



उत्पाद मैनुअल

आई एस/ आई ई सी 60269-2 : 2016 के अनुसार

अल्प वोल्टेज फ्यूज भाग 2 अधिकृत व्यक्तियों द्वारा उपयोग के लिए फ्यूज के लिए पूरक आवश्यकताएं (मुख्य रूप से औद्योगिक उपयोग के लिए फ्यूज) फ्यूज के मानकीकृत सिस्टम के उदाहरण ए से के लिए

दस्तावेज संख्या - पी एम/आई एस/ आई ई सी 60269-2/ 1/जून 2021

भारतीय मानक ब्यूरो की स्कीम-I (अनुरूपता मूल्यांकन) विनियम, 2018 के तहत यह उत्पाद मैनुअल प्रमाणीकरण के प्रचालन में रीति और पारिश्रिता की सुसंगतता सुनिश्चित करने के लिए सभी क्षेत्रीय/शाखा कार्यालयों और लाइसेंसी द्वारा संदर्भ सामग्री के रूप में उपयोग किया जाएगा। बीआईएस प्रमाणीकरण लाइसेंस/ प्रमाणपत्र प्राप्त करने के इच्छुक भावी आवेदकों द्वारा भी इस दस्तावेज का उपयोग किया जा सकता है।

PRODUCT MANUAL FOR

Low Voltage Fuses-Supplementary Requirements For Use By Authorized Persons (Fuses Mainly For Industrial Application) - Examples of Standardized Systems of Fuses A to K ACCORDING to IS/IEC 60269-2 : 2016

Document No.- PM/ IS/IEC 60269-2/ 1/ June 2021

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification licence/certificate.

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**PRODUCT MANUAL FOR
LOW VOLTAGE FUSES-SUPPLEMENTARY REQUIREMENTS
FOR USE BY AUTHORIZED PERSONS (FUSES MAINLY FOR
INDUSTRIAL APPLICATION) - EXAMPLES OF
STANDARDIZED SYSTEMS OF FUSES A TO K
ACCORDING TO IS/IEC 60269-2 : 2016**

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1.	Product	:	IS/IEC 60269-2 : 2016
	Title	:	Low Voltage Fuses-Supplementary Requirements For Use By Authorized Persons (Fuses Mainly For Industrial Application) - Examples of Standardized Systems of Fuses A to K
	No. of Amendments	:	0
2.	Sampling Guidelines:		
a)	Raw material	:	---
b)	Grouping guidelines	:	Please refer <u>ANNEX-A</u>
c)	Sample Size	:	As per Table 11, 12, 13 and 14 of IS/IEC 60269-1: 2014
3.	List of Test Equipment	:	Please refer <u>ANNEX – B</u>
4.	Scheme of Inspection and Testing	:	Please refer <u>ANNEX – C</u>
5.	Possible tests in a day :	:	Please refer <u>ANNEX-D</u>
6.	Scope of the Licence :	:	Please refer <u>ANNEX-E</u>

ANNEX-A

Grouping Guidelines

- 1) IS/IEC 60269-2 is divided into fuse systems, each dealing with a specific example of standardized fuses for use by authorized persons. Samples of different fuse systems shall be considered to be of different series. Fuse-Links/ Fuse Holders/ Complete Fuses shall be tested as per IS/IEC 60269-1 and IS/IEC 60269-2 considering the following:

Fuse-holders

- a) Rated voltage (see 5.2)
- b) Rated current (see 5.3.2)
- c) Kind of current and rated frequency if applicable (see 5.4)
- d) Rated acceptable power dissipation (see 5.5)
- e) Dimensions or size
- f) Number of poles, if more than one
- g) Peak withstand current

Fuse-links

- a) Rated voltage (see 5.2)
- b) Rated current (see 5.3.1)
- c) Kind of current and rated frequency, if applicable (see 5.4)
- d) Rated power dissipation (see 5.5)
- e) Time-current characteristics (see 5.6)
- f) Breaking range (see 5.7.1)
- g) Rated breaking capacity (see 5.7.2)
- h) Cut-off current characteristics (see 5.8.1)
- i) I^2t characteristics (see 5.8.2)
- k) Dimensions or size

Complete fuses

- a) Degree of protection according to IS/IEC 60529.

- 2) In accordance with Cl 8.1.5.2 of IS/IEC 60269-1, Fuse-links of different rated currents are considered to form a homogeneous series provided

– they have enclosures identical in form and construction, and with the exception of fuse elements, in dimension. This condition is also met when only the fuse-link contacts differ, in which case tests are performed with the fuse-link having the fuse-link contacts most likely to produce the least favourable test results;

– they have the same arc-extinguishing medium and the same completeness of filling;

– their fuse-elements consist of identical materials. They shall have the same length and form. For example, they may be formed with identical tools from material of different thickness.

– their cross-section, which may vary along the length of fuse-elements, as well as the number of fuse-elements, shall not exceed the cross-section and the number of fuse elements, respectively, of those fuse-links having the highest rated current;

- the 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 having the highest rated current;

- they are suitable to be used with a given fuse-holder, or are intended to be used without a fuse-holder, but in an arrangement identical for all rated currents of the homogeneous series.

- With respect to the temperature-rise test, the product $RI_n^{3/2}$ does not exceed the corresponding value for the fuse-link which has the largest rated current of the homogeneous series. The resistance R shall be measured with the fuse-link as indicated in 8.1.5.1.

- With respect to the breaking-capacity test, the rated breaking capacity is not greater than that of the fuse-link having the largest current within the homogeneous series. Otherwise, the fuse-link of the largest rated current among those having the greater rated breaking capacity shall be subjected to tests no. 1 and no. 2.

3) To cover a series of homogeneous Fuse-links with different current ratings which satisfy the requirements of homogeneous series as per clause 8.1.5.2 of IS/IEC 60269-1: 2014, following relaxation may be given provided all other parameters remains the same.

a) The fuse-link having the largest rated current shall be tested completely according to table 11 of IS/IEC 60269-1: 2014.

b) The fuse-link having the smallest rated current shall be tested only according to Table 12 of IS/IEC 60269-1: 2014.

c) The fuse-links between the largest and the smallest rated current shall be tested according to the table 13 of IS/IEC 60269-1: 2014.

d) If complete fuses with higher degree of protection is tested, fuses with lower degree of protection may also be covered.

4) The firm shall declare the varieties of Fuse-Links/Fuse Holders/Complete Fuse they intend to cover in the license. The scope of the license may be restricted based on the manufacturing and testing capabilities of the manufacturer.

5) During the operation of the license, BO shall ensure that all varieties covered in the license are tested in rotation to the extent possible.

ANNEX-B
List of Test Equipment

Major test equipment required to test as per the Indian Standard

Sl. No.	Tests used in with Cl. Reference	Test Equipment
1	Dimensions (Cl. 8.1.4)	Vernier Callipers
2	Resistance (Cl. 8.1.5.1)	Resistance Measuring instrument, Current Source
3	Insulating Properties and Suitability for Isolation (Cl. 7.2 & 8.2)	HV Tester, Humidity Chamber, Impulse Generator, Megger, Stop Watch.
4	Temperature Rise, Power Dissipation of the fuse link and acceptable power dissipation of a fuse holder, Resistance to Heat, Mechanical Strength (Cl. 7.3, 8.3, 8.9, 8.11)	Temperature Rise test apparatus with thermocouples.
5	Operation, Resistance to Heat (Cl. 7.4, 8.4.3, 8.9)	Test Apparatus for verification of operational Characteristics.
6	Protection against Electric Shock (Cl. 7.9)	Standard Test Fingers
7	Clearances & Creepage Distances (7.9.1)	Vernier Callipers
8	Leakage Currents of Fuses suitable for isolation (Cl. 7.9.2)	Test apparatus for detection of Leakage Current.
9	Resistance to Season Cracking (7.12.2 & 8.11.2.1)	Heating Oven, Test Cabinet, Ammonium Chloride, Sodium Hydroxide, Distilled Water, PH meter
10	Resistance to abnormal heat and fire (7.13 & 8.11.2.2)	Glow Wire Test Apparatus
11	Resistance to Rusting (7.12.1 & 8.11.2.3)	Humidity Chamber, Ammonium Chloride, Heating Oven, Stop Watch
12	Verification of the degree of protection of enclosures (8.8)	Test equipment/setup as specified in IS/IEC 60529.
13	Verification of non-deterioration of contacts (Cl. 8.10)	Cycling Test Apparatus with timer.
14	Breaking Capacity, Verification of the Cut-off current characteristics, Verification of I^2t characteristics, Overcurrent selectivity, Electromagnetic Compatibility, Resistance to Heat, Mechanical Strength (Cl. 7.5, 7.6, 7.7, 7.14, 8.5, 8.6, 8.7, 8.9, 8.11)	Test Equipment for verification of Breaking capacity with Oscillograph.
15	Mechanical Strength (8.11.1.1)	Fixture for Insertion and Withdrawal of Fuse link/carrier
16	Legibility and Durability of Marking (Cl. 6)	Hexane, Stop Watch
17	Maintaining the Room Temperature	Air Conditioner

The above list is indicative only and may not be treated as exhaustive.

ANNEX-C

Scheme of Inspection And Testing

1. LABORATORY - A laboratory shall be maintained which shall be suitably equipped (as per the requirement given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.

1.1 The manufacturer shall prepare a calibration plan for the test equipments.

2. TEST RECORDS – The manufacturer shall maintain test records for the tests carried out to establish conformity.

3. LABELLING AND MARKING – As per the requirement of IS/IEC 60269-2: 2016

4. LEVELS OF CONTROL - The tests as indicated in column 1 of Table 1 and the levels of control in column 3 of Table 1, shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2 above.

4.1 All the production which conforms to the Indian Standards and covered by the licence should be marked with Standard Mark.

5. REJECTIONS – Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016.

TABLE 1

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required (or) S: Sub-contracting permitted	Levels of Control		
Cl.	Requirement	Test Methods			No. of Sample	Frequency	Remarks
		Clause	Reference				
7.1	Mechanical Design	7.1	IS/IEC 60269-1 IS/IEC 60269-2	R	Each Piece		—
8.1.4	Dimensions	8.1.4		R	One from a day’s production of the same type & size	Once in a week	*
8.1.5.1	Resistance	8.1.5.1		R			
7.2	Insulating Properties and suitability for isolation	8.2		S		Once in three months	
8.11.2.4	Non-deterioration of insulating parts of fuse-link and fuse-base	8.11.2.4		S			
7.3	Temperature rise and acceptable power dissipation	8.3		S			
7.4	Conventional fusing and non-fusing current	8.4.3.1		S			
7.4	Rated current	8.4.3.2		S			
7.4	Time-current characteristics and gates	8.4.3.3		S			
7.4	Overload	8.4.3.4		S			
7.4	Conventional cable overload protection	8.4.3.5		S			
7.4	Indicating device, Striker	8.4.3.6		S			
7.5	Breaking Capacity	8.5		S	3	Once in 4 years for every type & size	
7.6	Cut-off current characteristics	8.6		S	1		
7.7 7.8	I²t characteristic Overcurrent discrimination of fuse-link	8.7		S	1		

7.9	Protection against electric shock	7.9		S	1	Once in a year for each type & size	
7.10	Resistance to Heat	8.9		S	1		
7.11	Mechanical Strength	8.11.1	IS/IEC 60269-1 IS/IEC 60269-2	S	1	Once in a year for each type & size	
7.12.1	Resistance to Rusting	8.11.2.3		S	1		
7.12.2	Freedom from season cracking	8.11.2.1		S	1		
7.13	Resistance to abnormal heat and fire	8.11.2.2		S	1		
8.8	Degree of Protection	8.8		S	1		
8.10	Non-deterioration of contacts	8.10		S	1		

* The testing shall be so arranged that all the types & sizes manufactured during a calendar year are tested.

Note-1: Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled by the Bureau.

Note-2: Levels of control given in column 3 are only recommendatory in nature. The manufacturer may define the control unit/batch/lot and submit his own levels of control in column 3 with proper justification for approval by BO Head.

ANNEX-D

Possible Tests in a Day

- 1) Mechanical Design (Cl. 7.1 except 7.1.3 IS/IEC 60269-1)
- 2) Dimensions (Cl. 8.1.4 IS/IEC 60269-1)
- 3) Resistance (Cl. 8.1.5.1 IS/IEC 60269-1)
- 4) Verification of suitability for isolation (Cl. 8.2.3 IS/IEC 60269-1)
- 5) Verification of Temperature rise and Power Dissipation (Cl. 8.3 IS/IEC 60269-1)
- 6) Verification of conventional non-fusing and fusing current (Cl. 8.4.3.1 of IS/IEC 60269-1)
- 7) Verification of Gates (8.4.3.3.2 of IS/IEC 60269-1 and IS 13703 (Part 2/Sec 1)
- 8) Conventional Cable Overload Protection Test (Cl.8.4.3.5 of IS/IEC 60269-1)
- 9) Protection against Electric Shock (Cl. 7.9 of IS/IEC 60269-1)
- 10) Clearances and Creepage Distances (Cl. 7.9.1 of IS/IEC 60269-1)
- 11) Leakage Currents of fuses suitable for isolation (Cl. 7.9.2 of IS/IEC 60269-1)

ANNEX-E**Scope of Licence**

“Licence is granted to use Standard Mark as per IS/IEC 60269-2: 2016 with the following scope:	
Name of the product	Low Voltage Fuses-Supplementary Requirements For Use By Authorized Persons (Fuses Mainly For Industrial Application) - Examples of Standardized Systems of Fuses A to K
Fuse System	
Characteristics	As applicable according to Clause 5.1 of IS/IEC 60269-1: 2014
Any other information	