing location/ address.....:		**No 125 Miaohouwang Road Binjiang District Hangzhou, Zhejiang CHINA**	
☐	**Associated CB Laboratory:**		
Testing location/ address.....:			
	Tested by (name + signature) ... :	**Long Xi, Test Engineer**	
	Approved by (name + signature) ..... :	**Du Liang, Approver**	
☐	**Testing procedure: TMP**		
Testing location/ address.....:			
	Tested by (name + signature) ... :		
	Approved by (name + signature) ..... :		
☐	**Testing procedure: WMT**		
Testing location/ address.....:			
	Tested by (name + signature) ... :		
	Witnessed by (name + signature)..... :		
	Approved by (name + signature) ..... :		
☐	**Testing procedure: SMT**		
Testing location/ address.....:			
	Tested by (name + signature) ... :		
	Approved by (name + signature) ..... :		
	Supervised by (name + signature)..... :		
☐	**Testing procedure: RMT**		

Testing location/ address.....:		
Tested by (name + signature) ... :		
Approved by (name + signature) ..... :		
Supervised by (name + signature)..... :		

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

The report 1C200790 has two parts:

part 1 for IEC60269-1(55 pages);

part 2 for IEC60269-2(41 pages)

Summary of testing:

RT16-2 and NH2, NT2 are identical products except with different model name.

For homogeneous series of RT16-2, type tests are listed in table 11, 12, 13 and 14 of IEC60269-1:2006+A1 and table 109 of IEC60269-2:2013.

All tests were performed and passed.

Tests performed (name of test and test clause):

Fuse-link:

RT16-2(NT2, NH2)

Un: 500 V AC

In=400 A Table 11 of IEC60269-1

In=400 A Table 13 of IEC60269-1

Un: 690 V AC

In=315 A Table 11 of IEC60269-1

In= In: 100 A, 125 A, 160 A, 200 A, 225 A, 250 A, 350 A (500 V AC)

Table 13 of IEC60269-1

Un=500 V AC and 690 V AC

In=80 A table 12 of IEC 60269-1

Un: 440 V DC

In=400 A Table 11 of IEC60269-1

In=80A Table 12 of IEC60269-1

In= 100 A, 125 A, 160 A, 200 A, 225 A, 250 A, 315 A, 350 A,

Table 13 of IEC60269-1

Fuse-holder: DNF1-1, DNF2-1

Testing location:

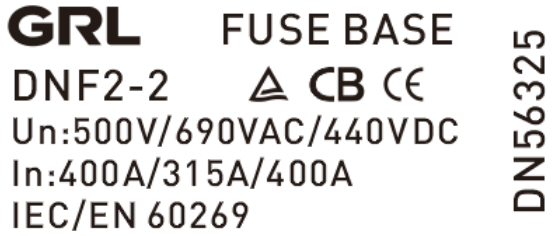
1. **The Low Voltage Apparatus Laboratory of Zhejiang Testing & Inspection Institute for Mechanical and Electrical Products Quality (ZTME)**

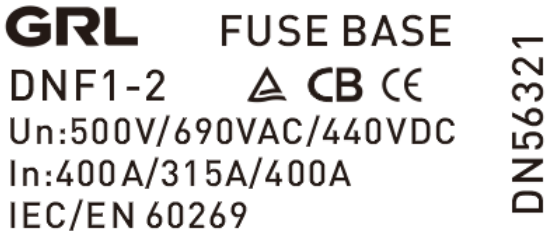
   No 125 Miaohouwang Road Binjiang District Hangzhou, Zhejiang CHINA

500 V AC, 440 V DC/In:400A, **690 V AC/In: 315 A** **Table 14 of IEC60269-1 and Table 109 of IEC60269-2** **8.11.2.3 Verification of resistance to rusting**	**2. Zhongjian Quality Test and Certification Research Institute Co., Ltd.** **No.352, banshan Road, Hangzhou, Zhejiang, China**
Summary of compliance with National Differences **List of countries addressed:** ☐ **The product fulfils the requirements of _____ (insert standard number and edition and delete the text in parenthesis or delete the whole sentence if not applicable)**	

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.





Test item particulars .....:	**For use by authorized persons**
Classification of installation and use.....:	**N/A**
Supply Connection.....:	**N/A**
.....:	
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 ..... :	**2020-08-14**
Date (s) of performance of tests..... :	**2020-08-14 to 2020-09-10**

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)..... :	**Zhejiang GRL Electric Co., Ltd.** **No. 246, Weishi Road, Economic Development Zone** **Yueqing City, Zhejiang Prov.325600, P. R. China**

General product information:

The products are Fuse-link and Fuse-holder for use by authorized persons.
Fuse-link: RT16-2(NT2, NH2)
Fuse-holder: DNF1-2, DNF2-2
Fuse-link: Un: 500 V AC or 690 V AC or 440 V DC
In: 80 A, 100 A, 125 A, 160 A, 200 A, 225 A, 250 A, 315 A, 350 A, 400 A (500 V AC or 440 V DC)
In: 80 A, 100 A, 125 A, 160 A, 200 A, 225 A, 250 A, 315 A, (690 V AC only)
Rated breaking capacity: 120 kA(500 V AC), 50 kA(690 V AC), 100 kA(440 V DC)
Breaking range and utilization category: gG
Fuse-holder: Un: 500 V AC or 440 V DC, In:400 A ;
Un: 690 V AC, In:315 A
Type nomenclature:
Fuse link:
RT 16 – 2(NH2, NT2)
① ② ③ ④
① RT: Fuses with blade contacts
② 16: Designed Code No.
③ 2: Size
④ NH2, NT2: same product with different name.

Fuse-holder:
DN F □ - 2
① ② ③ ④
①DN: Corporate code
② F: Fuse-holder Code No.
③ □: Designed Code No, 1 with touch protection function; 2 without touch protection function
④ 2: Size.

IEC 60269-1			
Clause	Requirement + Test	Result - Remark	Verdict
5	CHARACTERISTICS OF FUSES		
5.2	Rated voltage (V) as specified ..... :	500 V AC, 440 V DC or 690 V AC	**P**
5.3.1	Rated current (A) of the fuse-link in accordance with specified values ..... :	In: 80 A, 100 A, 125 A, 160 A, 200 A, 225 A, 250 A, 315 A, 350 A, 400 A (500 V AC or 440 V DC) In: 80 A, 100 A, 125 A, 160 A, 200 A, 225 A, 250 A, 315 A, (690 V AC only)	**P**
5.3.2	Rated current (A) of the fuse-holder ..... :	Un: 500 V AC/In: 400 A Un: 440 V DC/In:400 A Un: 690 V AC/In:315A	**P**
5.4	Rated frequency (Hz) ..... :	50Hz or DC	**P**
5.5	Max. rated power dissipation (VA) of fuse-link :	≤45W	**P**
	Rated acceptable power dissipation (VA) of fuse-holder ..... :	>45W	**P**
5.6	Limits of time-current characteristics based on reference ambient air temperature Ta of +20°C		**P**
5.6.1	Time-current zones deviated from standardized, or available in manufacturers documentation (with tolerances)..... :		**P**
5.6.2	Conventional times and currents see Table 2:	According to table 2 of IEC60269-1 and table 101 of IEC60269-2	**P**
5.6.3	Gates ..... :	According to table 3 of IEC60269-1 and table 102 of IEC60269-2	**P**
5.7	Breaking range and breaking capacity		**P**
5.7.1	Breaking range and utilization category..... :	**gG**	**P**
5.7.2	Rated breaking capacity (A) of fuse-link corresponds to the rated voltage (V), and is equal or higher than given minimum (A) in subsequent part of this standard ..... :	120 kA(500V AC), 50 kA(690V AC), 100 kA(440V DC)	**P**

IEC 60269-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.8	Cut-off current and I^2t characteristics are referred to the values of voltage, frequency and power factor		P
5.8.1	Cut-off current characteristics, if required, given by the manufacturer according to Figure 4 ..... :		**N/A**
5.8.2	Pre-arcing I^2t characteristics for pre-arcing times of less than 0,1 s down to a time corresponding to the rated breaking capacity given by the manufacturer..... :		**P**
	The operating I^2t characteristics with specified voltages as parameter for pre-arcing times less than 0,1 s given by the manufacturer ..... :		**P**

IEC 60269-1			
Clause	Requirement + Test	Result - Remark	Verdict
6	MARKINGS		
	Markings are durable and easily legible		**P**
6.1	Fuse-holders marked by:		**P**
	- name of manufacturer or trade mark which enable identification of fuse-holder ..... :	**GRL**	**P**
	- manufacturer's identification reference enabling to find all characteristics listed in 5.1.1 ..... :	DNF1-2, DNF2-2	**P**
	- rated voltage (V) ..... :	Un: 500 V AC or 440 V DC/In:400 A 690 V AC/315 A	**P**
	- rated current (A) ..... :	Un: 500 V AC or 440 V DC/In:400 A 690 V AC/315 A	**P**
	- kind of current and rated frequency (Hz) ..... :	50 Hz or DC	**P**
6.2	Fuse-link(s) except small fuse-link(s) marked by:		**P**
	- name of manufacturer or trade mark which enable identification of fuse-links ..... :	**GRL**	**P**
	- manufacturer's identification reference enabling to find all characteristics listed in 5.1.2 ..... :	RT16-2(NT2, NH2)	**P**
	- rated voltage (V) ..... :	500 V AC, 440 V DC or 690 V AC	
	- rated current (A) ..... :	In: 80 A, 100 A, 125 A, 160 A, 200 A, 225 A, 250 A, 315 A, 350 A, 400 A (500 V AC or 440 V DC) In: 80 A, 100 A, 125 A, 160 A, 200 A, 225 A, 250 A, 315 A, (690 V AC only)	
	- breaking range and utilization category (if applicable) (5.7.1) ..... :	120 kA(500V AC), 50 kA(690V AC), 100 kA(440V DC)	
	- kind of current ..... :	AC or DC	
	- rated frequency (Hz), if applicable (5.4)	50 Hz or DC	
	Small fuse-links marked by:		**N/A**
	- trademark ..... :		**N/A**

IEC 60269-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- list reference of manufacturer ..... :		**N/A**
	- rated voltage (V) ..... :		**N/A**
	- rated current (A) ..... :		**N/A**
6.3	Symbols for the kind of current and frequency in accordance with IEC 60417		**P**

IEC 60269-1			
Clause	Requirement + Test	Result - Remark	Verdict
7	STANDARD CONDITIONS FOR CONSTRUCTION		
7.1	Mechanical design	**Fulfilled**	**P**
7.1.1	Replacement of fuse-links easily and safely		P
7.1.2	Connections, including terminals		P
	Contact force is not transmitted through insulating material other than ceramic or other material with characteristics not less suitable, unless		P
	there is sufficient resilience in the metallic parts to compensate any possible shrinkage or other deformation of the insulating material		P
	Terminals cannot turn or be displaced when the connecting screws are tightened		P
	Terminals shall be such, that the conductors cannot be displaced		P
	Parts gripping the conductors are of metal		P
	Gripping parts cannot unduly damage conductors		P
	Terminals readily accessible under the intended conditions of installation		P
7.1.3	Fuse-contacts		P
	Fuse-contacts are such that necessary contact force is maintained under the conditions of service and operation		P
	Contact is such that electromagnetic forces occurring during operation under conditions in accordance with 7.5 not impair electrical connections between		P
	a) fuse-base and fuse-carrier		N/A
	b) fuse-carrier and fuse-link		N/A
	c) fuse-link and fuse-base		P
	Fuse contacts are so constructed and of such material that, when fuse is properly installed and service conditions are normal, adequate contact is maintained		P
	a) after repeated engagement and disengagement		P

IEC 60269-1			
Clause	Requirement + Test	Result - Remark	Verdict
	b) after being left undisturbed in service for long period		P
7.1.4	Construction of a gauge-piece		**N/A**
	Gauge-piece is so designed that it withstands normal stresses occurring during use		**N/A**
7.1.5	Mechanical strength of fuse-link		P
	Fuse-link have adequate mechanical strength and its contacts are securely fixed		P
7.2	Insulating properties and suitability for isolation		P
	Fuses are such that they do not lose insulating properties at voltages to which they are subjected in normal service		P
	Fuse passes the tests for verification of insulating properties and suitability for isolation in accordance with 8.2		P
7.3	Temperature rise, power dissipation of the fuse-link and acceptable power dissipation of the fuse-holder		P
	See Table 5 ..... :		P
	Requirements are verified by tests according to 8.3		P
7.4	Operation		P
	Fuse-link is so designed and proportioned that, when tested in its appropriate test arrangement at rated frequency and ambient air temperature of (20±5)°C		P
	- is able to carry continuously any current not exceeding its rated current		P
	- is able to withstand overload conditions as they may occur in normal service (see 8.4.3.4)		P
	Fuse-link satisfy these conditions if it passes the tests prescribed in 8.4		P
7.5	Breaking capacity		P
	Fuse is capable of breaking, at rated frequency and at voltage not exceeding the recovery voltage specified in 8.5, any circuit having prospective current between		P

IEC 60269-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- current I_f (for “g” fuse-links) ..... :	According to table 2 of IEC60269-1 and table 101 of IEC60269-2	P
	- current k_2I_n (for “a” fuse-links) ..... :		**N/A**
	- for a.c., rated breaking capacity at power factors not lower than those in Table 20 ..... :	0,1-0,2 for I1, I2; 0,3-0,5 for I3,I4, I5	P
	- for d.c., rated breaking capacity at time constants not greater than those limits in Table 21 ..... :		P
	Arc voltage not exceed values given in Table 6. :		P
	Fuse satisfy these conditions if it passes the tests prescribed in 8.5		P
7.6	Cut-off current characteristic		**N/A**

IEC 60269-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Values of cut-off current measured as specified in 8.6 are less than, or equal to, the values corresponding to cut-off current characteristics assigned by the manufacturer		**N/A**
7.7	I^2t characteristics		P
	Pre-arcing I^2t values verified according to 8.7 (Table 7) ..... :		P
	Operating I^2t values verified according to 8.7 .... :		P
7.8	Overcurrent discrimination of fuse-links ..... :		**P**
7.9	Protection against electric shock		**N/A**
	The degree of protection when the fuse is under normal service conditions: ..... :	IP00	**N/A**
	The degree of protection when replacing the fuse-link: ..... :	IP00	**N/A**
	The degree of protection when the fuse-link and fuse-carrier is removed: ..... :	IP00	**N/A**
7.9.1	Clearances and creepage distances		**P**
	Clearances are not less than the values given in Table 9 ..... :		**P**
	Creepage distances correspond to material group, as defined in 2.7.1.3 of IEC 60664-1, corresponding with rated voltage given in Table 10 ..... :		**P**
7.9.2	Leakage currents of fuses suitable for isolation		N/A
	Value of leakage current (mA) not exceed		N/A
	- 0,5 mA per pole for fuses in new conditions .. :		N/A
	- 2 mA per pole for fuses having been submitted to test according to 8.5 ..... :		N/A
7.9.3	Additional constructional requirements for fuses for linked fuse-carriers, suitable for isolation		N/A
	Fuse-holder are marked with the symbol IEC 60617-S00369		N/A
	When fuse is in open position, with fuse-link remaining inside the fuse-carrier, isolating distance between the fuse contacts in accordance with the isolating function are provided		N/A

IEC 60269-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Indication of this position is provided by the position of the fuse-carrier		N/A
	There exists a locking means in order to lock the fuses in the isolated position, locking is possible only in this position		N/A
	Fuses are designed so that the fuse-carrier remains attached to the fuse-base giving correct indication of the open position, and of locking		N/A
7.10	Resistance to heat		P
	All components are sufficiently resistant to heat which may occur in normal use (see 8.9 and 8.10)		P
7.11	Mechanical strength		P
	All components of fuse are sufficiently resistant to mechanical stresses which may occur in normal use (see 8.3 to 8.5 and 8.11.1)		P
7.12	Resistance to corrosion		P
	All metallic components of fuse are resistant to corrosive influences which may occur in normal use		P
7.12.1	Resistance to rusting		P
	Ferrous components are so protected that they meet relevant tests (see 8.2.2.3.2 and 8.11.2.3)		P
7.12.2	Resistance to season cracking		P
	Current-carrying parts are sufficiently resistant to season cracking (see 8.2.2.3.2 and 8.11.2.1)		P
7.13	Resistance to abnormal heat and fire		P
	All components of fuse are sufficiently resistant to abnormal heat and fire (see 8.11.2.2)		P
7.14	Electromagnetic compatibility		N/A
	Fuses within the scope of this standard are not sensitive to normal electromagnetic disturbances		N/A
	No immunity tests are required		N/A

IEC 60269-1			
Clause	Requirement + Test	Result - Remark	Verdict
8	TESTS Fuse-link:RT16-2(NT2, NH2) Fuse-holder: DNF1-2, DNF2-2		
8.1.2	At the beginning of each test, the fuse is approximately at the ambient temperature		P
8.1.3	Tests made on fuses in clean and dry condition		P
8.1.4	Arrangement of the fuse and dimensions		P
	Except for degree of protection test (see 8.8), fuse are mounted in free air in draught-free surroundings in the normal operation position and on insulating material of sufficient rigidity		P
	Before tests are started, specified external dimensions are measured and results compared with dimensions specified in the relevant data sheet of the manufacturer or specified in subsequent parts	Refer to Part 2 of report 1C200790	P
8.1.5	Testing of fuse-links		P
	Fuse-links tested with the kind(s) of current for which they are rated		P
	Fuse-links tested for a.c. with frequency for which they are rated		P
8.1.5.1	Complete tests		P
	Internal resistance R measured by a current ≤ 0,1 In		P
	Measuring current (A) ..... :	0,1 In	P
	Ambient air temperature in range of 20 ± 5 °C	22 °C	P
	The values of resistance	(see appended table)	P
8.1.5.2	Testing of fuse-links of a homogeneous series		P
	Fuse-links tested like a homogeneous series . :	Yes/~~No~~	P
	If yes: fuse-links have identical enclosures in form and construction (except of fuse-elements and contacts)		P
	- the same arc-extinguishing medium and same completeness of filling		P
	- fuse-elements of identical materials		P
	- their cross-section of fuse-elements not exceed the cross-section of fuse-links having the highest rated current		P

IEC 60269-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- number of fuse-elements do not exceed number of fuse-elements of fuse-links with the highest rated current		P
	- minimum distances between adjacent fuse-elements and between the fuse-elements and the inner surface of the cartridge is not less than those in the fuse-link with the highest rated current		P
	- fuse-links used with a given fuse-holder, or		P
	- fuse-links intended to be used in an arrangement identical for all rated currents of the homogeneous series		N/A
	- value of $RI_n^{3/2}$ does not exceed the value for the fuse-link with largest rated current of the homogeneous series (R measured as indicated in 8.1.5.1)		P
	the rated breaking capacity of fuse-links not greater than that of the fuse-link with the largest rated current within the homogeneous series		P
	- if not, the fuse-links with greater breaking capacity subjected to tests no. 1 and no. 2		**N/A**
	The fuse-link having the largest rated current tested completely according to Table 11		P
	The fuse-link having the smallest rated current tested only according to Table 12		P
	The fuse-links between the largest and smallest rated current tested according to Table 13		P
8.1.6	Testing of fuse-holders		P
	The fuse-holders are subjected to the tests according to Table 14		P
8.2	Verification of the insulating properties and of the suitability for isolation		P
8.2.1	Arrangement of the fuse-holder		P
	The fuse-holder fitted with a fuse-links of the largest dimensions for the type of fuse-holder concerned		P
	The fuse-base fixed to a metal plate, unless otherwise specified		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Fuse-link is replace a while live - surfaces of fuse-link, of device for replacing it or of fuse-carrier, if of insulating material, are provided with metal coverings connected during tests to the frame of the apparatus; if of metal, they are connected direct to the frame		P
8.2.2	Verification of the insulating properties		**P**
	Points of application of the test voltage		P
	The test voltage is applied between:		
	a) live parts and the frame with the fuse-link and the device for replacing it, or		P
	the fuse-carrier, if any, in position		P
	no breakdown of insulation or flashover during 1 min of the applying test voltage		P
	b) the terminals without fuse-link, device for replacing or the fuse-carrier		P
	no breakdown of insulation or flashover during 1 min of the applying test voltage		P
	c) live parts of different polarity in the case of multipole fuse-holder with fuse-links, fuse-carrier(s) or device(s) for replacing the fuse-links		**N/A**
	no breakdown of insulation or flashover during 1 min of the applying test voltage		**N/A**
	d) live parts which in the case of a multipole fuse-holder reach different potential after the fuse-link operates (equipped by fuse-carrier or device for replacing without fuse-link)		**N/A**
	no breakdown of insulation or flashover during 1 min of the applying test voltage		**N/A**
	The values of test voltage (V) as specified in Table 15 ..... :	1890 V(DNF1-2, DNF2-2)	P
8.2.2.3.2	Fuse-holder is subjected to humid atmospheric conditions	DNF1-2, DNF2-2	P
	Relative humidity of ambient air (%) ..... :		P
	Ambient air temperature (°C) ..... :	21,2°C to 22,1 °C	P
	Duration of treatment (h) ..... :	93% to 94%	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Insulation resistance is measured between the points prescribed in 8.2.2.1 by applying d.c. voltage of approximately 500 V		P
	Points of measuring:		P
	a) min. measured value (MΩ) ..... :	550 MΩ	P
	b) min. measured value (MΩ) ..... :	550 MΩ	P
	c) min. measured value (MΩ) ..... :		**N/A**
	d) min. measured value (MΩ) ..... :		**N/A**
	The insulation resistance not less than MΩ .... :	550 MΩ > 1 MΩ	P
8.2.3	Verification of the suitability for isolation		P
	Clearances and creepage distances are verified by dimensional measurement and by voltage test		P
	Points of application of the test voltage		P
	The test voltage is applied between:		
	- terminals when the fuse-link and device for replacing it, are removed		P
	Test voltage (kV) for verification of the rated impulse withstand voltage is given in Table 16 :	9,8 kV	P
	The 1,2/50 µs impulse voltage applied 5 times for each polarity at intervals of 1 s minimum	5 times	P
	no breakdown of insulation or flashover during of the applying test voltage		P
	no disruptive discharge during the test		P
8.2.4.2	Fuse-holder is subjected to humid atmospheric conditions	DNF1-2, DNF2-2	P
	Relative humidity of ambient air (%) ..... :	21,2°C to 22,1 °C	P
	Ambient air temperature (°C) ..... :	93% to 94%	P
	Duration of treatment (h) ..... :	48h	P
	Insulation resistance is measured between the points prescribed in 8.2.2.1 by applying d.c. voltage of approximately 500 V		P
	Points of measuring:		
	a) min. measured value (MΩ) ..... :	550 MΩ	P
	b) min. measured value (MΩ) ..... :	550 MΩ	P
	c) min. measured value (MΩ) ..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	d) min. measured value (MΩ) ..... :		N/A
	The insulation resistance not less than 1 MΩ :	550 MΩ > 1 MΩ	P
8.3	Verification of temperature rise and power dissipation		P
8.3.1	One fuse used for test (unless otherwise stated by the manufacturer) mounted in free air	RT16-2(NT2, NH2) 400 A	P
	Test performed at an ambient air temperature of (20±5) °C		P
	Ambient air temperature during the test (°C) ... :	21,7 °C/ DNF1-2 23,4 °C/ DNF2-2	P
	Cross-sectional area (see Table17) (mm^2 or mm x mm)..... :	240 mm^2	–
	Tightened by torque; torque (Nm) ..... :	32 Nm	–
8.3.2	The temperature of the fuse measured by method of measuring ..... :	Thermocouple measurement	P
8.3.3	Measurement of the power dissipation of the fuse-link		P
	One fuse used for test (unless otherwise stated by the manufacturer) mounted in free air	RT16-2(NT2, NH2) 400 A	P
	Test performed at an ambient air temperature of (20±5) °C		P
	Ambient air temperature during the test (°C) ... :	21,7 °C/ DNF1-2 23,4 °C/ DNF2-2	P
	Cross-sectional area (see Table17) (mm^2 or mm x mm)..... :	240 mm^2	–
	Tightened by torque; torque (Nm) ..... :	32 Nm	–
8.3.4.1	Temperature rise of the fuse-holder	DNF1-2,DNF2-2	P
	Applied a.c. current (A) for test equal to the rated current of the fuse-holder ..... :	400 A AC	P
	Test made with fuse-link (A), or ..... :	RT16-2(NT2, NH2) 400 A	P
	with a dummy fuse-link specified in subsequent parts..... :	Part 2-System A	P
	Temperature rise limits T for contacts and terminals (Table 5):		P

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Clause	Requirement + Test	Result - Remark	Verdict
	spring loaded contacts; limit (K) ..... :	unenclosed / ~~enclosed~~ Measurement: max. 48,9 K Limit: 55 K	P
	bolted contacts; limit (K) ..... :	unenclosed / enclosed	N/A
	terminals; limit (K) ..... :	unenclosed / ~~enclosed~~ Measurement: max. 44,1 K Limit:65 K	P
8.3.4.2	Power dissipation of a fuse-link		P
	The test made with a.c. at the current (A) equal to the rated current of the fuse-link ..... :	400 A	P
	The points of measuring ..... :	Between Input terminal and output terminal	P
	Measured value of power (W) dissipation in limits (W) specified in subsequent parts ..... :	Part 2-System A	P
8.3.5	The acceptable power dissipation (W) of fuse-holder not less than the rated power dissipation of the corresponding fuse-links ..... :	Fuse-link: 43,6 W<45 W (DNF1-2); 44,0 W<45 W (DNF2-2) Fuse holder: 46,8 W≥45 W (DNF1-2); 47,6W ≥ 45 W (DNF2-2)	P
	After the tests prescribed in 8.3, the insulating parts of the fuse-holders cooled down to ambient temperature withstood the test voltage according to 8.2 ..... :	1.89 kV	P
	No deformation after tests of 8.3		P
8.4	Verification of operation		P
8.4.1	The test arrangement as specified in 8.1.4		P
	Length (m) of conductors (see 8.3.1) ..... :	2m (In>50A)	P
	their cross-sectional area (mm^2) as specified in Table 17 ..... :	According to table 17	P
8.4.2	Ambient air temperature during test within (20±5) °C		P
8.4.3.1	Verification of conventional non-fusing and fusing current		

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Clause	Requirement + Test	Result - Remark	Verdict
	a) the fuse-link subjected to the conventional non-fusing current (I_{nf}) (see Table 2) ..... :	80~400 A, see table 2	–
	the fuse-link did not operate within the conventional time of (h) (Table 2) ..... :	2h(63A< In≤160A) 3h(160A< In≤400A)	P
	b) the same fuse-link, after cooled down to ambient temperature, subjected to the conventional fusing current (I_f) (seeTable 2) ..... :	400A, 80A see table 2	–
	the fuse-link operated within the conventional time of (minutes) (Table 2) ..... :	25 min 29 s (In=400A, 3h) 18 min 33 s(In=80A,2h)	P
8.4.3.2	Verification of rated current of “g” fuse-links		P
	One fuse-link submitted to a pulse test for 100 h	100h	P
	On-period equal to conventional time (h) ..... :	3h(160A< In≤400A) 2 h(63A<In≤160A)	P
	Off-period of 0,1 of the conventional time ..... :	18 min (160A< In≤250A) 12 min (63A<In≤160A)	
	Test current (A) equal to 1,05 of the rated current ..... :	1.05*In A In= In: 80 A, 100 A, 125 A, 160 A, 200 A, 225 A, 250 A, 315 A, 350 A, 400 A	P
	After the test, the fuse-link not have changed its characteristics		P
8.4.3.1	a) the fuse-link subjected to the conventional non-fusing current (I_{nf}) (see Table 2) ..... :	80~250 A, see table 2	–
	the fuse-link did not operate within the conventional time of (h) (Table 2) ..... :	2h(63A< In⩽160A); 3h(160A< In⩽ 400A)	P
8.4.3.3	Verification of time-current characteristics and gates		P
8.4.3.3.1	The time-current characteristics verified on the basis of the test according to 8.5	See 8.5	P
	Values of pre-arcing and operating times within the time-current zones:		**P**
	- indicated by the manufacturer		N/A
	- specified in subsequent parts ..... :	Part 2	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Verification for smaller current ratings, if only one largest rated current fuse-link is subjected to the test according to 8.5 (in case of homogeneous series):		**P**
	"g" fuse-links (except “gD”, "gG" and "gM")		N/A
	Tests made in connection with verification of the gates (see8.4.3.3.2)		N/A
	Ambient air temperature within (20±5) °C ..... :		N/A
	rated current In (A) of the fuse-link ..... :		_
	test performed at voltage (V) ..... :		_
	test 3a) prospective current (A) equal to kIn ($10 \leq k \leq 20$) ..... :		N/A
	pre-arcing time (s) ..... :		_
	specified pre-arcing time (s) max./min. ..... :		N/A
	test 4a) prospective current (A) equal to kIn ($5 \leq k \leq 8$) ..... :		N/A
	pre-arcing time (s) ..... :		_
	specified pre-arcing time (s) max./min. ..... :		N/A
	test 5a) prospective current (A) equal to kIn ($2{,}5 \leq k \leq 4$) ..... :		N/A
	pre-arcing time (s) ..... :		_
	specified pre-arcing time (s) max./min. ..... :		N/A
	Verification for smaller current ratings, if only one largest rated current fuse-link is subjected to the test according to 8.5 (in case of homogeneous series):		N/A
	"a" fuse-links		N/A
	Ambient air temperature within (20±5) °C ..... :		N/A
	rated current In (A) of the fuse-link ..... :		_
	test performed at voltage (V) ..... :		_
	test 3a) prospective current (A) equal to nk_2 In ($5 \leq n \leq 8$) ..... :		N/A
	pre-arcing time (s) ..... :		_
	specified pre-arcing time (s) max./min. ..... :		N/A
	test 4a) prospective current (A) equal to nk_2 In ($2 \leq n \leq 3$) ..... :		N/A
	pre-arcing time (s) ..... :		_
	specified pre-arcing time (s) max./min. ..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	test 5a) prospective current (A) equal to nk_2 In ($1 \leq n \leq 1,5$) ..... :		N/A
	pre-arcing time (s) ..... :		_
	specified pre-arcing time (s) max./min. ..... :		N/A
8.4.3.3.2	Verification of gates		P
	"gG" and "gM" fuse-links	"gG" / ~~"gM"~~	P
	rated current of the fuse-link (A) ..... :		_
	test performed at voltage (V) ..... :		_
	a) testing current (A); pre-arcing time (s) higher than 10 s ..... :	16A≤In, Detail see table 3 of standard; >10 s 16A>In, Detail see part 2 table 102 of standard; >10 s	P
	b) testing current (A); pre-arcing time (s) less than 5 s ..... :	16A≤In, Detail see table 3 of standard; <5 s 16A>In, Detail see part 2 table 102 of standard;<5 s	P
	c) testing current (A); pre-arcing time (s) higher than 0,1 s ..... :	16A≤In, Detail see table 3 of standard; >0,1 s 16A>In, Detail see part 2 table 102 of standard; >0,1 s	P
	d) testing current (A); pre-arcing time (s) less than 0,1 s ..... :	16A≤In, Detail see table 3 of standard; <0,1 s 16A>In, Detail see part 2 table 102 of standard; <0,1 s	P
	"aM" fuse-links		N/A
	rated current of the fuse-link (A) ..... :		_
	test performed at voltage (V) ..... :		_
	Cross-sectional area (see Table18) (mm^2 or mm x mm)..... :		_
	e) testing current (A); pre-arcing time (s) higher than 60 s ..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	f) testing current (A); pre-arcing time (s) less than 60 s ..... :		N/A
	g) testing current (A); pre-arcing time (s) higher than 0,2 s ..... :		N/A
	h) testing current (A); pre-arcing time (s) less than 0,10 s..... :		N/A
8.4.3.4	Overload	Fuse-link (80A and 400A, AC/DC)	P
	The test arrangement is same as that for the temperature rise test (see 8.3.1)		P
	Three fuse-links submitted to 50 pulses having the same duration and test current ..... :	50 pulses	P
	test performed at voltage (V) ..... :	500 V AC/440 V DC	_
	“g” fuse-links:		P
	test current (A) equal to 0,8 times the current stated for a pre-arcing time of 5 s ..... :	0,8*1280=1020 A for In=400A 10s to 400s(400A) 0,8*208A=166A for In=80A 10s to 600s (80A)	P
	duration of each pulse 5 s		P
	time (s) interval between pulses equal to 20 % of the conventional time (s) specified in Table 2 .. :	See table 2	P
	“a” fuse-links:		N/A
	rated current In (A) of fuse-link ..... :		N/A
	test current (A) equal to $k_1 I_n$ ± 2% ..... :		N/A
	the pulse duration (s) corresponds to that indicated on the overload curve for $k_1 I_n$ stated by manufacturer ..... :		N/A
	time (s) intervals between pulses equal to 30 times the pulse duration ..... :		N/A
	fuse-links having ambient air temperature subjected to a current (A) equal to current for the overload test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	pre-arcing time (s) of sample lies within the manufacturers time-current zone ..... :	For In=400A/AC(10s to 400s) 1) 185s 2) 188s 3) 186s For In=80A/AC(10s to 600s) 1) 329s 2) 328s 3) 330s For In=400A/DC(10s to 400s) 1) 180s 2) 184s 3) 182s For In=80A/DC(10s to 600s) 1) 325s 2) 326s 3) 328s	P
8.4.3.5	Conventional cable overload protection test (for "gG" fuse-links only)	In=200 A, 160 A, 80 A necessary to perform	P
	fuse-link mounted as specified in 8.4.1		P
	provided with PVC insulated copper conductors of cross-sectional area (mm^2) (see Table 19) .. :	70 $mm^2 \times 2$ m(In=200A) 50 $mm^2 \times 2$ m(In=160A) 16 $mm^2 \times 2$ m(In=80A)	P
	fuse and conductor connected to it, preheated with rated current (A) of fuse-link ..... :	200 A, 160 A, 80 A	P
	for a time (h) equal to the conventional time .... :	3 h	P
	test current increased to 1,45 I_z (A) (I_z specified in Table 19) ..... :	1,45*213=308,85 A	P
	the fuse-link operated in time (s) less than the conventional time (s) ..... :	20min18s(<3h) AC 200A 27min30s(<2h) AC 160A 18min24s(<2h) AC 80A 18min50s(<3h) DC 200A 25min11s(<2h) DC 160A 17min48s(<2h) DC 80A	P

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Clause	Requirement + Test	Result - Remark	Verdict
8.4.3.6	Operation of indicating devices and strikers, if any		N/A
	Operation of indicating device verified in combination with the verification of breaking capacity (see 8.5.5)		N/A
	The verification of striker operation:		N/A
	"g" fuse-link tested at current (A) equal to current I_4 (see Table 20 abd 21) ..... :		N/A
	recovery voltage (V) ..... :		N/A
	stated recovery voltage (V) ..... :		N/A
	“a" fuse-link tested at current (A) equal to current $2k_1I_n$ (A) (see Figure 2) ..... :		N/A
	recovery voltage (V) ..... :		N/A
	stated recovery voltage (V) ..... :		N/A
	Striker operate during all tests made at recovery voltage of at least 20 V		N/A
	No failure of indicating device or striker		N/A
8.5	Verification of the breaking capacity		P
8.5.1	The test arrangements as specified in 8.1.4		P
8.5.2	Characteristics of the test circuit as specified		P
	Scheme of test circuit (see Figure 5)		P
	Deviations form specified characteristics of test circuit ..... :		N/A
8.5.3	Measuring instruments		P
8.5.4	Calibration of test circuit		P
	Calibration oscillograms and their evaluation		P
8.5.6	The breaking-capacity tests made at an ambient air temperature of (20 ± 5) °C		P
	Breaking-capacity tests on a.c. fuses		**P**
8.5.5.1	Table 20, test No. 1 for "g" and "a" fuse-links	gG: Fuse-link: 80A, 400 A/500 V AC 80A, 315 A/690 V AC	P
	Rated breaking capacity of the fuse-links (kA), at voltage (V) ..... :	120 kA/500 V AC 50kA/690 V AC	–

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Clause	Requirement + Test	Result - Remark	Verdict
	Rated current (A) of the fuse-links ..... :	40A, 250A(500 V AC) 40A, 250A(690 V AC)	P
	Prospective current I_1 (kA) equal to rated breaking capacity within a tolerance of + 10%, - 0% ..... :	$120^{+10\%}$ kA/1,1×500 V AC: 122 kA(400 A/500 V AC) 122 kA(80 A/500 V AC) $50^{+10\%}$ kA/1,05×690 V AC: 50,9 kA(315 A/690 V AC) 50,9 kA(80 A/690 V AC)	P
	Power factor ..... :	0,18(400 A/500 V AC) 0,18(315 A/690 V AC) 0,18(80 A/500 V AC) 0,18(80 A/690 V AC)	P
	Initiation of arcing after voltage zero: within 40° - 65° for sample 1 and within 65° - 90° for sample 2 and 3, or ..... :	Fuse-link: 400 A/500 V AC 1) 51°; 2) 76°; 3) 77° Fuse-link: 315 A/690 V AC 1) 51°; 2) 76°; 3) 77° Fuse-link: 80 A/500 V AC 1) 53°; 2) 77°; 3) 77° Fuse-link: 80 A/690 V AC 1) 56°; 2) 79°; 3) 78°	P
	for sample 1) arcing after voltage zero within 0° + 10°, - 0° ..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Power-frequency recovery voltage: voltage (V) i.e (%) of rated voltage within 105% + 5%, - 0% of the rated voltage or 110% + 5%, - 0% of the rated voltage ..... :	Fuse-link: 400 A/500 V AC; 80 A/500 V AC 1,1×500 V AC=550 V AC 1) 553 V AC 2) 553 V AC 3) 553 V AC Fuse-link:315 A/690 V AC; 80 A/690 V AC 1,05×690 V AC=724,5 V AC 1) 726 V AC 2) 726 V AC 3) 726 V AC Fuse-link: 400 A/440 V DC 80 A/440 V DC 1,15×440 V DC=506 V AC 1) 517 V DC 2) 517 V DC 3) 517 V DC	P
	Cut-off current (A) ..... :	Fuse-link: 400 A/500 V AC 1) 50,7 kA 2) 48,0 kA 3) 47,9 kA Fuse-link: 315 A/690 V AC 1) 26,1 kA 2) 25,6 kA 3) 25,1 kA Fuse-link: 80 A/500 V AC 1) 9,20 kA 2) 9,97 kA 3) 10,5 kA Fuse-link: 80 A/690 V AC 1) 6,53 kA 2) 7,04 kA 3) 6,91 kA	P
8.5.8	Acceptability of No. 1 test results		P

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Clause	Requirement + Test	Result - Remark	Verdict
	a) max. arc voltage (V) did not exceed stated values of 7.5 (Table 6) ..... :	≤ 2,5 kV for the following AC fuse-links Fuse-link: 400 A/500 V AC 1) 1000 V 2) 1030 V 3) 1080 V Fuse-link: 315 A/690 V AC 1) 1370 V 2) 1260 V 3) 1250 V Fuse-link: 80 A/500 V AC 1) 991 V 2) 1050 V 3) 1080 V Fuse-link: 80 A/690 V AC 1) 1260 V 2) 1320 V 3) 1330 V	P
	b) fuse-links operated without external effects or damage to the components of the complete fuse		P
	c) no permanent arcing, flashover or ejection of dangerous flames		P
	d) no damage of fuse components hindering from their further use		P
	e) no damage of fuse-link such, that it is difficult or dangerous to replace them		P
	f) fuse-link remains in one piece before its removal from the fuse- carrier		P

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Clause	Requirement + Test	Result - Remark	Verdict
	g) resistance (MΩ) between contacts of fuse-links after test not less than 50 000 Ω for the rated voltage of fuse-links to 250 V, 100 000 Ω in all other cases ..... :	≥ 0.1 MΩ Fuse-link: 400 A/500 V AC 1) 550 MΩ 2) 550 MΩ 3) 550 MΩ Fuse-link: 315 A/690 V AC 1) 550 MΩ 2) 550 MΩ 3) 550 MΩ Fuse-link: 80 A/500 V AC 1) 550 MΩ 2) 550 MΩ 3) 550 MΩ Fuse-link: 80 A/690 V AC 1) 550 MΩ 2) 550 MΩ 3) 550 MΩ	P
8.5.5.1	Table 20, test No. 2 for "g" and "a" fuse-links		P
	Prospective current I_2 (kA) ..... :	≈ 18 kA/1,1×500 V AC: 18,2 kA(400 A/500 V AC) ≈ 12,6 kA/1,05×690 V AC: 12,7 kA(315 A/690 V AC)	P
	Test made under conditions which approximate those giving maximum arc energy		P
	Power factor ..... :	0,23(400 A/500 V AC) 0,23(315 A/690 V AC)	P
	Making angle after voltage zero: within tolerance 0° + 20°, - 0° ..... :	Fuse-link: 400 A/500 V AC 1) 8°; 2) 8°; 3) 6° Fuse-link: 315 A/690 V AC 1) 8°; 2) 8°; 3) 6°	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Power-frequency recovery voltage: voltage (V) i.e (%) of rated voltage within 105% + 5%, - 0% of the rated voltage or 110% + 5%, - 0% of the rated voltage ..... :	Fuse-link: 400 A/500 V AC; 1,1×500 V AC=550 V AC 1) 558 V AC 2) 558 V AC 3) 558 V AC Fuse-link: 315 A/690 V AC; 1,05×690 V AC=724,5 V AC 1) 733 V AC 2) 733 V AC 3) 733 V AC	P
	Recovery voltage maintained at a value (V); duration (s) for sample (No.) ..... :	Fuse-link: 400 A/500 V AC; 500V AC to 1,15×500 V AC=575 V AC 1) 558 V AC 30s 2) 558V AC 30s 3) 558 V AC 30s Fuse-link: 315 A/690 V AC; 690V AC to 1,1×690 V AC=759V AC 1) 733 V AC 30s 2) 733 V AC 30s 3) 733 V AC 30s	P
	For other samples duration 15 s (8.5.5.2)		N/A
8.5.8	Acceptability of No. 2 test results		P
	a) max. arc voltage (V) did not exceed stated values of 7.5 (Table 6) ..... :	≤ 2,5 kV for the following AC fuse-links Fuse-link: 250 A/500 V AC 1)1050 V 2) 1030 V 3) 970 V Fuse-link: 200 A/690 V AC 1) 1270 V 2) 1320 V 3) 1330 V	P
	b) fuse-links operated without external effects or damage to the components of the complete fuse		P

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Clause	Requirement + Test	Result - Remark	Verdict
	c) no permanent arcing, flashover or ejection of dangerous flames		P
	d) no damage of fuse components hindering from their further use		P
	e) no damage of fuse-link such, that it is difficult or dangerous to replace them		P
	f) fuse-link remains in one piece before its removal from the fuse- carrier		P
	g) resistance (MΩ) between contacts of fuse-links after test not less than 50 000 Ω for the rated voltage of fuse-links to 250 V, 100 000 Ω in all other cases ..... :	≥ 0.1 MΩ Fuse-link: 400 A/500 V AC 1) 550 MΩ 2) 550 MΩ 3) 550 MΩ Fuse-link: 315 A/690 V AC 1) 550 MΩ 2) 550 MΩ 3) 550 MΩ	P
8.5.5.1	Table 20, test No. 2* for "g" and "a" fuse-links, for $I_2 \geq I_1$	(see appended table)	N/A
	Prospective current I_2 (kA) for test No. 2 greater than the rated breaking capacity (kA) ..... :		N/A
	Test made on six samples replacing tests of Nos. 1 and 2. Test made with current I_1 (kA) ... :		N/A
	Making angels differ approximately 30° between each test		N/A
	Power factor ..... :		N/A
8.5.8	Acceptability of No. 2 test results		N/A
	a) max. arc voltage (V) did not exceed stated values of 7.5 (Table 6) ..... :		N/A
	b) fuse-links operated without external effects or damage to the components of the complete fuse		N/A
	c) no permanent arcing, flashover or ejection of dangerous flames		N/A
	d) no damage of fuse components hindering from their further use		N/A
	e) no damage of fuse-link such, that it is difficult or dangerous to replace them		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	f) fuse-link remains in one piece before its removal from the fuse- carrier		N/A
8.5.5.1	Table 20, test No. 3 for "g" and "a" fuse-links		P
	Prospective current for "g" fuse-link I_3 (A) equal to 3,2 I_f ..... :	2048±20% A/1,1×500 V AC: 2090 A(400 A/500 V AC) 2048±20% A/1,05×690 V AC: 1612,8 A(200 A/690 V AC)	P
	Prospective current for "a" fuse-link I_3 (A) equal to 2,5 $k_2 I_n$ ..... :		N/A
	Power factor ..... :	0,39(400 A/500 V AC) 0,45(315 A/690 V AC)	
	Tolerance on current ± 20%		P
	Recovery voltage (V) maintained for 15 s (8.5.5.2)	15s	P
8.5.8	Acceptability of No. 3 test results		P
	a) max. arc voltage (V) did not exceed stated values of 7.5 (Table 6) ..... :		N/A
	b) fuse-links operated without external effects or damage to the components of the complete fuse		P
	c) no permanent arcing, flashover or ejection of dangerous flames		P
	d) no damage of fuse components hindering from their further use		P
	e) no damage of fuse-link such, that it is difficult or dangerous to replace them		P
	f) fuse-link remains in one piece before its removal from the fuse- carrier		P
	g) resistance (MΩ) between contacts of fuse-links after test not less than 50 000 Ω for the rated voltage of fuse-links to 250 V, 100 000 Ω in all other cases ..... :	⩾ 0.1 MΩ Fuse-link: 400 A/500 V AC 1) 500 MΩ Fuse-link: 315 A/690 V AC 1) 500 MΩ	P
8.5.5.1	Table 20, test No. 4 for "g" and "a" fuse-links		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Prospective current for "g" fuse-link I_4 (A) equal to 2,0 I_f ..... :	$1280^{+20\%}$ A/1,1×500 V AC: 1290 A(400 A/500 V AC) $1008^{+20\%}$ A/1,05×690 V AC: 1023 A(315 A/690 V AC)	P
	Prospective current for "a" fuse-link I_4 (A) equal to 1,6 $k_2 I_n$ ..... :		N/A
	Power factor ..... :	0,39(400 A/500 V AC) 0,34(315 A/690 V AC)	
	Tolerance on current + 20%, - 0%		P
	Recovery voltage (V) maintained for 15 s (8.5.5.2) ..... :	15s	P
8.5.8	Acceptability of No. 4 test results		P
	a) max. arc voltage (V) did not exceed stated values of 7.5 (Table 6) ..... :		N/A
	b) fuse-links operated without external effects or damage to the components of the complete fuse		P
	c) no permanent arcing, flashover or ejection of dangerous flames		P
	d) no damage of fuse components hindering from their further use		P
	e) no damage of fuse-link such, that it is difficult or dangerous to replace them		P
	f) fuse-link remains in one piece before its removal from the fuse- carrier		P
	g) resistance (MΩ) between contacts of fuse-links after test not less than 50 000 Ω for the rated voltage of fuse-links to 250 V, 100 000 Ω in all other cases ..... :	⩾ 0.1 MΩ Fuse-link: 400 A/500 V AC 1) 500 MΩ Fuse-link: 315 A/690 V AC 1) 500 MΩ	P
8.5.5.1	Table 20, test No. 5 for "g" and "a" fuse-links		P
	Prospective current for "g" fuse-link I_5 (A) equal to 1,25 I_f ..... :	$800^{+20\%}$ A/1,1×500 V AC: 820 A(400 A/500 V AC) $630^{+20\%}$ A/1,05×690 V AC: 636 A(315 A/690 V AC)	P
	Prospective current for "a" fuse-link I_5 (A) equal to $k_2 I_n$ ..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Power factor ..... :	0,39(400 A/500 V AC) 0,39(315 A/690 V AC)	P
	Tolerance on current + 20%, - 0%		P
	Recovery voltage (V) maintained for 15 s (8.5.5.2) ..... :	15 s	P
8.5.8	Acceptability of No. 5 test results		P
	a) max. arc voltage (V) did not exceed stated values of 7.5 (Table 6) ..... :		N/A
	b) fuse-links operated without external effects or damage to the components of the complete fuse		P
	c) no permanent arcing, flashover or ejection of dangerous flames		P
	d) no damage of fuse components hindering from their further use		P
	e) no damage of fuse-link such, that it is difficult or dangerous to replace them		P
	f) fuse-link remains in one piece before its removal from the fuse- carrier		P
	g) resistance (MΩ) between contacts of fuse-links after test not less than 50 000 Ω for the rated voltage of fuse-links to 250 V, 100 000 Ω in all other cases ..... :	⩾ 0.1 MΩ Fuse-link: 400 A/500 V AC 1) 500 MΩ Fuse-link: 315 A/690 V AC 1) 500 MΩ	
	Breaking-capacity tests on d.c. fuses		
8.5.5.1	Table 21, d.c.test No. 1 for "g" and "a" fuse-links	gG, fuse-link: 80A, 400 A/440 V DC	P
	Rated breaking d.c. capacity of the fuse-links (kA), at voltage (V) ..... :	100 kA(80A,250 A/440 V DC)	–
	Rated current (A) of the fuse-links ..... :	80A,400 A	P
	Rated voltage (V) of the fuse-links ..... :	440 V DC	P
	Prospective current I_1 (kA) equal to rated breaking capacity within a tolerance of + 10%, - 0% ..... :	$100^{+10\%}$ kA/1,15×440 V DC: 103 kA(400A/440 V DC) 103 kA(80 A/440 V DC)	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Time constant ..... :	τ =15,7ms(400 A/440 V DC) τ =15,7ms(80 A/440 V DC)	P
	Arcing commences at current (A) ..... :	Fuse-link: 400 A/440 V DC 1) 22,2 kA 2) 19,4 kA 3) 21,1 kA Fuse-link: 80 A/440 V DC 1) 9,78 kA 2) 10,3 kA 3) 9,95 kA	_
	Value of recovery voltage: voltage (V) within tolerances 115 + 5%, - 9% of the rated voltage :	Fuse-link: 400 A/440 V DC 80 A/440 V DC 1,15×440 V DC=506 V AC 1) 517 V DC 2) 517 V DC 3) 517 V DC	P
8.5.8	Acceptability of No. 1 test results		P
	a) max. arc voltage (V) did not exceed stated values of 7.5 (Table 6) ..... :	≤ 2,5 kV for the following DC fuse-links Fuse-link: 400 A/440 V DC 1) 805 V 2) 734 V 3) 736 V Fuse-link: 80 A/440 V DC 1) 728 V 2) 671 V 3) 701 V	P
	b) fuse-links operated without external effects or damage to the components of the complete fuse		P
	c) no permanent arcing, flashover or ejection of dangerous flames		P
	d) no damage of fuse components hindering from their further use		P
	e) no damage of fuse-link such, that it is difficult or dangerous to replace them		P
	f) fuse-link remains in one piece before its removal from the fuse- carrier		P

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Clause	Requirement + Test	Result - Remark	Verdict
	g) resistance (MΩ) between contacts of fuse-links after test not less than 50 000 Ω for the rated voltage of fuse-links to 250 V, 100 000 Ω in all other cases ..... :	Fuse-link: 400 A/440 V DC 1) 500 MΩ 2) 500 MΩ 3) 500 MΩ Fuse-link: 80 A/440 V DC 1) 500 MΩ 2) 500 MΩ 3) 500 MΩ	P
8.5.5.1	Table 21, d.c.test No. 2 for "g" and "a" fuse-links		
	a) During test No. 1 arcing commences at a current ≥ 0,5 I_1, test No. 2 was not performed		N/A
	b) Prospective current I_2 (A). Test made under conditions which approximate those giving maximum arc energy ..... :	≈ 15 kA/1,15×250 V DC: 15,3 kA(400 A/440 V DC)	
	Time constant ..... :	9,05 ms	
	Arcing commences at current (A) ..... :		–
	Value of recovery voltage: voltage (V) within tolerances 115 + 5%, - 9% of the rated voltage :	Fuse-link: 400 A/440 V DC 1,15×440 V DC=506 V AC 1) 517 V DC 2) 517 V DC 3) 517 V DC	P
8.5.8	Acceptability of No. 2 test results		P
	a) max. arc voltage (V) did not exceed stated values of 7.5 (Table 6) ..... :	≤ 2,5 kV for the following DC fuse-links Fuse-link: 400 A/440 V DC 1) 752 V 2) 758 V 3) 742 V	P
	b) fuse-links operated without external effects or damage to the components of the complete fuse		P
	c) no permanent arcing, flashover or ejection of dangerous flames		P
	d) no damage of fuse components hindering from their further use		P
	e) no damage of fuse-link such, that it is difficult or dangerous to replace them		P
	f) fuse-link remains in one piece before its removal from the fuse- carrier		P

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Clause	Requirement + Test	Result - Remark	Verdict
	g) resistance (MΩ) between contacts of fuse-links after test not less than 50 000 Ω for the rated voltage of fuse-links to 250 V, 100 000 Ω in all other cases ..... :	Fuse-link: 400 A/440 V DC 1) 500 M Ω 2) 500 M Ω 3) 500 M Ω	P
8.5.5.1	Table 21, d.c.test No. 3 for "g" and "a" fuse-links	Fuse-link: 400 A/440 V DC	P
	Conventional fusing current (A) ..... :	I_f=1,6In=1,6*400=640 A	_
	Prospective current I_3 (A) equal to 3,2 I_f ..... :	2100 (3,2*If=2048)	P
	Tolerance on current (%) ± 20% ..... :		P
	Time constant ..... :	4,47 ms	
	Arcing commences at current (A) ..... :	1) 2080 A	_
	Value of recovery voltage: voltage (V) within tolerances 115 + 5%, - 9% of the rated voltage :	1) 517 V DC	P
8.5.8	Acceptability of No. 3 test results		P
	a) max. arc voltage (V) did not exceed stated values of 7.5 (Table 6) ..... :		N/A
	b) fuse-links operated without external effects or damage to the components of the complete fuse		P
	c) no permanent arcing, flashover or ejection of dangerous flames		P
	d) no damage of fuse components hindering from their further use		P
	e) no damage of fuse-link such, that it is difficult or dangerous to replace them		P
	f) fuse-link remains in one piece before its removal from the fuse- carrier		P
	g) resistance (MΩ) between contacts of fuse-links after test not less than 50 000 Ω for the rated voltage of fuse-links to 250 V, 100 000 Ω in all other cases ..... :	1) 550 MΩ	P
8.5.5.1	Table 21, d.c.test No. 4 for "g" and "a" fuse-links	Fuse-link: 400A/440 V DC	P
	Conventional fusing current (A) ..... :	I_f=1,6In=1,6*400=640 A	_
	Prospective current I_4 (A) equal to 2,0 I_f ..... :	1300 (2,0*If=1280)	P
	Tolerance on current (%) + 20%, - 0% ..... :		P
	Time constant ..... :	4,47 ms	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Arcing commences at current (A) ..... :	1) 1290 A	–
	Value of recovery voltage: voltage (V) within tolerances 115 + 5%, - 9% of the rated voltage :	1) 515 V DC	P
8.5.8	Acceptability of No. 4 test results	Fuse-link: 400 A/440 V DC	P
	a) max. arc voltage (V) did not exceed stated values of 7.5 (Table 6) ..... :		N/A
	b) fuse-links operated without external effects or damage to the components of the complete fuse		P
	c) no permanent arcing, flashover or ejection of dangerous flames		P
	d) no damage of fuse components hindering from their further use		P
	e) no damage of fuse-link such, that it is difficult or dangerous to replace them		P
	f) fuse-link remains in one piece before its removal from the fuse- carrier		P
	g) resistance (MΩ) between contacts of fuse-links after test not less than 50 000 Ω for the rated voltage of fuse-links to 250 V, 100 000 Ω in all other cases ..... :	1) 550 MΩ	P
8.5.5.1	Table 21, d.c.test No. 5 for "g" and "a" fuse-links	Fuse-link: 400 A/440 V DC	
	Conventional fusing current (A) ..... :	I_f=1,6In=1,6*400=640 A	–
	Prospective current I_5 (A) equal to 1,25 I_f ..... :	816 (1,25*If=800)	
	Tolerance on current (%) + 20%, - 0% ..... :		
	Time constant ..... :	3,84ms	
	Arcing commences at current (A) ..... :	1) 814 A	–
	Value of recovery voltage: voltage (V) within tolerances 115 + 5%, - 9% of the rated voltage :	1) 514 V DC	P
8.5.8	Acceptability of No. 5 test results		P
	a) max. arc voltage (V) did not exceed stated values of 7.5 (Table 6) ..... :		N/A
	b) fuse-links operated without external effects or damage to the components of the complete fuse		P

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Clause	Requirement + Test	Result - Remark	Verdict
	c) no permanent arcing, flashover or ejection of dangerous flames		P
	d) no damage of fuse components hindering from their further use		P
	e) no damage of fuse-link such, that it is difficult or dangerous to replace them		P
	f) fuse-link remains in one piece before its removal from the fuse- carrier		P
	g) resistance (MΩ) between contacts of fuse-links after test not less than 50 000 Ω for the rated voltage of fuse-links to 250 V, 100 000 Ω in all other cases ..... :	1) 550 MΩ	P
8.6	Verification of the cut-off current characteristics		N/A
8.6.2	The values measured did not exceed cut-off characteristics indicated by the manufacturer (see 5.8.1)		N/A
8.7	Verification of I^2t characteristics and overcurrent discrimination		P
8.7.2	The operating I^2t values measured not exceed the values indicated by the manufacturer, or		N/A
	those specified in subsequent parts	Part 2 table 103	P
	The pre-arcing I^2t values not less than minimum pre-arcing values given by the manufacturer, or		N/A
	they lie within the limits indicated in Table 7		P
8.7.3	Verification of compliance for fuse-links at 0,01 s		P
	"gG" and "gM" fuse-links at 0,01 s comply with Table 7		P
8.7.4	Verification of overcurrent discrimination		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The discrimination of the fuse-links verified by means of the time-current characteristics and the pre-arcing and operating I^2t values	pre-arcing: 400 A/500 V AC 566; 581 kA^2s ≥557 kA^2s 315A/690 V AC 313; 339 kA^2s ≥ 302 kA^2s 80 A/690 V AC 14,9; 14,9 kA^2s ≥ 13,7 kA^2s 400 A/440 V DC 669; 621 kA^2s ≥557 kA^2s 80 A/440 V DC 15,8; 16,6 kA^2s ≥ 13,7 kA^2s operating: 400 A/500 V AC 1,00;1,03 MA^2s ≤ 1,6 MA^2s 315 A/690 V AC 863; 761 kA^2s ≤ 900 kA^2s 80 A/690 V AC 31,9; 32,4 kA^2s ≤ 36 kA^2s 400 A/440 V DC 1,26;1,00 MA^2s ≤ 1,6 MA^2s 80 A/440 V DC 22,9; 22,4 kA^2s ≤ 36 kA^2s	P
8.8	Verification of the degree of protection of enclosures		N/A
	Degree of protection IP ..... :	IP	N/A
	Verification by test under conditions specified in IEC 60529 ..... :		N/A
8.9	Verification of resistance to heat		P
	No damage impaired by heat during the previous tests (in particular with respect to 8.3, 8.4, 8.5 and 8.10)		P
8.10	Verification of non-deterioration of contacts		P

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Clause	Requirement + Test	Result - Remark	Verdict
8.10.1	Three samples provided with standardized dummy fuse-links of the highest current rating (A) intended to be used in the fuse-holder (see subsequent parts) ..... :	400 A/500 V AC 315A/690 V AC	P
8.10.2	Test current (A) for load period ..... :	400A*1.25=500A(500V AC) 400A*1.25=500A (690 V AC)	P
	Duration (s) of load period ..... :	45min	P
	Duration (s) of no-load period ..... :	18min	P
	a) Test of 250 cycles, measured values not exceed the limits given in subsequent parts	Part 2	P
	b) Test of 750 cycles, measured values not exceed the limits given in subsequent parts		N/A
8.11	Mechanical and miscellaneous tests		P
8.11.1	Mechanical strength		P
	Mechanical characteristics of fuse and its parts judged in the context of normal handling and mounting as well as with results shown after breaking-capacity test (see 8.5), if not otherwise specified in the subsequent parts		P
8.11.2	Miscellaneous tests		P
8.11.2.1	Verification of freedom from season cracking		P
	Current-carrying parts made of rolled copper alloy with less than 83% copper content and with all grease removed, placed for 4 h in test cabinet having temperature of (30 ± 10) °C		P
	After this, samples placed for 8 h in test cabinet, on the bottom of which is ammonium chloride solution having pH value 10 - 11		P
	After test no cracks visible to the unaided eye		P
8.11.2.2	Verification of resistance to abnormal heat and fire		P
8.11.2.2.1	Parts of insulating material, except ceramic, have a limited duration of burning without spreading fire by flames or burning droplets or glowing particles falling from the specimen		P
8.11.2.2.5	Glow-wire test: (650 ± 10) °C		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Parts of insulating materials not necessary to retain current-carrying parts in position even though they are in contact with them, made the glow-wire test (650 ± 10) °C		N/A
	No visible flame, or burning or glowing of the specimen extinguish within max. (s) after removal of the glow-wire. Limit (30 ± 1) s ..... :		N/A
	No burning of the tissue paper		N/A
	No scorching of the pinewood board		N/A
	Glow-wire test: (960 ± 10) °C	For base of the fuse-holder	P
	Parts of insulating materials necessary to retain current-carrying parts and parts of the earthing circuit, if any, in position , made the glow-wire test (960 ± 10) °C	For base of the fuse-holder, DNF1-2 PA66; DNF2-2 DMC; 960 °C	P
	No visible flame, or burning or glowing of the specimen extinguish within max. (s) after removal of the glow-wire. Limit (30 ± 1) s ..... :	30 s	P
	No burning of the tissue paper		P
	No scorching of the pinewood board		P
8.11.2.3	Verification of resistance to rusting	Fuse-link: 400 A/500 V AC Fuse-base: DNF1-2 Fuse-link: 315 A/690 V AC Fuse-base: DNF2-2	P
	Tested parts after degreasing (10 min in specified solution) placed for 10 min in air saturated with moisture and after that dried 10 min in an ambient temperature (100 ± 5) °C	10 min, 100 °C	P
	Surface of tested parts show no signs of rust		P

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Clause	Requirement + Test	Result - Remark	Verdict
Annex E	Particular requirements for fuse-bases with screwless-type terminals for external cooper conductors		
E.6	MARKING		N/A
	In addition to cl.6, following requirement apply :		N/A
	universal terminals – no marking		N/A
	non-universal terminals..... :	s or sol, r, f	N/A
	Markings appeared on fuse-base or on the smallest package or in technical information		N/A
	Marking indicating the length of insulation to be removed before insertion of the conductor into terminal is shown on the fuse-base		N/A
	Maximum number of conductors which may be clamped		N/A
E.7.	STANDARD CONDITIONS FOR CONSTRUCTION		N/A
	Clause 7 applies with the following modifications ..... :		N/A
E.7.1	Fixed connections including terminals		N/A
	Terminals resisted the mechanical loads that occur when equipment is used in accordance with ith intended purpose		N/A
	Connection or disconnection of conductors are made		N/A
	- by the use of general purpose tool or by convenient device integral with terminal		N/A
	- by simple insertion (for rigid conductors). For disconnection of conductors an operation other than a pull only is necessary		N/A
	Universal terminals accepted rigid (solid or stranded) and flexible unprepared conductors		N/A
	Non-universal terminals accepted the types of conductors declared by the manufacturer		N/A
E.7.2	Dimensions of connectable conductors are given in table E.1 ..... :		N/A
E.7.3	Nominal cross-sections to be clamped are defined in table E.2 ..... :		N/A
E.7.4	Insertion and disconnecting of conductors are made in accordance with the manufacturers instructions		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
E.7.5	Design and construction of terminals		N/A
	Terminals are designed and constructed so that ..... :		N/A
	- each conductor is clamped individually		N/A
	- during operation of connection or disconnection conductors can be connected or disconnected either at the same time or separately		N/A
	- inadequate insertion of the conductor is avoided		N/A
	It is possible to clamp securely any number of conductors up to maximum provided for		N/A
E.7.6	Resistance to ageing		N/A
	Terminals are resistant to ageing		N/A
E.8	TESTS		N/A
E.8.1	Test of reliability of terminals		N/A
E.8.1.1	Reliability of screwless system		N/A
	smallest diameter of conductor (mm) ..... :		_
	Connection and subsequent disconnection are made 5 times		N/A
	largest diameter of conductor (mm) ..... :		_
	Connection and subsequent disconnection are made 5 times		N/A
	After tests the terminal not be damaged in such a way as to impair its further use		N/A
E.8.1.2	Test of reliability of connection		N/A
	Conductor is either pushed as far as possible into the terminal or is inserted so that adequate connection is obvious		N/A
	After test no wire of conductor escaped outside the terminal		N/A
E.8.2	Tests of reliability of terminals for external conductors: mechanical strength		N/A
	Pull force (N) ..... :		_
	minimum and maximum cross-sectional area (mm^2):		_

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Clause	Requirement + Test	Result - Remark	Verdict
	Pull is applied without jerks for 1 min		N/A
	During test the conductor not slip out of the terminal		N/A
E.8.3	Cycling test		N/A
	new copper conductors with cross section according to table 17 (mm^2) ..... :		–
	number of samples ..... :	9 / 3 / 6	N/A
	rated current of the fuse-base (A) ..... :		N/A
	192 temperature cycles (duration of each cycle is approximately 1h)		N/A
	Air temperature in the cabinet is raised to 40°C in approximately 20 min. It is maintained of this value for approximately 10 min		N/A
	Samples are then allowed to cool down in approximately 20 min to temperature of approximately 30°C. They are kept at this temperature for approximately 10 min.		N/A
	for measuring the voltage drop, allowed to cool down further, to temperature of 20°C		N/A
	Maximum voltage drop not exceed smaller of two following values ..... :	(see appended table)	N/A
	- either 22,5 mV ..... :		N/A
	- or 1,5 times value measured after 24^{th} cycle :		N/A
	After test an inspection with naked eye, by normal or corrected vision, show no changes evidently impairing further use, such as cracks, deformations or the like		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

APPENDIX 1

8.1.5.1	TABLE: Internal resistance of the fuse-links											—
	a) rated current (A) of the fuse-link :						400 A(500V AC)					—
	measuring current (A) :						1A					—
	ambient air temperature (°C) :						22°C					—
internal resistance	sample No.											
	1	2	3	4	5	6	7	8	9	10	11	12
R (mΩ)	0,129	0.125	0,131	0.125	0,128	0.129	0,132	0.133	0,128	0.126	0,125	0.125
internal resistance	sample No.											
	13	14	15	16	17	18	19	20	21	22	23	24
R (mΩ)	0,128	0.130	0,131	0.130	0,129	0.125	0,126	0.127	0,127	0.128	0,129	0.130
internal resistance	sample No.											
	25	26	27	28	29	30	31	32	33	34	-	-
R (mΩ)	0,130	0.129	0,131	0.125	0,126	0.129	0,130	0.131	0,133	0.130	-	-
	b) rated current (A) of the fuse-link :						350 A(500V AC)					—
	measuring current (A) :						1 A					—
	ambient air temperature (°C) :						22°C					—
internal resistance	sample No.											
	1	2	3	4	5	6	7	8	-	-	-	-
R (mΩ)	0,150	0,153	0,155	0,149	0,148	0,152	0,151	0,153	-	-	-	-
	c) rated current (A) of the fuse-link :						315 A(690 V AC)					—
	measuring current (A) :						1 A					—
	ambient air temperature (°C) :						23,0°C					—
internal resistance	sample No.											
	1	2	3	4	5	6	7	8	9	10	11	12
R (mΩ)	0,175	0,172	0,173	0,176	0,176	0,174	0,173	0,172	0,174	0,175	0,175	0,175
internal resistance	sample No.											
	13	14	15	16	17	18	19	20	21	22	23	24
R (mΩ)	0,175	0,174	0,176	0,175	0,176	0,175	0,175	0,176	0,172	0,173	0,176	0,175
internal resistance	sample No.											
	25	26	27	28	29	30	31	32	33	34		

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Clause	Requirement + Test	Result - Remark	Verdict

R (mΩ)	0,176	0,173	0,174	0,175	0,174	0,175	0,177	0,172	0,174	0,173			
	d) rated current (A) of the fuse-link :							250 A(500 V AC)					—
	measuring current (A) :							1 A					—
	ambient air temperature (°C) :							23,0°C					—
internal resistance	sample No.												
	1	2	3	4	5	6	7	8	-	-	-	-	
R (mΩ)	0,236	0,235	0,237	0,237	0,235	0,238	0,236	0,233	-	-	-	-	
	e) rated current (A) of the fuse-link :							200 A(500 V AC)					—
	measuring current (A) :							1 A					—
	ambient air temperature (°C) :							23,0°C					—
internal resistance	sample No.												
	1	2	3	4	5	6	7	8	-	-	-	-	
R (mΩ)	0,305	0,310	0,310	0,309	0,308	0,307	0,311	0,310	-	-	-	-	
	f) rated current (A) of the fuse-link :							160A(500 V AC)					—
	measuring current (A) :							1 A					—
	ambient air temperature (°C) :							22,5°C					—
internal resistance	sample No.												
	1	2	3	4	5	6	7	8	-	-	-	-	
R (mΩ)	0,386	0,384	0,388	0,389	0,385	0,384	0,386	0,387	-	-	-	-	
	g) rated current (A) of the fuse-link :							125A(500 V AC)					—
	measuring current (A) :							1 A					—
	ambient air temperature (°C) :							22,8°C					—
internal resistance	sample No.												
	1	2	3	4	5	6	7	8	-	-	-	-	
R (mΩ)	0,489	0,485	0,488	0,492	0,490	0,491	0,486	0,490	-	-	-	-	
	h) rated current (A) of the fuse-link :							100 A(500 V AC)					—
	measuring current (A) :							1 A					—
	ambient air temperature (°C) :							21,3°C					—
internal resistance	sample No.												
	1	2	3	4	5	6	7	8	-	-	-	-	
R (mΩ)	0,831	0,827	0,830	0,830	0,833	0,828	0,829	0,832	-	-	-	-	
	i) rated current (A) of the fuse-link :							80 A(690 V AC)					—
	measuring current (A) :							1 A					—
	ambient air temperature (°C) :							22,8°C					—

IEC 60269-1			
Clause	Requirement + Test	Result - Remark	Verdict

internal resistance	sample No.											
	1	2	3	4	5	6	7	8	9	10	11	12
R (mΩ)	1,18	1,19	1,18	1,19	1,17	1,18	1,18	1,17	1,19	1,18	1,18	1,18
internal resistance	sample No.											
	13	14	15	16	17	18	19	20	21	-	-	-
R (mΩ)	1,18	1,17	1,17	1,18	1,19	1,18	1,18	1,19	1,18	-	-	-

	k) rated current (A) of the fuse-link :	400 A(440 V DC)	—
	measuring current (A) :	1 A	—
	ambient air temperature (°C) :	23,0°C	—

internal resistance	sample No.											
	1	2	3	4	5	6	7	8	9	10	11	12
R (mΩ)	0,126	0,130	0,128	0,126	0,127	0,130	0,128	0,129	0,128	0,126	0,127	0,129
internal resistance	sample No.											
	13	14	15	16	17	18	19	20	21	22	23	24
R (mΩ)	0,130	0,129	0,130	0,126	0,126	0,127	0,127	0,128	0,128	0,129	0,130	0,126

	l) rated current (A) of the fuse-link :	350 A(440 V DC)	—
	measuring current (A) :	1 A	—
	ambient air temperature (°C) :	22,1°C	—

internal resistance	sample No.											
	1	2	3	4	5	6	7	8	9	10	11	12
R (mΩ)	0,146	0,147	0,149	0,148	0,147	0,147	-	-	-	-	-	-

	v) rated current (A) of the fuse-link :	315 A(440 V DC)	—
	measuring current (A) :	1 A	—
	ambient air temperature (°C) :	22,8°C	—

internal resistance	sample No.											
	1	2	3	4	5	6	7	8	9	10	11	12
R (mΩ)	0.176	0.178	0.175	0.174	0.178	0.177	0.178	-	-	-	-	-

	w) rated current (A) of the fuse-link :	250 A(440V DC)	—
	measuring current (A) :	1 A	—
	ambient air temperature (°C) :	24,0°C	—

internal resistance	sample No.											
	1	2	3	4	5	6	7	8	9	10	11	12

IEC 60269-1												
Clause	Requirement + Test							Result - Remark				Verdict
R (mΩ)	0,237	0,239	0,235	0,235	0,236	0,237	0,238	-	-	-	-	-
	x) rated current (A) of the fuse-link :							200A(440 V DC)				—
	measuring current (A) :							1 A				—
	ambient air temperature (°C) :							24,0°C				—
internal resistance	sample No.											
	1	2	3	4	5	6	7	8	9	10	11	12
R (mΩ)	0,308	0,309	0,312	0,310	0,311	0,310	0,309	-	-	-	-	-
	y) rated current (A) of the fuse-link :							160 A(440 V DC)				—
	measuring current (A) :							1 A				—
	ambient air temperature (°C) :							24,0°C				—
internal resistance	sample No.											
	1	2	3	4	5	6	7	8	9	10	11	12
R (mΩ)	0,388	0,390	0,387	0,387	0,388	0,387	0,389	-	-	-	-	-
	z) rated current (A) of the fuse-link :							125 A(440 V DC)				—
	measuring current (A) :							1 A				—
	ambient air temperature (°C) :							21,4°C				—
internal resistance	sample No.											
	1	2	3	4	5	6	7	8	9	10	11	12
R (mΩ)	0,490	0,488	0,486	0,492	0,491	0,490	0,487	-	-	-	-	-
	a1) rated current (A) of the fuse-link :							100 A(440 V DC)				—
	measuring current (A) :							1 A				—
	ambient air temperature (°C) :							22,0°C				—
internal resistance	sample No.											
	1	2	3	4	5	6	7	8	9	10	11	12
R (mΩ)	0,825	0,826	0,829	0,828	0,826	0,827	0,826	-	-	-	-	-
	b1) rated current (A) of the fuse-link :							80A(440 V DC)				—
	measuring current (A) :							1 A				—
	ambient air temperature (°C) :							22,5°C				—
internal resistance	sample No.											
	1	2	3	4	5	6	7	8	9	10	11	12
R (mΩ)	1,18	1,19	1,18	1,18	1,19	1,17	1,17	1,18	1,17	1,18	1,18	1,19
internal resistance	sample No.											
	13	14	15	16	17	-	-	-	-	-	-	-
R (mΩ)	1,18	1,18	1,19	1,19	1,17	-	-	-	-	-	-	-

IEC 60269-1			
Clause	Requirement + Test	Result - Remark	Verdict

8.5.5.1	TABLE: Table 20, test No. 2* for "g" and "a" fuse-links, for $I_2 \geq I_1$				N/A
sample No.	making angle after voltage zero	recovery voltage		cut off current	resistance between contacts
	(°)	(V)	(%)	(A)	(MΩ)
1					
2					
3					
4					
5					
6					

E.8.3	TABLE: Cycling test								N/A
	rated current of fuse-base (A) .....:								—
	sample No. (terminal)								
	1	2	3	4	5	6	7	8	9
ΔU 24 (mV)									
ΔU 192 (mV)									

Test Report issued under the responsibility of:

TÜVRheinland®

TEST REPORT
IEC 60269-2
Low-voltage fuses
Part 2: Supplementary requirements for fuses for use by authorized persons (fuses mainly for industrial application) - Examples of standardized systems of fuses A to K

Report Number. ..... :	**1C200790_P2**
Date of issue ..... :	**2020-11-02**
Total number of pages	**41**
Applicant's name..... :	Zhejiang GRL Electric Co., Ltd.
Address..... :	No. 246, Weishi Road, Economic Development Zone Yueqing City, Zhejiang Prov.325600, P. R. China
Test specification:	
Standard..... :	IEC 60269-2: 2013 (Fifth Edition) to be used in conjunction with IEC 60269-1:2006 (Fourth Edition) + A1:2009
Test procedure ..... :	CB Scheme
Non-standard test method.....:	N/A
Test Report Form No..... :	IEC60269_2C
Test Report Form(s) Originator . :	EZU
Master TRF ..... :	Dated 2014-06

If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description .....:	**Low-voltage fuse**
Trade Mark .....:	**GRL**
Manufacturer .....:	**Zhejiang GRL Electric Co., Ltd.**
Model/Type reference.....:	**Fuse-link: RT16-2(NT2, NH2)**
	Fuse-holder: DNF1-2, DNF2-2
Ratings.....:	**Fuse-link: Un: 500 V AC or 690 V AC or 440 V DC**
	In: 80 A, 100 A, 125 A, 160 A, 200 A, 225 A, 250 A, 315 A, 350 A, 400 A (500 V AC or 440 V DC)
	In: 80 A, 100 A, 125 A, 160 A, 200 A, 225 A, 250 A, 315 A, (690 V AC only)
	Rated breaking capacity: 120 kA(500 V AC), 50 kA(690 V AC), 100 kA(440 V DC)
	Breaking range and utilization category: gG
	Fuse-holder: Un: 500 V AC or 440 V DC, In:400 A ;
	Un: 690 V AC, In:315 A

Testing procedure and testing location:			
☒	**CB Testing Laboratory:**	The Low Voltage Apparatus Laboratory of Zhejiang Testing & Inspection Institute for Mechanical and Electrical Products Quality (ZTME)	
Testing location/ address.....:		No 125 Miaohouwang Road Binjiang District Hangzhou, Zhejiang CHINA	
☐	**Associated CB Testing Laboratory:**		
Testing location/ address.....:			
Tested by (name + signature) .....:		**Long Xi, Test Engineer**	LongXi
Approved by (name + signature).....:		**Du Liang, Approver**	Du Liang
☐	**Testing procedure: TMP/CTF Stage 1:**		
Testing location/ address.....:			
Tested by (name + signature) .....:			
Approved by (name + signature).....:			

☐	**Testing procedure: WMT/CTF Stage 2:**		
Testing location/ address.....:			
Tested by (name + signature) .....:			
Witnessed by (name + signature).....:			
Approved by (name + signature).....:			
☐	**Testing procedure: SMT/CTF Stage 3 or 4:**		
Testing location/ address.....:			
Tested by (name + signature) .....:			
Witnessed by (name + signature).....:			
Approved by (name + signature).....:			
Supervised by (name + signature) .....:			

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

The report 1C200790 has two parts:

part 1 for IEC60269-1(55 pages);

part 2 for IEC60269-2(41 pages);

Attachment 1: Test equipment list ;

Attachment 2: Photo documentation

Summary of testing:

RT16-2 and NH2, NT2 are identical products except with different model name.

For homogeneous series of RT16-2, type tests are listed in table 11, 12, 13 and 14 of IEC60269-1:2006+A1 and table 109 of IEC60269-2:2013.

All tests were performed and passed.

Tests performed (name of test and test clause):	Testing location:
Fuse-link: **RT16-2(NT2, NH2)** **Un: 500 V AC** **In=400 A Table 11 of IEC60269-1** **In=400 A Table 13 of IEC60269-1** **Un: 690 V AC** **In=315 A Table 11 of IEC60269-1** **In= In: 100 A, 125 A, 160 A, 200 A, 225 A, 250 A, 350 A (500 V AC)** **Table 13 of IEC60269-1** **Un=500 V AC and 690 V AC** **In=80 A table 12 of IEC 60269-1** **Un: 440 V DC** **In=400 A Table 11 of IEC60269-1** **In=80A Table 12 of IEC60269-1** **In= 100 A, 125 A, 160 A, 200 A, 225 A, 250 A, 315 A, 350 A,** **Table 13 of IEC60269-1**	**See part 1**

Fuse-holder: DNF1-1, DNF2-1 **500 V AC, 440 V DC/In:400A,** **690 V AC/In: 315 A** **Table 14 of IEC60269-1 and Table 109 of IEC60269-2** **8.11.2.3 Verification of resistance to rusting**	

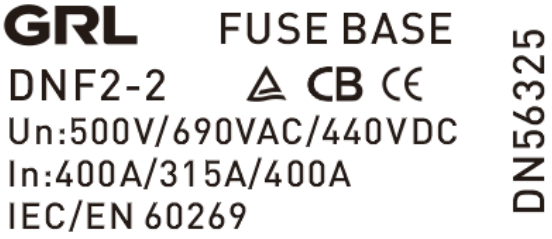
Summary of compliance with National Differences

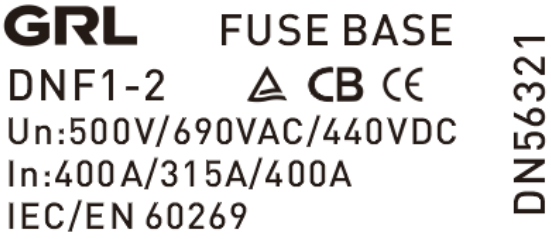
List of countries addressed:

☐ **The product fulfils the requirements of _____ (insert standard number and edition and delete the text in parenthesis, leave it blank or delete the whole sentence, if not applicable)**

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.





Test item particulars.....:	**For use by authorized persons**
Classification of installation and use .....:	**N/A**
Supply Connection .....:	**N/A**
Fuse system.....:	**A~~/B/C/D/E/F/G/H/I/J/K~~**
.....:	
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 .....:	**2020-08-14**
Date (s) of performance of tests.....:	**2020-08-14 to 2020-09-10**

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 4.2.5 of IECEE 02:

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

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

Name and address of factory (ies) .....:	**Zhejiang GRL Electric Co., Ltd.** **No. 246, Weishi Road, Economic Development Zone** **Yueqing City, Zhejiang Prov.325600, P. R. China**

General product information:

The products are Fuse-link and Fuse-holder for use by authorized persons.
Fuse-link: RT16-2(NT2, NH2)
Fuse-holder: DNF1-2, DNF2-2
Fuse-link: Un: 500 V AC or 690 V AC or 440 V DC
In: 80 A, 100 A, 125 A, 160 A, 200 A, 225 A, 250 A, 315 A, 350 A, 400 A (500 V AC or 440 V DC)
In: 80 A, 100 A, 125 A, 160 A, 200 A, 225 A, 250 A, 315 A, (690 V AC only)
Rated breaking capacity: 120 kA(500 V AC), 50 kA(690 V AC), 100 kA(440 V DC)
Breaking range and utilization category: gG
Fuse-holder: Un: 500 V AC or 440 V DC, In:400 A ;
Un: 690 V AC, In:315 A
Type nomenclature:
Fuse link:

RT 16 – 2(NH2, NT2)
① ② ③ ④

① RT: Fuses with blade contacts
② 16: Designed Code No.
③ 2: Size
④ NH2, NT2: same product with different name.

Fuse-holder:

DN F □ - 2
① ② ③ ④

①DN: Corporate code
② F: Fuse-holder Code No.
③ □: Designed Code No, 1 with touch protection function; 2 without touch protection function
④ 2: Size.

IEC 60269-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Requirements IEC 60269-1		
FUSE SYSTEM A – FUSES WITH FUSE-LINKS WITH BLADE CONTACTS (NH FUSE SYSTEM)			
5	CHARACTERISTICS OF FUSES		
5.2	Rated voltage (V) as specified ..... :	500 V AC, 440 V DC or 690 V AC	**P**
5.3.1	Rated current (A) of the fuse-link in accordance with specified values ..... :	In: 40 A, 50 A, 63 A, 80 A, 100 A, 125 A, 160 A, 200 A, 225 A, 250 A (500 V AC or 440 V DC) In: 40 A, 50 A, 63 A, 80 A, 100 A, 125 A, 160 A, 200 A (690 V AC only)	**P**
5.3.2	Rated current (A) of the fuse-holder and the size of the fuse-link..... :	Un: 500 V AC/In: 250 A Un: 244 V DC/In:250 A Un: 690 V AC/In:200 A	**P**
5.5	Rated power (W) dissipation of fuse-link see Figure 101 .....:	≤32W	**P**
	Rated acceptable power (VA) dissipation of fuse-bases given in Figure 102 ..... :	>32W	**P**
5.6	Limits of time-current characteristics		**P**
5.6.1	Time-current characteristics, time-current zones and overload curves..... :		**P**
5.6.2	Conventional times and current see Table 101 ..... :		**P**
5.6.3	Gates ..... :	According to table 3 of IEC60269-1 and table 102 of IEC60269-2	**P**
5.7.2	Rated breaking capacity (A)..... :	120 kA(500V AC), 50 kA(690V AC), 100 kA(440V DC)	**P**
6	MARKING		
	Markings are legible		**P**

IEC 60269-2			
Clause	Requirement + Test	Result - Remark	Verdict
6.1	Fuse-holders marked by:		**P**
	- IEC 60269-2 ..... :	See marking plate	**P**
	- size ..... :	2	**P**
	Marking of rated current and rated voltage are discernible from the front		**P**
6.2	Fuse-links marked by:		**P**
	- IEC 60269-2 ..... :	See marking plate	**P**
	- size or reference ..... :	2	**P**
	- rated breaking capacity ..... :	120 kA(500V AC), 50 kA(690V AC), 100 kA(440V DC)	**P**
	Marking of rated current and rated voltage are discernible from the front		**P**
	Fuse-links are marked as described in Table 104 ..... :	See marking plate	**P**

IEC 60269-2			
Clause	Requirement + Test	Result - Remark	Verdict
7	STANDARD CONDITIONS FOR CONSTRUCTION		
7.1	Mechanical design		P
	The dimensions of the fuse-links given in Figure 101	400A	P
	Dimensions:		
	dimension marking a_1: prescribed (mm); measured (mm) ..... :	150±2,5; 150	P
	dimension marking a_2: prescribed (mm); measured (mm) ..... :	75-10; 70	P
	dimension marking a_3: prescribed (mm); measured (mm) ..... :	62±2,5; 62	P
	dimension marking a_4: prescribed (mm); measured (mm) ..... :	68±2,5; 67	P
	dimension marking $b_1$min: prescribed (mm); measured (mm) ..... :	25min; 25	P
	dimension marking $b_2$min: prescribed (mm); measured (mm) ..... :	8 min; 12.5	P
	dimension marking $b_3$max: prescribed (mm); measured (mm) ..... :	6max; 5	P
	dimension marking $b_4$min: prescribed (mm); measured (mm) ..... :	22 min; 22	P
	dimension marking c_1: prescribed (mm); measured (mm) ..... :	48±0,8; 48	P
	dimension marking c_2: prescribed (mm); measured (mm) ..... :	11-2; 10.2	P
	dimension marking d: prescribed (mm); measured (mm) ..... :	$2,5^{+1.5}_{-0.5}$; 2.5	P
	dimension marking $e_1$max: prescribed (mm); measured (mm) ..... :	61max; 58.5	P
	dimension marking $e_2$max: prescribed (mm); measured (mm) ..... :	60 max; 59	P
	dimension marking e_3: prescribed (mm); measured (mm) ..... :	20^{+5}_{-2}; 25	P

IEC 60269-2			
Clause	Requirement + Test	Result - Remark	Verdict
	dimension marking e_4: prescribed (mm); measured (mm) ..... :	6±0,2; 6	P
	dimension marking f max: prescribed (mm); measured (mm) ..... :	15 max; 13.5	P
	dimension marking z max: prescribed (mm); measured (mm) .....:	5 max; 1.3	P

IEC 60269-2			
Clause	Requirement + Test	Result - Remark	Verdict
	The dimensions of the fuse-base given in Figure 102		
	Dimensions:	DNF1-2, DNF2-2	
	dimension marking g: prescribed (mm); measured (mm) ..... :	61±1; Single pole	P
	dimension marking h: prescribed (mm); measured (mm) ..... :	200±1,5; 200; 200	P
	dimension marking $n_1$max: prescribed (mm); measured (mm) ..... :	60max; 40; 40	P
	dimension marking $n_2$max: prescribed (mm); measured (mm) ..... :	68 max; 65; 65	P
	dimension marking $p_1$max: prescribed (mm); measured (mm) ..... :	60 max; 60; 60	P
	dimension marking p_2: prescribed (mm); measured (mm) ..... :	35±1,5; 35; 35	P
	dimension marking r min: prescribed (mm); measured (mm) ..... :	17min; 48,9; 52	P
	dimension marking s max: prescribed (mm); measured (mm) ..... :	46max; 33,5; 29,5	P
	dimension marking t min: prescribed (mm); measured (mm) ..... :	27min; 27,3;27,5	P
	dimension marking v: prescribed (mm); measured (mm) ..... :	80±3; 82; 82	P
	dimension marking w_1: prescribed (mm); measured (mm) ..... :	30±0,7; 30; 30	P
	dimension marking w_2: prescribed (mm); measured (mm) ..... :	25±0,7; 25; 25	P
	dimension marking x min: prescribed (mm); measured (mm) ..... :	20 min; 20;/	P
	dimension marking y: prescribed (mm); measured (mm) ..... :	10.5±0,5; 10.5; 10,5	P
	dimension marking z max: prescribed (mm); measured (mm) ..... :	5max; 4.7; 4,7	P

IEC 60269-2			
Clause	Requirement + Test	Result - Remark	Verdict
	dimension marking a min: prescribed (mm); measured (mm) .....:	28 min; 41; 41	P
	dimension marking b min: prescribed (mm); measured (mm) .....:	25 min; 30; 30	P
	dimension marking c min: prescribed (mm); measured (mm) .....:	4 min; 5; 5	P
	dimension marking d : prescribed (mm); measured (mm) .....:	11±0,25; M10 11;M10/11;M10	P
	dimension marking e : prescribed (mm); measured (mm) .....:	12,5±0,5; 13; 13	P
7.1.2	Connections, including terminals cross-sectional ranges (Table 105) .....: torques to be applied (Table 111) (lug terminal) ..:	25 mm^2 to 240mm^2 32 Nm	P
7.1.3	Contact surfaces should be silver plated .....:	Yes /~~No~~	P
	If no test according to 8.10 are passed with dummies described in 8.10.1		P
7.1.6	Dynamic short-circuit withstand shall meet cut-off currents (Table 112) .....:	44…48 kA	P
7.1.7	Construction of fuse-link		P
	Blade contacts made of solid material .....:	Silver plated copper	P
	If any other construction, manufacturer demonstrate that construction adequate .....:		N/A
	Endplates not permitted to protrude radially from insulation body.....:	Not protrude	P
	preferable to insulate the gripping lugs from live parts		P
	Fuse-links has an indicator.....:		N/A
	Electrically conductive parts of indicator not ejected from the fuse-link during operation .....:		P
7.2	Insulating properties and suitability for insulation		P
	Creepage distances and clearances of fuses and fuse-accessories meet requirements of IEC 60664-1 for overvoltage category III and pollution degree 3.....:	Refer to part I	P

IEC 60269-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Insulating parts of fuse-base supporting live parts meet the test at PTI 400 according to IEC 60112 (test solution A) .....:	PTI 400	P
7.7	I^2t characteristics		P
	maximum pre-arcing I^2t (Table 7 of IEC 60269-1) .....:		P
	rated currents lower than 16 A and for 224 A (Table 106) .....:		P
	maximum operating I^2t for “aM” fuse-links (Table 107) test No. 2 of the largest rated current of each homogeneous series (Table 20 of IEC 60269-1) :		N/A
7.8	Overcurrent discrimination of “gG” fuse-links (see 8.7.4, Table 108) .....:		P
7.9	Protection against electric shock		P
	increased by means of partition walls and covers of fuse-contacts.....:	According to final installation	P
	operation by authorized persons, instructed in electrical matters, using replacement handles according to this fuse system.....:	Operation by authorized persons	P
8	TESTS		
	IEC 60269-1 applies with the following supplementary requirements		P
8.1.4	Arrangement of fuse and dimensions		P
	Requirements of 7.2 verified on fuse-bases.....:	Verified by clause 8,2	P
	Creepage distances and clearances of fuse-links according to 7.2 are verified .....:		N/A
	Clearances verified on fuse-link inserted into model fuse-base according to Figure 111.....:		N/A
8.1.6	Testing of fuse-holders		P
	In addition to test given in IEC 60269-1 tested according to Table 109.....:		P
8.2.2.1	Points of application of test voltage		P
	In addition to IEC 60269-1 e) between isolated metal gripping-lugs and terminals of test fuse-bases.....:		N/A

IEC 60269-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.2.3.2	Value of test voltage		N/A
	rated impulse withstand voltage in Table 110....:		N/A
8.2.3.3	Test method		N/A
	5 impulses of both polarities and of shape 1,2/50 µs and rated withstand voltage level according to Table 110.....: minimum period between impulses are 1 s.....:		N/A
8.2.4	Acceptability of test results		N/A
8.2.4.3	No flash-over or puncture shall occur during test .....:		N/A
8.2.5	Resistance to tracking		P
	insulating parts supporting live parts of fuse-links and fuse-bases tested according to IEC 60112 (test solution A) .....:	Base of fuse-holder	P
	Five specimens tested and passed at PTI 400 .:	PTI 400 (PA66, DNF1-2) PTI 400 (DMC, DNF2-2)	P
8.3	Verification of temperature rise and power dissipation		P
8.3.1	Arrangement of the fuse		P
	Tightened by torque (Nm) .....:	32 Nm	—
8.3.2	Measurement of the temperature rise	See part 1	P
	Protective covers and fuse-carriers as provided by manufacturer mounted .....:	No protective covers	N/A
8.3.4.1	Temperature rise of the fuse-holder	See part 1	P
	Dummy (Figure 105) Point at which temperature rise is measured (Figure 106)	See part I	P
8.3.4.2	Power dissipation of a fuse-link (Figure 106)	See part I	P
8.4.3.1	Verification of conventional non-fusing and fusing current	See part I	P
	non-fusing current test – second test specimen are used for b)	See part I	P
8.4.3.5	Conventional cable overload protection test (for “gG” fuse-links only)	See part I	P

IEC 60269-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Details of special test are given in Annex AA		N/A
Annex AA	Special test for cable overload protection		N/A
	For fuses with I_n > 16 A of the sizes 000, 00, 0, 1 and 2.....:		N/A
AA.1	Arrangement of the fuse		N/A
	Three fuse-links in fuse-bases mounted in a box .....:		N/A
	Ambient air temperature outside the fuse box shall be (30^{+5}_{0}°C) .....:	°C	N/A
AA.2	Test method and acceptability of test results		N/A
	1,13 I_n flowed through the fuse-links for conventional time (see Table 2 of IEC 60269-1) :	A for s	N/A
	None of fuse-links operated .....:		N/A
	Test current raised without interruption within 5 s to 1,45 I_n.....:	A	N/A
	One fuse-link operated within conventional time:		N/A
8.5.5.1	Verification of the peak withstand current of a fuse-base		N/A
	not be carried out , if this has already been verified during the breaking capacity test of fuse-links with the highest rating of the size .....:	Verified during the breaking capacity test with 400 A fuse-link	P
8.5.5.1.1	Arrangement of the fuse		N/A
	single-phase type, 8.5.1 of IEC 60269-1 peak values of the test currents (Table 112) ....: maximum values (see 8.5.5.1.3) .....: dummy fuse-link (Figure 101).....:		N/A
8.5.5.1.2	Test method		N/A
	fuse-base 1 (Figure107) resilient spring travel is limited to elastic range.: contacts opened up three times.....:		N/A
	fuse-base 2 (see 8.11.1.2) F_{max} according to Table 118		N/A
8.5.5.1.3	Acceptability of test results		N/A
	fuse-links not be ejected		N/A
	no signs of arcing or welding or other damage		N/A

IEC 60269-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.5.8	Acceptability of test results		N/A
	Fuse or circuit-breaker not operate during this test		N/A
8.7.4	Verification of overcurrent discrimination		P
	verified by I^2t values evaluated from the recorded test results		P
	Arrangement of the samples as for the breaking capacity test		P
	two samples tested at the r.m.s. prospective test current I, corresponding to minimum pre-arcing I^2t	pre-arcing: 400 A/500 V AC 566; 581 kA^2s ≥557 kA^2s 315A/690 V AC 313; 339 kA^2s ≥ 302 kA^2s 80 A/690 V AC 14,9; 14,9 kA^2s ≥ 13,7 kA^2s 400 A/440 V DC 669; 621 kA^2s ≥557 kA^2s 80 A/440 V DC 15,8; 16,6 kA^2s ≥ 13,7 kA^2s	P
	the other samples tested at the r.m.s. prospective test current I, corresponding to operating I^2t	operating: 400 A/500 V AC 1,00;1,03 MA^2s ≤ 1,6 MA^2s 315 A/690 V AC 863; 761 kA^2s ≤ 900 kA^2s 80 A/690 V AC 31,9; 32,4 kA^2s ≤ 36 kA^2s 400 A/440 V DC 1,26;1,00 MA^2s ≤ 1,6 MA^2s 80 A/440 V DC 22,9; 22,4 kA^2s ≤ 36 kA^2s	P
		500 V AC, 690 V AC, 440 V DC	—

IEC 60269-2			
Clause	Requirement + Test	Result - Remark	Verdict
	The values of I^2t lie within corresponding limits specified in Table 113 .....:	pre-arcing: 400 A/500 V AC 566; 581 kA^2s ≥557 kA^2s 315A/690 V AC 313; 339 kA^2s ≥ 302 kA^2s 80 A/690 V AC 14,9; 14,9 kA^2s ≥ 13,7 kA^2s 400 A/440 V DC 669; 621 kA^2s ≥557 kA^2s 80 A/440 V DC 15,8; 16,6 kA^2s ≥ 13,7 kA^2s operating: 400 A/500 V AC 1,00;1,03 MA^2s ≤ 1,6 MA^2s 315 A/690 V AC 863; 761 kA^2s ≤ 900 kA^2s 80 A/690 V AC 31,9; 32,4 kA^2s ≤ 36 kA^2s 400 A/440 V DC 1,26;1,00 MA^2s ≤ 1,6 MA^2s 80 A/440 V DC 22,9; 22,4 kA^2s ≤ 36 kA^2s	P
8.9	Verification of resistance to heat		P
	Tests apply to fuse-link and fuse-base		P
	Fuse-holder with fuse-links having maximum power dissipation are cyclically loaded as pre-treatment.....:		P
	After cooling to normal temperature breaking capacity tested at I_1 (see 8.5).....:	I_1 =120kA(AC500V); 50kA(AC690V)	P
	Fuse-links with organic material Fuse-holder with fuse-links having maximum power dissipation are cyclically loaded as pre-treatment.....		N/A

IEC 60269-2			
Clause	Requirement + Test	Result - Remark	Verdict
	After cooling to normal temperature breaking capacity tested at I_1 and I_5 (see 8.5) .....:	I_1 = I_5 =	N/A
8.9.1	Fuse-base	DNF1-2 400A DNF2-2 400A	P
	test below apply if it is not obvious that components are not affected adversely by given temperature and withdrawal forces		P
8.9.1.1	Test arrangement		P
	Figure 105 and 108		P
	Test se-up in heating chamber		P
8.9.1.2	Test method		P
	Temperature of (80^{+5}_{0})°C for 2 h	81,3 °C, 2h	P
	160% rated current for 2 h .....:	160% I_n =640	P
	Test voltage .....:	50 V	—
	3 min after switching off tensile force F_{max} (see Table 118) exerted for 15 s	 F_{max} = 400 N/15s	P
8.9.1.3	Acceptability of test results		P
	Contact pieces not have moved to affect the further use		P
	Dimensions of Figure 102 are considered		P
	Insulating mounting part no broken and no show any signs of cracks		P
8.9.2	Fuse-links with gripping lugs of moulded material or of metal fixed in moulded material		N/A
8.9.2.1	Test arrangement		N/A
	Figure 108		N/A
8.9.2.2	Test method		N/A
	Temperature of (80^{+5}_{0})°C for 2 h		N/A
	150% rated current for conventional time.....:	A for h	N/A
	Test voltage .....:	V	—
	3 min after fuse-link operated or conventional time expired tensile force F_{max} (see Table 118) exerted for 15 s	 F_{max} =	N/A
8.9.2.3	Acceptability of test results		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Gripping lugs remain fully operational		N/A
	Dimensions of Figure 101 (d and c_2) not be exceeded by more than 2 mm		N/A
8.10	Verification of non-deterioration of contacts		P
8.10.1	Arrangement of the fuse	DNF1-2, 400A (400 A/ 500 V AC) DNF2-2, 400A (315A/ 690 V AC)	P
	Figure 105		P
	for lug terminals, torque in Table 111 .....:	32 Nm	—
	Insulation of conductors removed over the whole length .....:		P
	All covers of contacts and terminals are removed		N/A
8.10.1.2	Direct terminal clamps		N/A
	Test performed on 10 direct terminal clamps of five fuse-bases		N/A
	Distance between fuse-base centres of at least three times e_2 (see Figure 101)		N/A
	Torque of tightened of screws .....:	Nm	—
	Conductor cross-section .....:	mm^2	—
8.10.2	Test method		P
	Test current (A) for load period ..... :	400A*1.25=500A(500V AC) 400A*1.25=500A (690 V AC)	P
	Duration (s) of load period ..... :	45 min	P
	Duration (s) of no-load period ..... :	18 min	P
	Test voltage (V).....:	50 V	—
	a) Test of 50 cycles, measured values did not exceed the limits given in subsequent parts of IEC 60269	(see appended table)	P
	b) Test of 250 cycles, measured values did not exceed the limits given in subsequent parts of IEC 60269	(see appended table)	P
	c) Test of 500 cycles, measured values did not exceed the limits given in subsequent parts of IEC 60269	(see appended table)	N/A

IEC 60269-2			
Clause	Requirement + Test	Result - Remark	Verdict
	d) Test of 750 cycles, measured values did not exceed the limits given in subsequent parts of IEC 60269	(see appended table)	N/A
8.10.2.1	Contacts		P
	Points between voltage drop is measured (A and B in Figure 106)		P
	Withdrawal force (Table 118); measured force after 250 cycles (N)	DNF1-2, 400A 1) 325 N 2) 325 N 3) 325N DNF2-2, 400 A 1) 325 N 2) 325 N 3) 325N	P
	Withdrawal force (Table 118); measured force after 750 cycles (N) .....:	1) 2) 3)	N/A
	If measured values too low, test of 8.5.5.1 .....:		N/A
8.10.2.2	Direct terminal clamps		N/A
	Points between voltage drop is measured (Figure 110)		N/A
	Test sequence for all types conductors (see Table 116)	(see appended table)	N/A
	Verification of temperature rise (see 8.3.4.1) (see figure 110).....:		N/A
8.10.3	Acceptability of test results		P
8.10.3.1	Contacts		P

IEC 60269-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Limit value after 250th cycle ≤ 15%	DNF1-2 400A: 1) 11,60% 2) 7,50% 3) 10,00% DNF2-2 400A: 1) 11,90% 2) 9,76% 3) 11,90%	P
	Limit value after 500th cycle ≤ 30%		N/A
	Limit value after 750th cycle ≤ 40%		N/A
	Difference between last and first measurement of temperature rise less than 20 K .....:	Max. difference: DNF1-2: 4,4 K Max. difference: DNF2-2: 3,3 K	P
8.10.3.2	Direct terminal clamps		
	Permissible tolerance for resistance R_{cl0} for Al conductors : $R_{cl\,0\,max} \leq 2\ R_{cl\,0\,min}$ .....:		
	Permissible changes of the resistance from $R_{cl\,50}$ to $R_{cl\,750}$: see Table 117 .....:		
	Copper or cleaned aluminium conductors ..... :		
	Uncleaned aluminium conductors..... :		
	Change from 50th to 250th cycle		
	Change after 250th to 500th cycle		
	Change after 500th to 750th cycle		
	Change between 50th to 750th cycle		
	Temperature rise at test spot F < 75K		
8.11	Mechanical and miscellaneous tests		P
8.11.1.1	Mechanical strength of fuse-holders		P

IEC 60269-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Test set-up subjected to temperature rise test at rated current .....:	DNF1-2, 400 A 47,0K; 48,6K;48,4K 47,7K;48,2K;47,5K DNF2-2, 400 A 47,5K;49,0K;48,3K; 48,2K; 48,6K; 47,7K	P
	fuse-link or fuse-carrier are withdrawn and inserted into fuse-base 100 times .....:	DNF1-2, 400A (400 A/ 500 V AC) 100 times DNF2-2, 400 A (315 A/ 690 V AC) 100 times	—
	All parts are intact and function normally		P
	Test set-up subjected to further temperature rise test at rated current (values obtained are not more than 5 K or 15 % above the values from temperature-rise test prior) .....:	DNF1-2, 400 A 50,3K; 51,4K; 51,7K 50,8K; 51,1K; 50,8K Max. difference: DNF1-2: 4,4 K Not more 5 K than above the values DNF2-2, 400 A 49,9K;52,4K;52,8K; 51,3K;51,7K;51,1K Max. difference: DNF2-2: 3,3 K Not more 5K than above the values	P
8.11.1.2	Mechanical strength of the fuse-base	DNF1-2, 400A (400 A/ 500 V AC) DNF2-2, 400 A (315 A/ 690 V AC)	P

IEC 60269-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Test-link inserted three times in the fuse-base .: (Dimensions of blade contacts see Figure 101) (Withdrawal force F lied within limits in Table 118)	DNF1-2, 400 A/ 500 V AC 3 times For samples No. D1 to D8 328 N, 327N, 329 N, 328 N, 327 N, 227N, 227 N, 329 N DNF2-2, 315 A/ 690 V AC 3 times For samples No. D21 to D28 326N, 327N, 327 N, 327N 327N, 325N, 326 N, 325N	P
	Steel screws are fastened three times at the terminals, torque of 1,2 times value specified by manufacturer or value of Table 111 .....:	DNF1-1 (400 A/ 500 V AC) DNF2-1(315 A/ 690 V AC) 38,4 N	P
	Contact pieces not have moved to affect the further use		P
	Insulating mounting part no broken and no show any signs of cracks		P
8.11.1.8	Impact resistance of gripping-lugs of moulded material or of metal fixed in moulded material		N/A
8.11.1.8.1	Test arrangement		N/A
8.11.1.8.2	Facility is given in Figure 109.....:		N/A
	One fuse-link ...(150±5)°C for 168 h		—
	Another one .....-15°C for 72 h		—
	One impact on each of gripping-lugs		N/A
8.11.1.8.3	Acceptability of test results		N/A
	No damage capable of hindering their further use		N/A
	No bent out by more than 3 mm		N/A
	Coupling with a handle (Figure 103) not are hindered		N/A

IEC 60269-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.11.2.3	Verification of resistance to rusting	DNF1-2, 400 A (400A/500 V AC) DNF2-2 400A (315A/690 V AC)	P
8.11.2.3.1	According to ISO 6988 cyclic moist atmosphere containing 0,2% SO2 (SFW 0,2 S) for 1 cycle	0,2% SO_2 for 1 cycle	P
8.11.2.3.2	Optional test (severe environmental conditions)		N/A
	Fuse-links and fuse-bases for used in environment of pollution degree ≥3 tested with SFW 2,0 S for 5 cycles .....:		N/A
	They marked accordingly .....:		
8.11.2.4	Non-deterioration of insulating parts of fuse-link and fuse-base	DNF1-2, 400 A (400A/500 V AC) DNF2-2 400A (315A/690 V AC)	P
8.11.2.4.1	Test method		P
	Period 168 h .....:	168 h for fuse-holder	—
	for equipment comprising moulded elements to support live parts (150±5)°C	150 °C	—
	for covers (100±5)°C	/	—
	Period greater than 1 h.....:	1 h	—
	for sealing compounds; stability of marking .....(150±5)°C	150 °C	—
	After cooling to ambient temperature the following are tested.		P
	Fuse-links: breaking capacity with I_1 and I_2 ....:		P
	Fuse-base: mechanical strength in accordance with 8.11.1.2		P
8.11.1.2	Mechanical strength of the fuse-base	DNF1-2, 400 A (400A/500 V AC) DNF2-2 400A (315A/690 V AC)	P

IEC 60269-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Test-link inserted three times in the fuse-base .: (Dimensions of blade contacts see Figure 101) (Withdrawal force F lied within limits in Table118)	DNF1-2, 400 A/ 500 V AC 3 times For samples No. D1 to D8 328 N, 327N, 329 N, 328 N, 327 N, 227N, 227 N, 329 N DNF2-2, 315 A/ 690 V AC 3 times For samples No. D21 to D28 326N, 327N, 327 N, 327N 327N, 325N, 326 N, 325N	P
	Steel screws are fastened three times at the terminals, torque of 1,2 times value specified by manufacturer or value of Table 111 .....:	DNF1-1 (400 A/ 500 V AC) DNF2-1(315 A/ 690 V AC) 38,4 N	P
	Contact pieces not have moved to affect the further use		P
	Insulating mounting part no broken and no show any signs of cracks		P
8.11.2.4.2	Acceptability of test results		P
	Not have changed of positions of fuse-base contacts to correct functioning		P
	No fracture nor any signs of fracture on insulating body with terminals		P
	Mechanical strength of cemented joints not impaired		P
	Sealing compounds not shifted to extent permitting live parts to exposed		P
	Fuse-links operate correctly		P
	Marking are durable and easily legible		P

IEC 60269-2			
Clause	Requirement + Test	Result - Remark	Verdict

APPENDIX 1

8.10.2	TABLE: Direct terminal clamps									P
	ambient air temperature (°C) ..... :			22,7						—
	DNF1-2 400A sample No. (contacts) , input and output terminal									
	1	2	3	4	5	6	7	8	9	10
T 1 (K)	47,5	49,0	48,3							
	48,2	48,6	47,7							
ΔU initial (mV)	--	--	--							
	--	--	--							
Rcl 0 (mΩ)	--	--	--							
	--	--	--							
ΔU 50 (mV)	2,05	2,00	2,00							
	2,15	2,10	2,15							
Rcl 50 (mΩ)	0,041	0,040	0,040							
	0,043	0,042	0,043							
ΔU 250 (mV)	2,20	2,15	2,20							
	2,40	2,25	2,30							
Rcl 250 (mΩ)	0,044	0,043	0,044							
	0,048	0,045	0,046							
T 2 (K)	49,9	52,4	52,8							
	51,3	51,7	51,1							
ΔU 500										
Rcl 500										
ΔU 750										
Rcl 750										
T 3 (K)										

T 1: Initial temperature rise / T 2: temperature rise after 250 cycles / T 3: final temperature rise

IEC 60269-2			
Clause	Requirement + Test	Result - Remark	Verdict

8.10.2	TABLE: Direct terminal clamps									P
	ambient air temperature (°C) ..... :			23,0						—
	DNF2-2 400A sample No. (contacts) , input and output terminal									
	1	2	3	4	5	6	7	8	9	10
T 1 (K)	47,0	48,6	48,4							
	47,7	48,2	47,5							
ΔU initial (mV)	--	--	--							
	--	--	--							
Rcl 0 (mΩ)	--	--	--							
	--	--	--							
ΔU 50 (mV)	2,00	2,05	2,10							
	2,10	2,15	2,05							
Rcl 50 (mΩ)	0,040	0,041	0,042							
	0,042	0,043	0,041							
ΔU 250 (mV)	2,20	2,25	2,35							
	2,35	2,35	2,25							
Rcl 250 (mΩ)	0,044	0,045	0,047							
	0,047	0,047	0,045							
T 2 (K)	50,3	51,4	51,7							
	50,8	51,1	50,8							
ΔU 500										
Rcl 500										
ΔU 750										
Rcl 750										
T 3 (K)										

T 1: Initial temperature rise / T 2: temperature rise after 250 cycles / T 3: final temperature rise

Attachment 1 Test equipment list

Test equipment list at test location 1

Clause	Testing / measuring equipment / material used, (Equipment ID)	Model	Serial number	Calibration due date
1	Digital calipers	1103-200C	SB-Ⅰ-E005	2021-09-10
2	Vernier caliper	0-100 mm	SB-Ⅰ-E003	2021-09-10
3	Digital micro ohmmeter	ZY9987	SB-Ⅰ-N013	2021-04-09
4	GND-Resistance Tester	VG2678A	SB-Ⅰ-S076	2021-09-10
5	Temperature and humidity recorder	HC-02	SB-Ⅰ-C011	2021-09-10
6	Temperature and humidity data recorder	DT-172	SB-Ⅰ-C025	2021-09-10
7	Damp heat test chamber	RS-110A	SB-Ⅰ-S015	2021-09-10
8	Walking in type alternating humidity heat box	JSR-V30M25P85	SB-Ⅰ-S065	2021-09-10
9	High and low temperature alternating humidity heat box	EL-10KA	SB-Ⅰ-S067	2021-09-10
10	Withstand voltage tester	VG2672F	SB-Ⅰ-S058	2021-04-09
11	Impulse voltage tester	GC-20	SB-Ⅰ-S035	2021-09-10
12	Impulse voltage tester	GC-20B	SB-Ⅰ-S059	2021-09-10
13	Insulation resistance meter	ZC25-4	SB-Ⅰ-N011	2021-09-10
14	Current transformer	HL55	SB-Ⅰ-M004	2021-04-24
15	Current transformer	HL23-1	SB-Ⅰ-M010	2021-04-24
16	Current transformer	HLB2	SB-Ⅰ-M022	2021-10-18
17	Current transformer	HL1	SB-Ⅰ-M026	2021-04-24
18	Current transformer	HL23-5	SB-Ⅰ-M036	2021-10-26
19	data acquisition/Switch unit	34970A/34901	SB-Ⅰ-S040	2021-09-10
20	electric parameter measuring instrument	GDW305B	SB-Ⅰ-S018	2021-09-10
21	Three phase PWM special tester	PF9833	SB-Ⅰ-S057	2021-09-10
22	Walking in type high and low temperature test chamber	GD-V180M40P60	SB-Ⅰ-S060	2021-09-10
23	Walking in type high and low temperature test chamber	HW-V160P15P60	SB-Ⅰ-S062	2021-09-10
24	Torque wrench	QL12N	SB-Ⅰ-S011	2021-09-10
25	Torque wrench	QL25N	SB-Ⅰ-S012	2021-09-10

26	Torque screw driver	NQ-2	SB-Ⅰ-S021	2021-09-10
27	Torque screw driver	NQ-4	SB-Ⅰ-S022	2021-09-10
28	data acquisition system	SYNERGY 16	SB-Ⅰ-S045	2021-04-09
29	data acquisition system	GENESIS	SB-Ⅰ-S041	2021-04-09
30	data acquisition system	SATURN-BE12	SB-Ⅰ-S046	2021-04-09
31	coil	FK-6914 FK-6915 FK-6916	SB-Ⅰ-S051	2021-04-09
32	coil	FK-6917 FK-6918 FK-6919	SB-Ⅰ-S053	2021-04-09
33	Coil	FK-6920 FK-6921 FK-6922	SB-Ⅰ-S049	2021-04-09
34	Coil	FK-6923 FK-6924 FK-6925	SB-Ⅰ-S052	2021-04-09
35	Coil	FJ-4141 FJ-4142 FJ-4143	SB-Ⅰ-S056	2021-04-09
36	Coil	FJ-4419 FJ-4420 FJ-4421	SB-Ⅰ-S048	2021-04-09
37	Coil	FJ-3037 FJ-3038 FJ-3039	SB-Ⅰ-S084	2021-04-09
38	Standard test finger	AQ-1	SB-Ⅰ-S002-1	2021-09-10
39	Drip test device		SB-XⅠ-S001	2021-09-10
40	Touch test tool	C type	SB-XⅠ-S026	2021-09-10
41	Touch test tool	D type	SB-XⅠ-S027	2021-09-10
42	Touch test tool	A type	SB-XⅠ-S032	2021-09-10
43	Walking in type high and low temperature test chamber	GD-V80M60P100	SB-Ⅰ-S061	2021-09-10
44	Ball pressure test device	SH9014	SB-Ⅰ-S031	2021-09-10
45	Tube dynamometer	LTZ-20	SB-Ⅰ-F004	2021-09-10
46	Tube dynamometer	LTZ-100	SB-Ⅰ-F015	2021-09-10
47	PH meter	PHS-3C	SB-Ⅰ-S088	2021-04-09
48	electronic stopwatch	DT480	SB-Ⅰ-D004	2021-09-10
49	Glow Wire Tester	GWH-A	SB-Ⅰ-S010	2021-09-10
50	Electric leakage tracking index tester	TI-A	SB-II-S030	2021-09-10
51	electric parameter measuring instrument	GDW305B	SB-Ⅰ-S019	2021-09-10
52	Insulation tester	1508	SB-Ⅰ-N012	2021-04-09

53	Empty box barometer	DYM3	SB-Ⅰ-G001	2021-03-06
54	Empty box barometer	DYM3	SB-Ⅰ-G002	2021-03-06
55	DC voltage divider	FLP1-3V/10kA	SB-Ⅰ-U018	2021-04-13
56	DC voltage divider	FLP1-2.5V/30kA	SB-Ⅰ-U017	2021-04-13
57	DC voltage divider	FLP1-3V/3kA	SB-Ⅰ-U020	2021-04-13
58	DC voltage divider	FLP1-3V/1kA	SB-Ⅰ-U021	2021-04-13
59	DC voltage divider	SH-T	SB-Ⅰ-U022	2021-04-24
60	DC voltage divider	SH-T	SB-Ⅰ-U023	2021-04-24
61	DC voltage divider	SH-T	SB-Ⅰ-U024	2021-04-24
62	DC voltage divider	SH-T	SB-Ⅰ-U025	2021-04-24
63	DC voltage divider	FLP1-3V/1kA	SB-Ⅰ-U026	2021-04-13
64	DC voltage divider	FLP1-3V/3kA	SB-Ⅰ-U027	2021-04-13
65	DC voltage divider	FLP1-3V/100kA	SB-Ⅰ-U028	2021-04-13
66	DC voltage divider	FLP1-3V/5kA	SB-Ⅰ-U029	2021-04-13

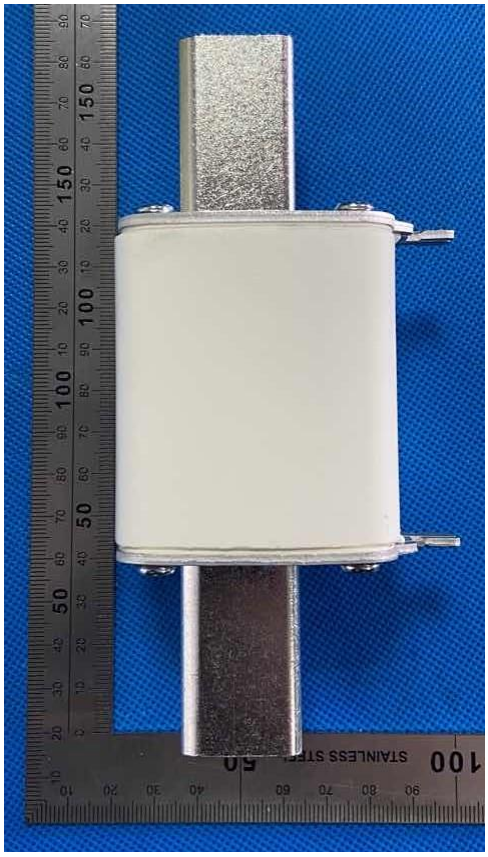
Test equipment list at test location 2

Clause	Testing / measuring equipment / material used, (Equipment ID)	Model	Serial number	Calibration due date
1	Sulfur dioxide corrosion test chamber	GS-S02T50	WD-58	2020-11-26
2	USB temperature and humidity recorder	Cos-03	WD-106	2020-09-24

Attachment 2 Photo documentation

Picture 1 Fuse-link RT16-2 400A 440 V DC

Picture 2 Fuse-link RT16-2 400A 440 V DC

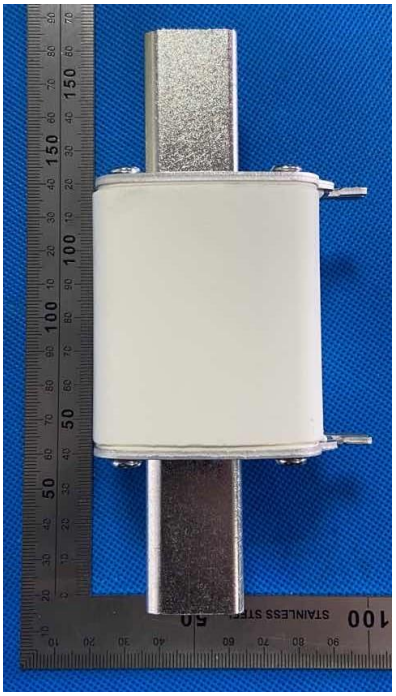


Picture 3 Fuse-link RT16-2 400A 440 V DC

Picture 4 Fuse-link RT16-2 400A 440 V DC

Picture 5 Fuse-link RT16-2 315 A 690 V AC

Picture 6 Fuse-link RT16-2 315 A 690 V AC



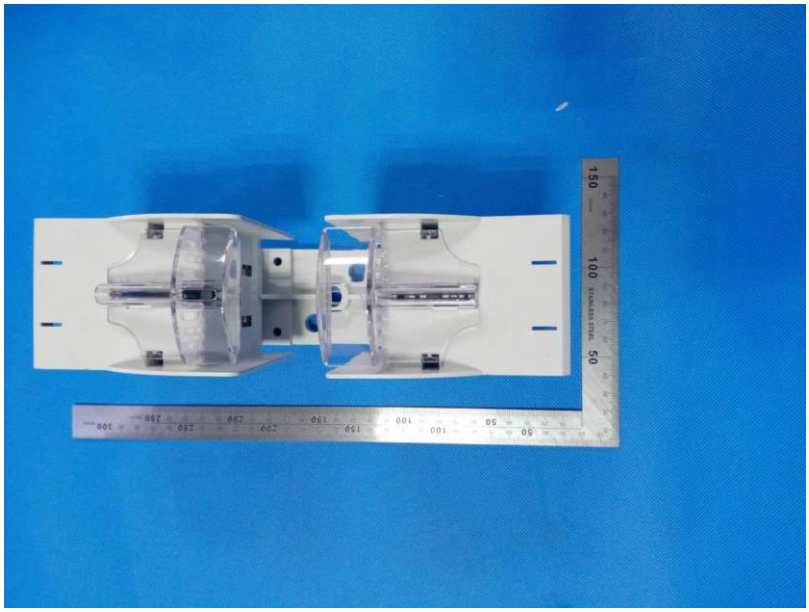
Picture 7 Fuse-link RT16-2 315 A 690 V AC

Picture 8 Fuse-link RT16-2 315 A 690 V AC

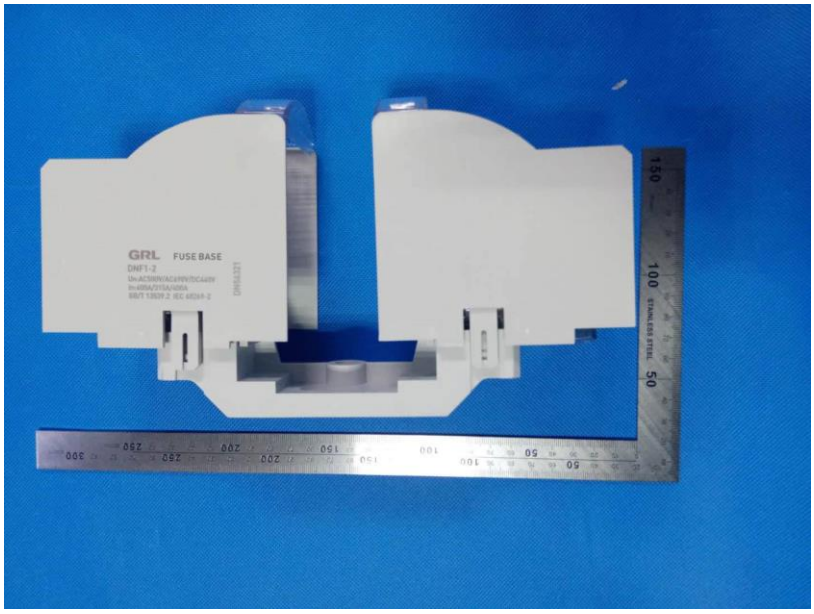
Picture 9 Fuse-link RT16-2 80 A 690 V AC

Picture 10 Fuse-link RT16-2 80 A 690 V AC

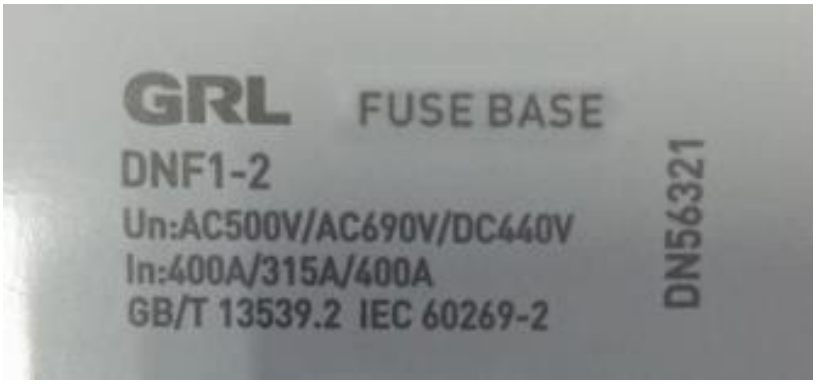
Picture 11 Fuse-link RT16-2 80 A 690 V AC



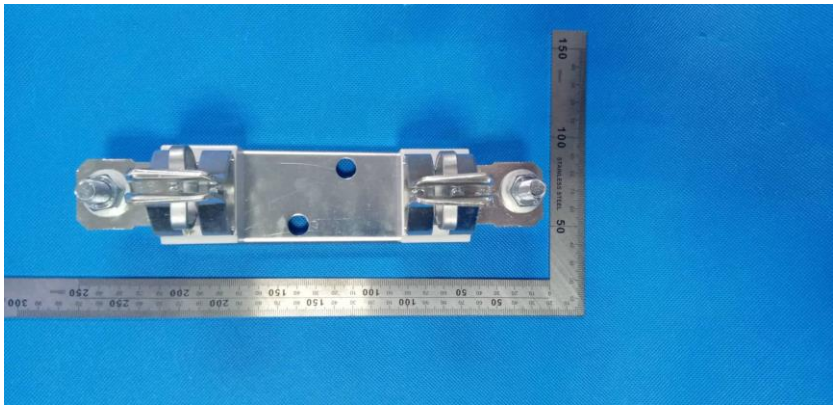
Picture 12 Fuse-holder DNF1-2



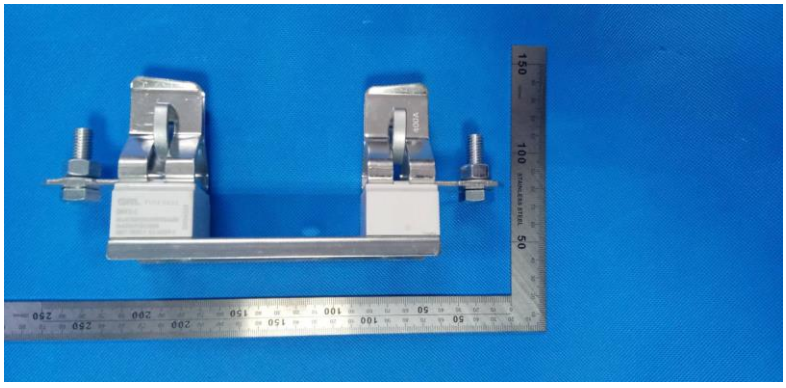
Picture 13 Fuse-holder DNF1-2



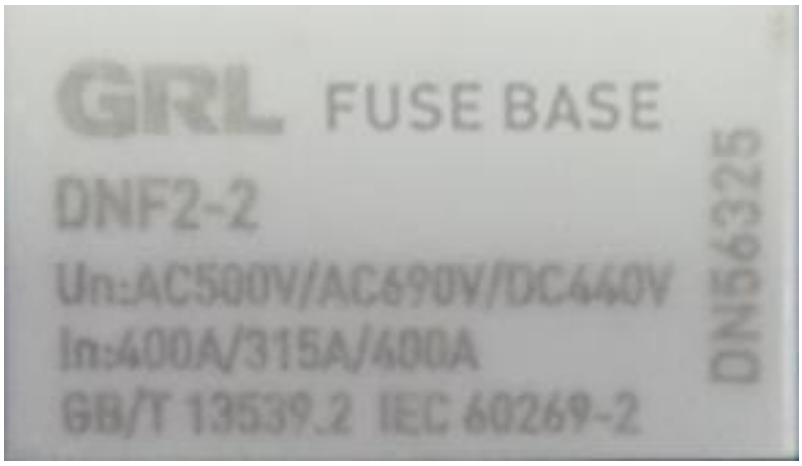
Picture 14 Fuse-holder DNF1-2



Picture 15 Fuse-holder DNF2-2



Picture 16 Fuse-holder DNF2-2



Picture 17 Fuse-holder DNF2-2

-End of the report-

Test requirements of EN 60269-1:2007/A2:2014			
Clause	Requirement + Test	Result - Remark	Verdict
5	**CHARACTERISTICS OF FUSES**		P
5.2	**Rated voltage (V)**		P
	In table 1 delete the asterisk after 415		
	Add, at the end of the series I column, “1000*” and at the end of the series II column, “347”.		N/A
	Replace the d.c preferred value for rated voltages		
5.3.1	Replace Note 1 and Note 2 by the following new paragraph: if it is necessary to choose lower values or intermediate values or higher values, these values should be selected from the series R10 of ISO 3, and in exceptional cases, from R20 or R40 of ISO 3. Add 35 as a new value between 32 and 40		P
5.6.2	Conventional times and currents Replace the first paragraph by the following: The conventional times and currents for “gG” and “gM” fuse-links are given in table 2.		P
5.6.3	Gates Replace, in the heading of table 3, “for “gG” and “gM” fuse-links” by the following new text: “gG”, “gK” and “gM” fuse-links”. Add a new row for 35A after the row for 32A. Add at the end of Subclause 5.6.3: for “gK” fuse-links, gates are given in IEC 60269-2, fuse system K”.	35 A was not been declared by manufacturer	N/A
5.7.1	Breaking range and utilization category: Add, in the third paragraph, the following new dashed item: -“gK” indicates fuse-link with a full-range breaking capacity for general application.	gG	N/A
7.7	**I2t characteristics**		P
	Add at the end of the first paragraph: Values for “gK” fuse-links are given in IEC 60269-2, fuse system K.		N/A
	Add a new row for 35A after the row for 32A.		N/A
7.8	**Overcurrent discrimination of fuse-links :**		P
	Replace, in the title and in the text of 7.8, “discrimination’ by “selectivity”.		P
	Add a new row for 35A after the row for 32A in table 17 and table 18.		N/A
	Replace table 19 by new table		P

Test requirements of EN 60269-1:2007/A2:2014			
Clause	Requirement + Test	Result - Remark	Verdict
	Replace, in the "time constant" row, "$0,5(I)^{0,3}$" by "$0,5(I)^{0,3}$" ms" in table 21		P
8.7	**Verification of I^2t characteristics and overcurrent discrimination**		P
	Replace, in the title, "discrimination' by "selectivity".		P
8.7.3	Verification of compliance for fuse-links at 0,01 s		P
	Add, at the end of the first sentence, "as shown in Clause B.1". Replace, in the second sentence, "Annex B" by "Clause B.2".		P
8.7.4	Verification of overcurrent discrimination		P
	Replace, in the title, the text and the note, "discrimination" by "selectivity".		P

Deviation between HD 60269-2:2013 and IEC 60269-2:2013			
Clause	Requirement + Test	Result - Remark	Verdict

Fuse system A – Fuses with fuse-links with blade contacts (NH fuse system)			
6.2	**Markings of fuse-links**		P
	Fuse-links with isolated gripping-lugs shall be marked in a place visible at the front with the graphical symbol of a gripping-lug in a square		N/A
	Add, at the end of the series I column, “1000*” and at the end of the series II column, “347”.		N/A
8.5.5.1	Add the following at the end of the first sentence: or if the minimum withdrawal forces according to 8.11 are exceeded.		N/A