Test Report issued under the responsibility of:

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

Report Number. .....:	180301688SHA-001
Date of issue .....:	2018-04-24
Total number of pages.....	29
Applicant's name.....:	YUEQING BARFUSE ELECTRIC CO., LTD
Address .....:	Yonghe san Rd, no.15, Chengdong Industry zone, Yueqing, Zhejiang, China
Test specification:	
Standard.....:	IEC 60269-1:2006 + A1:2009 + A2:2014
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 .....:	STRIP TYPE FUSE RAIL
Trade Mark .....:	BARFUSES BATTLE FOR SAFETY
Manufacturer.....:	Same as applicant
Model/Type reference .....:	BTR2
Ratings .....:	Un=690V, In=250A; Ip=690V/50kA; System C

Testing procedure and testing location:		
☒	Testing CB Laboratory:	Intertek Testing Services Shanghai
Testing location/ address .....:		Building No.86, 1198 Qinzhou Road (North), Shanghai 200233, China
☒	Associated CB Laboratory:	Inspection Center of Products' Quality of Low Voltage Electric Apparatus in Zhejiang Province
Testing location/ address .....:		No. 400 Guangqiong Rd. Jiaxing Zhejiang CHINA
	Tested by (name + signature).....:	Quiet Lin
	Approved by (name + signature)...:	Allen Wang
☐	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):

N/A

Summary of testing:

Clause	Testing Items	Testing Location
8.1.4	Arrangement of the fuse and dimensions	CBTL
8.1.5.1	Resistance	CBTL
8.2	Verification of the insulating properties and of the suitability for isolation	ACTL
8.3	Temperature rise, power dissipation	ACTL
8.4.3.1	Verification of conventional non-fusing and fusing current	ACTL
8.4.3.2	Verification of rated current of “g” fuse-link	ACTL
8.4.3.3	Verification of time-current characteristics and gates	ACTL
8.4.3.4	Overload	ACTL
8.4.3.5	Conventional cable overload protection	ACTL
8.4.3.6	Operation of Indicating device and striker	ACTL
8.5	Verification of the breaking capacity	ACTL
8.6	Verification of the cut-off current characteristics	ACTL
8.7	Verification of I2t characteristics and overcurrent discrimination	ACTL
8.8	Degree of protection	CBTL
8.9	Resistance to heat	CBTL
8.10	Non-deterioration of contacts	ACTL
8.11.1	Mechanical strength	ACTL
8.11.2	Miscellaneous test	ACTL

Number of fuse-holder to be tested

Test according to subclause		Number of samples				
		#01	#02	#03		
8.1.4	Dimensions	x				
8.2	Insulating properties and suitability for isolation	x				
8.11.2.2	Resistance to abnormal heat and fire	x				
8.11.1.2	Mechanical strength of the fuse-base		x			
8.3	Temperature rise, power dissipation			x		
8.11.1.1	Mechanical strength of fuse-holder			x		
8.3	Temperature rise, power dissipation			x		
8.10.1.1	Contacts		x			
8.11.1.2	Mechanical strength of the fuse-base		x			
8.5.5.1	Peak withstand current of a fuse-base		x			
8.9	Resistance to heat			x		
8.11.2.4	Non-deterioration of of insulating parts of fuse-link and fuse-base			x		
8.11.1.2	Mechanical strength of the fuse-base			x		
8.10.1.2	Direct terminal clamps [b)]					
8.11.2.3	Resistance to rusting		x			

Note:
a) The test sequence is according to IEC 60269-2, Table 302
b) Clause 8.10.1.2 is not applicable, no such direct terminal clamps.

Summary of compliance with National Differences

The products comply with the standard EN 60269-1:2007+A1:2009+A2:2014 and HD 60269-2:2013

Copy of marking plate

BARFUSES
BATTLE FOR SAFETY

Made In China

Product Model:	BTR2-250A	STRIP TYPE FUSE RAIL	
Rated voltage:	AC690V50HZ	Rated current:	250A
Applicaton Category	AC-21B	Isolation code:	
Fuse Size:	SIZE I	Dissipated power:	32W

Test item particulars.....:	
Classification of installation and use.....:	**Rail installed**
Supply Connection.....:	**Copper bus-rail with screws and copper conductor with pillar terminals**
.....:	
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.....:	**2018-03-20**
Date (s) of performance of tests .....:	**2018-03-20 ~ 2018-04-20**

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.

This test report is valid only being read together with the test reports of 180301688SHA-002

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) ..... : Same as applicant
General product information: Un=690V, In=250A; Ip=690V/50kA; System C; Uimp=6kV Rated acceptable power dissipation 32W

IEC 60269-1			
Clause	Requirement + Test	Result - Remark	Verdict
5	CHARACTERISTICS OF FUSES		
5.2	Rated voltage (V) as specified ..... :	690	P
5.3.1	Rated current (A) of the fuse-link in accordance with specified values ..... :		N/A
5.3.2	Rated current (A) of the fuse-holder ..... :	250	P
5.4	Rated frequency (Hz) ..... :	50Hz	P
5.5	Max. rated power dissipation (VA) of fuse-link ..... :		N/A
	Rated acceptable power dissipation (VA) of fuse-holder ..... :	32W	P
5.6	Limits of time-current characteristics based on reference ambient air temperature Ta of +20°C		N/A
5.6.1	Time-current zones deviated from standardized, or available in manufacturers documentation (with tolerances) ..... :		N/A
5.6.2	Conventional times and currents see Table 2 .... :		N/A
5.6.3	Gates..... :		N/A
5.7	Breaking range and breaking capacity		--
5.7.1	Breaking range and utilization category ..... :		N/A
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 ..... :	690V/50kA (normally used with fuse-holder)	P
5.8	Cut-off current and I^2t characteristics are referred to the values of voltage, frequency and power factor		--
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 :		N/A
	The operating I^2t characteristics with specified voltages as parameter for pre-arcing times less than 0,1 s given by the manufacturer ..... :		N/A

IEC 60269-1			
Clause	Requirement + Test	Result - Remark	Verdict
6	MARKINGS		
	Markings are durable and easily legible		P
6.1	Fuse-holders marked by:		--
	- name of manufacturer or trade mark which enable identification of fuse-holder ..... :	BARFUSES BATTLE FOR SAFETY	P
	- manufacturer's identification reference enabling to find all characteristics listed in 5.1.1 ..... :		P
	- rated voltage (V) ..... :	690V	P
	- rated current (A) ..... :	250A	P
	- kind of current and rated frequency (Hz) ..... :	50Hz	P
6.2	Fuse-link(s) except small fuse-link(s) marked by:		--
	- name of manufacturer or trade mark which enable identification of fuse-links ..... :		N/A
	- manufacturer's identification reference enabling to find all characteristics listed in 5.1.2 ..... :		N/A
	- rated voltage (V) ..... :		N/A
	- rated current (A) ..... :		N/A
	- breaking range and utilization category (if applicable) (5.7.1) ..... :		N/A
	- kind of current ..... :		N/A
	- rated frequency (Hz), if applicable (5.4)		N/A
	Small fuse-links marked by:		--
	- trademark ..... :		N/A
	- 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		P
7.1.1	Replacement of fuse-links easily and safely		P
7.1.2	Connections, including terminals		--
	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		--
	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		--
	a) fuse-base and fuse-carrier	No fuse-carrier	N/A
	b) fuse-carrier and fuse-link	No fuse-carrier	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		--
	a) after repeated engagement and disengagement		P
	b) after being left undisturbed in service for long period		P
7.1.4	Construction of a gauge-piece		--
	Gauge-piece is so designed that it withstands normal stresses occurring during use		N/A
7.1.5	Mechanical strength of fuse-link		--

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Clause	Requirement + Test	Result - Remark	Verdict
	Fuse-link have adequate mechanical strength and its contacts are securely fixed		N/A
7.2	Insulating properties and suitability for isolation		--
	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	Only fuse-holder	P
	See Table 5 ..... :		P
	Requirements are verified by tests according to 8.3		P
7.4	Operation		--
	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		N/A
	- is able to carry continuously any current not exceeding its rated current		N/A
	- is able to withstand overload conditions as they may occur in normal service (see 8.4.3.4)		N/A
	Fuse-link satisfy these conditions if it passes the tests prescribed in 8.4		N/A
7.5	Breaking capacity		--
	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		N/A
	- current I_f (for “g” fuse-links) ..... :		N/A
	- current $k_2 I_n$ (for “a” fuse-links) ..... :		N/A
	- for a.c., rated breaking capacity at power factors not lower than those in Table 20 ..... :		N/A
	- for d.c., rated breaking capacity at time constants not greater than those limits in Table 21 ..... :		N/A
	Arc voltage not exceed values given in Table 6..... :		N/A
	Fuse satisfy these conditions if it passes the tests prescribed in 8.5		N/A
7.6	Cut-off current characteristic		--

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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		--
	Pre-arcing I^2t values verified according to 8.7 (Table 7) ..... :		N/A
	Operating I^2t values verified according to 8.7 ..... :		N/A
7.8	Overcurrent discrimination of fuse-links ..... :		N/A
7.9	Protection against electric shock		--
	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		--
	Clearances are not less than the values given in Table 9 ..... :	Between contacts:>20mm Between different poles: 10,8mm	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 ..... :	Between contacts:>20mm Between different poles: >20mm	P
7.9.2	Leakage currents of fuses suitable for isolation		--
	Value of leakage current (mA) not exceed		--
	- 0,5 mA per pole for fuses in new conditions ..... :		P
	- 2 mA per pole for fuses having been submitted to test according to 8.5 ..... :		P
7.9.3	Additional constructional requirements for fuses for linked fuse-carriers, suitable for isolation	No such fuse-carrier	--
	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
	Indication of this position is provided by the position of the fuse-carrier		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	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		--
	All components are sufficiently resistant to heat which may occur in normal use (see 8.9 and 8.10)		P
7.11	Mechanical strength		--
	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		--
	All metallic components of fuse are resistant to corrosive influences which may occur in normal use		P
7.12.1	Resistance to rusting		--
	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		--
	Current-carrying parts are sufficiently resistant to season cracking (see 8.2.2.3.2 and 8.11.2.1)		N/A
7.13	Resistance to abnormal heat and fire		--
	All components of fuse are sufficiently resistant to abnormal heat and fire (see 8.11.2.2)		P
7.14	Electromagnetic compatibility		--
	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 **(3 Samples: #01~#03, Fuse-base)**		
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 (Sample: #01)		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	Part 2, System C See report: 180301688SHA-002	P
8.1.5	Testing of fuse-links		N/A
	Fuse-links tested with the kind(s) of current for which they are rated		N/A
	Fuse-links tested for a.c. with frequency for which they are rated		N/A
8.1.5.1	Complete tests		--
	Internal resistance R measured by a current ≤ 0,1 In		N/A
	Measuring current (A) ..... :		N/A
	Ambient air temperature in range of 20 ± 5 °C		N/A
	The values of resistance		N/A
8.1.5.2	Testing of fuse-links of a homogeneous series		--
	Fuse-links tested like a homogeneous series ..... :		N/A
	If yes: fuse-links have identical enclosures in form and construction (except of fuse-elements and contacts)		N/A
	- the same arc-extinguishing medium and same completeness of filling		N/A
	- fuse-elements of identical materials		N/A
	- their cross-section of fuse-elements not exceed the cross-section of fuse-links having the highest rated current		N/A
	- number of fuse-elements do not exceed number of fuse-elements of fuse-links with the highest rated current		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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		N/A
	- fuse-links used with a given fuse-holder, or		N/A
	- 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)		N/A
	the rated breaking capacity of fuse-links not greater than that of the fuse-link with the largest rated current within the homogeneous series		N/A
	- 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		N/A
	The fuse-link having the smallest rated current tested only according to Table 12		N/A
	The fuse-links between the largest and smallest rated current tested according to Table 13		N/A
8.1.6	Testing of fuse-holders		--
	The fuse-holders are subjected to the tests according to Table 14	IEC 60269-2, Table 302	P
8.2	Verification of the insulating properties and of the suitability for isolation (Sample: #01)		P
8.2.1	Arrangement of the fuse-holder		--
	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	Fixed as figue 302, IEC60269-2	P
	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	Not replaced when lived	N/A
8.2.2	Verification of the insulating properties		--
	Points of application of the test voltage		P
	The test voltage is applied between:		--

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Clause	Requirement + Test	Result - Remark	Verdict
	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		P
	no breakdown of insulation or flashover during 1 min of the applying test voltage		P
	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)		P
	no breakdown of insulation or flashover during 1 min of the applying test voltage		P
	The values of test voltage (V) as specified in Table 15 ..... :	3000V	P
8.2.2.3.2	Fuse-holder is subjected to humid atmospheric conditions		P
	Relative humidity of ambient air (%) ..... :	92,3	P
	Ambient air temperature (°C) ..... :	25	P
	Duration of treatment (h) ..... :	48	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) ..... :	>100	P
	b) min. measured value (MΩ) ..... :	>100	P
	c) min. measured value (MΩ) ..... :	>100	P
	d) min. measured value (MΩ) ..... :	>100	P
	The insulation resistance not less than MΩ ..... :	1 MΩ	P
8.2.3	Verification of the suitability for isolation		--
	Clearances and creepage distances are verified by dimensional measurement and by voltage test		P
	Points of application of the test voltage		--

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Clause	Requirement + Test	Result - Remark	Verdict
	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 ..... :	9,8kV	P
	The 1,2/50 µs impulse voltage applied 5 times for each polarity at intervals of 1 s minimum		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		P
	Relative humidity of ambient air (%) ..... :	92,3	P
	Ambient air temperature (°C) ..... :	25	P
	Duration of treatment (h) ..... :	48	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) ..... :	>100	P
	b) min. measured value (MΩ) ..... :	>100	P
	c) min. measured value (MΩ) ..... :	>100	P
	d) min. measured value (MΩ) ..... :	>100	P
	The insulation resistance not less than 1 MΩ ..... :	1 MΩ	P
8.11.2.2	Verification of resistance to abnormal heat and fire (Sample: #01)		--
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		P
	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	Cover of terminal	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 ..... :	No visible flame	P
	No burning of the tissue paper		P
	No scorching of the pinewood board		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Glow-wire test: (960 ± 10) °C	Base/cover of contacts	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		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 ..... :	No visible flame / 3,2s	P
	No burning of the tissue paper		P
	No scorching of the pinewood board		P
8.11	Mechanical and miscellaneous tests		P
8.11.1	Mechanical strength (Samples: #02)		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	See report: 180301688SHA-002	P
8.10	Verification of non-deterioration of contacts (Samples: #02)		P
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) :	1 sample IEC 60269-2	P
8.10.2	Test current (A) for load period ..... :	313A	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	See report: 180301688SHA-002	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 (Samples: #02)	Verification after Clause 8.10	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	See report: 180301688SHA-002	P

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Clause	Requirement + Test	Result - Remark	Verdict
8.5	Verification of the breaking capacity **(Samples: #02)**		--
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	17,1°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 **(Sample: #02)**	See report: 180301688SHA-002 for peak withstand test on fuse-holder	P
	Rated breaking capacity of the fuse-links (kA), at voltage (V) ..... :	690V/50kA	–
	Rated current (A) of the fuse-links ..... :	250A	P
	Prospective current I_1 (kA) equal to rated breaking capacity within a tolerance of + 10%, - 0% ..... :	L1: 730V/50,7kA L2: 730V/50,5kA L3: 730V/50,3kA	P
	Power factor ..... :	0,19	P
	Initiation of arcing after voltage zero: within 40° - 65° for sample 1 and within 65° - 90° for sample 2 and 3, or ..... :	No such requirement for peak withstand current of a fuse-holder.	N/A
	for sample 1) arcing after voltage zero within 0° + 10°, - 0° ..... :		N/A
	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 ..... :	730V	P
	Cut-off current (kA) ..... :	L1: 20,9 L2: 13,2 L3: 22,9	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) ..... :	1,7kV(max.)	P

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Clause	Requirement + Test	Result - Remark	Verdict
	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 :	Only No.1 test	N/A
8.11.2.3	Verification of resistance to rusting (Sample: #02)		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	CH_2Cl_2: 10min 10% NH_4Cl: 10min 20°C, 100%: 10min Dried 100°C :10min	P
	Surface of tested parts show no signs of rust		P
8.3	Verification of temperature rise and power dissipation **(Sample #03)**		--
8.3.1	One fuse used for test (unless otherwise stated by the manufacturer) mounted in free air		P
	Test performed at an ambient air temperature of (20±5) °C		P
	Ambient air temperature during the test (°C) ..... :	20	P
	Cross-sectional area (see Table17) (mm^2 or mm x mm) ..... :	120x2 mm^2 x m And bus rail	_
	Tightened by torque; torque (Nm) ..... :	32	_
8.3.2	The temperature of the fuse measured by method of measuring ..... :	thermalcouples	P
8.3.3	Measurement of the power dissipation of the fuse-link		N/A
	One fuse used for test (unless otherwise stated by the manufacturer) mounted in free air		N/A
	Test performed at an ambient air temperature of (20±5) °C		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Ambient air temperature during the test (°C) ..... :		N/A
	Cross-sectional area (see Table17) (mm^2 or mm x mm) ..... :		–
	Tightened by torque; torque (Nm) ..... :		–
8.3.4.1	Temperature rise of the fuse-holder		P
	Applied a.c. current (A) for test equal to the rated current of the fuse-holder ..... :	250	P
	Test made with fuse-link (A), or ..... :	250	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):		--
	spring loaded contacts; limit (K) ..... :	unenclosed / ~~enclosed~~	N/A
	bolted contacts; limit (K) ..... :	unenclosed / ~~enclosed~~	N/A
	terminals; limit (K) ..... :	unenclosed / ~~enclosed~~ 43K	P
8.3.4.2	Power dissipation of a fuse-link		--
	The test made with a.c. at the current (A) equal to the rated current of the fuse-link ..... :	250	P
	The points of measuring ..... :	Point S in figure 106(IEC 60269-2)	P
	Measured value of power (W) dissipation in limits (W) specified in subsequent parts ..... :	Phase A: 19,7W Phase B: 19,4W Phase C: 19,8W	P
8.3.5	The acceptable power dissipation (W) of fuse-holder not less than the rated power dissipation of the corresponding fuse-links ..... :	32W	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 ..... :		P
	No deformation after tests of 8.3		P
8.11	Mechanical and miscellaneous tests		P
8.11.1	Mechanical strength (Samples: #03)		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	See report: 180301688SHA-002	P

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Clause	Requirement + Test	Result - Remark	Verdict
8.3	Verification of temperature rise and power dissipation (Sample #03)	After Clause 8.11.1.1	--
8.3.1	One fuse used for test (unless otherwise stated by the manufacturer) mounted in free air		P
	Test performed at an ambient air temperature of (20±5) °C		P
	Ambient air temperature during the test (°C) ..... :	20	P
	Cross-sectional area (see Table17) (mm2 or mm x mm)..... :	120x2 mm2 x m And bus rail	_
	Tightened by torque; torque (Nm) ..... :	32	_
8.3.2	The temperature of the fuse measured by method of measuring ..... :	thermalcouples	P
8.3.3	Measurement of the power dissipation of the fuse-link		N/A
	One fuse used for test (unless otherwise stated by the manufacturer) mounted in free air		N/A
	Test performed at an ambient air temperature of (20±5) °C		N/A
	Ambient air temperature during the test (°C) ..... :		N/A
	Cross-sectional area (see Table17) (mm2 or mm x mm)..... :		_
	Tightened by torque; torque (Nm) ..... :		_
8.3.4.1	Temperature rise of the fuse-holder		P
	Applied a.c. current (A) for test equal to the rated current of the fuse-holder ..... :	250	P
	Test made with fuse-link (A), or ..... :	250	P
	with a dummy fuse-link specified in subsequent parts ..... :	Part	N/A
	Temperature rise limits T for contacts and terminals (Table 5):		--
	spring loaded contacts; limit (K) ..... :	unenclosed / ~~enclosed~~	N/A
	bolted contacts; limit (K) ..... :	unenclosed / ~~enclosed~~	N/A
	terminals; limit (K) ..... :	unenclosed / ~~enclosed~~ 46K	P
8.3.4.2	Power dissipation of a fuse-link		--
	The test made with a.c. at the current (A) equal to the rated current of the fuse-link ..... :	250	P
	The points of measuring ..... :	Point S in figure 106(IEC 60269-2)	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Measured value of power (W) dissipation in limits (W) specified in subsequent parts ..... :	Phase A: 21,7W Phase B: 21,4W Phase C: 20,9W	P
8.3.5	The acceptable power dissipation (W) of fuse-holder not less than the rated power dissipation of the corresponding fuse-links ..... :	32W	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 ..... :		P
	No deformation after tests of 8.3		P
8.9	Verification of resistance to heat (Sample: #03)	See report: 180301688SHA-002	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
8.5	Verification of the breaking capacity (after clause 8.9) **(Samples: #03)**		--
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	17,1°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 **(Sample: #03)**	See report: 180301688SHA-002 for peak withstand test on fuse-holder	P
	Rated breaking capacity of the fuse-links (kA), at voltage (V) ..... :	690V/50kA	–
	Rated current (A) of the fuse-links ..... :	250A	P
	Prospective current I_1 (kA) equal to rated breaking capacity within a tolerance of + 10%, - 0% ..... :	L1: 730V/50,7kA	P
	Power factor ..... :	0,19	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Initiation of arcing after voltage zero: within 40° - 65° for sample 1 and within 65° - 90° for sample 2 and 3, or ..... :	No such requirement for peak withstand current of a fuse-holder.	N/A
	for sample 1) arcing after voltage zero within 0° + 10°, - 0° ..... :		N/A
	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 ..... :	730V	P
	Cut-off current (kA) ..... :	L1: 29,5	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) ..... :	1,7kV(max.)	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
	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 :	Only No.1 test	N/A
8.11.2.3	Verification of resistance to rusting (Sample: #02)		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	CH_2Cl_2: 10min 10% NH_4Cl: 10min 20°C, 100%: 10min Dried 100°C :10min	P
	Surface of tested parts show no signs of rust		P

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Clause	Requirement + Test	Result - Remark	Verdict
8.11.2.4	Non-deterioration of insulating parts of fuse-link and fuse-base (Samples: #03)	See report: 180301688SHA-002	P
8.11	Mechanical and miscellaneous tests		P
8.11.1	Mechanical strength (Samples: #03)		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	See report: 180301688SHA-002	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		--
	Clause 7 applies with the following modifications .. :		N/A
E.7.1	Fixed connections including terminals		--
	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
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

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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		--
E.8.1	Test of reliability of terminals		--
E.8.1.1	Reliability of screwless system		--
	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):		–
	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

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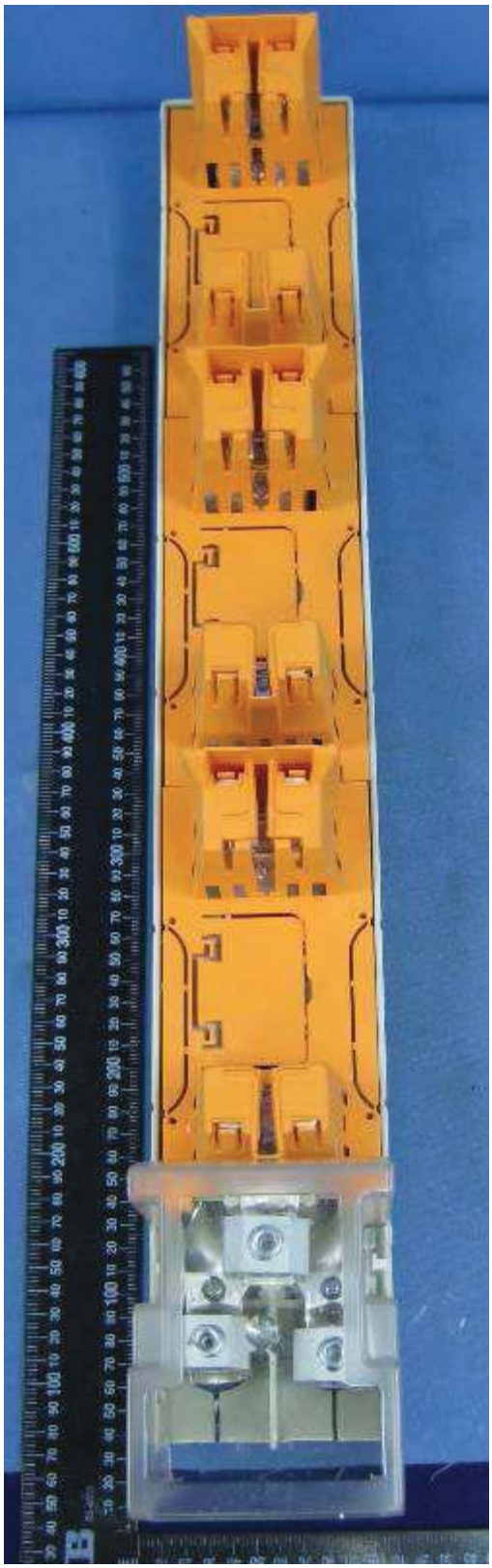
Clause	Requirement + Test	Result - Remark	Verdict
	Samples are then allowed to cool down in approximately 20 min to temperature of approximately 30°C. They are kept at this temperature for approximately 10 min.		N/A
	for measuring the voltage drop, allowed to cool down further, to temperature of 20°C		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 24th 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

Photo of sample:



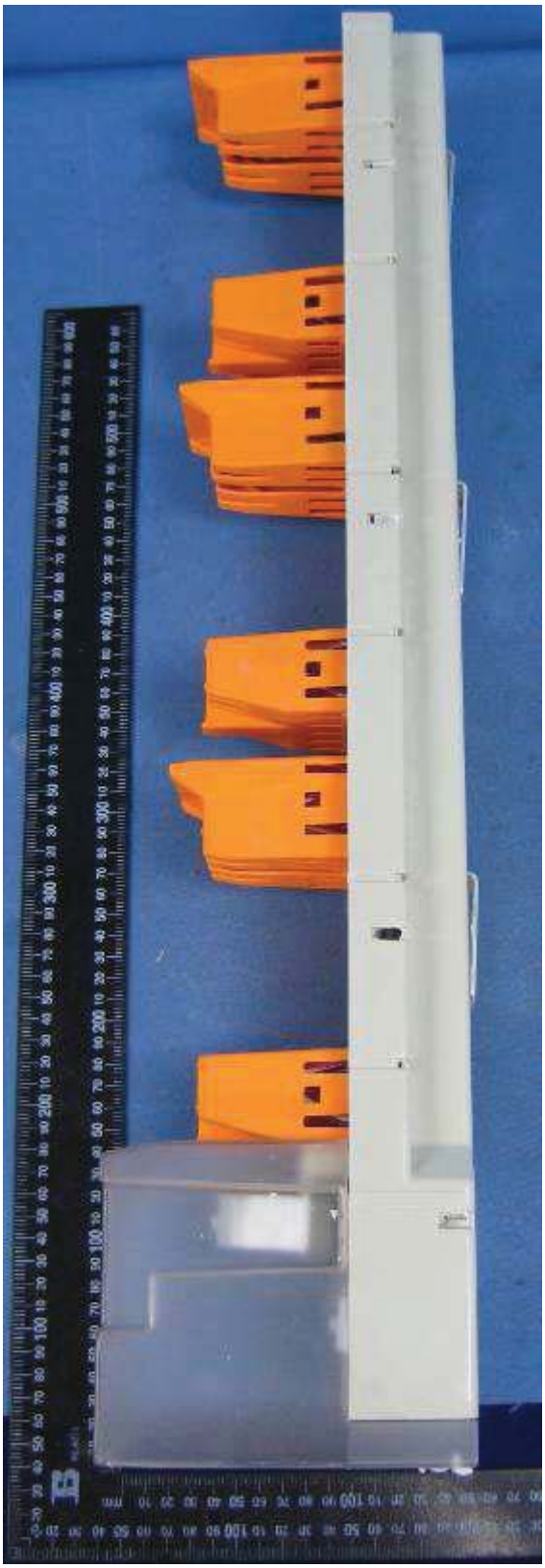


Photo of sample: