

Unofficial Translation

In the event of any doubt or misunderstanding arising from this translation, the standard in Thai will be held to be authoritative

TIS 10-2529(1986) Thai Industrial Standard for Low-Voltage Distribution Link Fuses

1. Scope

- 1.1 This standard specifies classes and types, rating, shape, dimensions and tolerances, requirements, marking and labelling, sampling and criteria for conformity, and testing of low-voltage distribution link fuses for electric circuits of voltages not exceeding 250 V, frequency of 50 Hz, rated current not exceeding 60 A, intended for use at altitude not exceeding 2 000 m above sea level, the ambient temperature within an maximum of 40°C and a minimum of -5°C, and the average temperature over a period of 24 h not exceeding 35°C.

2. Definitions

For the purpose of this standard, the following definitions apply:

- 2.1 **LOW-VOLTAGE DISTRIBUTION LINK FUSE:** hereinafter referred to as “FUSE” : A finished device comprising fuse tip and fuse element, intended for protection of electrical circuits and appliances.
- 2.2 **FUSE TIP:** An extended part of a fusible element or welded metal tip on each end of fusible element by which the link fuse is connected with the fuse holder.
- 2.3 **FUSE ELEMENT:** The part of a fuse designed to melt when excess current passes through for a certain duration.
- 2.4 **RATED CURRENT:** The current assigned to the fuse which is able to continuously pass through the fuse without impairing the quality and causing the temperature rise exceeding the specified value.
- 2.5 **RATED VOLTAGE:** The maximum voltage assigned to the fuse; it is the maximum voltage of the knife switch with cover.

3. Classes and types

- 3.1 Fuse according to this standard are of 2 classes.
- 3.1.1 Class A: fuses in which fuse element and fuse tip are connected by soldering or welding.
- 3.1.2 Class B: fuses in which fuse element and fuse tip are made from one single piece of metal.
- 3.2 Each class of fuse is classified according to its breaking capacity into 2 types:
- 3.2.1 Fast interruption: Fuses with rapid circuit interruption denoted by the abbreviation F;
- 3.2.2 Slow interruption: Fuses with relatively slower circuit interruption denoted by the abbreviation S;

4. Rating

- 4.1 Symbols and rating of fuses shall be as shown in Table 1.

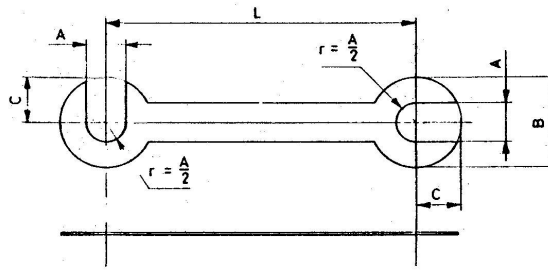


Figure 2 Shape and dimensions of class B fuse
(clause 5.1)

- Note: 1. The shape of the tip in Figures 1 and 2 is given as an example.
The thickness T is not specified for class B fuse.
2. Shape and dimensions of the fuse element are not specified in this standard.

Table 2
Dimensions and tolerances of fuses
(clause 5.2)

Units in mm

Symbol	Rated current A	L	A	B	C	D max.	E min.	T min.
A 45, B 45	3, 5, 10, 15	45±1	5.5±0.2	12±0.3	6±0.2	12	8.5	0.3
A 45	20, 30							
A 55	40, 50, 60	55±1	7±0.3	16±0.5	8±0.3	16	10	0.4

6. Requirements

- 6.1 Temperature rise
The temperature rise at the head of screw shall not exceed 60°C.
Test shall comply with clause 9.2.
- 6.2 Non-fusing characteristic
When tested as specified in clause 9.3, the fuse element shall not melt.
- 6.3 Fusing
When tested as specified in clause 9.4, the fuse element shall melt within a suitable time which shall not exceed the duration specified in Table 3.
- 6.4 Durability of marking at fuse tip
When tested as specified in clause 9.5, marking as in clause 7.1 shall not be obliterated.

Table 3
Fusing time
(clause 6.3)

Rated current	Fusing time, min		
	Test current 1.35 times the rated current for type F	Test current 1.6 times the rated current for type S	Test current 2 times the rated current for both types
A			
3 to 15	60		2
20 to 30			2
40 to 60			4

7. Marking

- 7.1 Each fuse tip shall at least bear figures, letters or mark indicating clearly, legibly and indelibly the following information:
- (1) Symbol and abbreviation of its type
 - (2) Rated current in amperes
 - (3) Rated voltage in volts
 - (4) Name of manufacturer or factory, or trade mark
- Example: 5A, 250V, A 45F
- 7.2 Each package unit shall at least bear figures, letters or mark indicating clearly, legibly and indelibly the following information:
- (1) Symbol
 - (2) Type
 - (3) Rated current in amperes
 - (4) Rated voltage in volts
 - (5) Net weight of fuses and gross weight
 - (6) Number of fuses contained
 - (7) Date of manufacture
 - (8) Name of manufacturer of factory, or trade mark
- 7.3 The following information shall be included in each package unit.
- (1) Fuses are not permitted for use in the areas exposed to steam, oil vapour, smoke, dust, salt, acid substance, flammable materials or gases.
 - (2) Instructions for use (if any)
- 7.4 In case foreign language is used, the meaning shall correspond to that in Thai specified above.
- 7.5 Any person who manufactures the industrial products complying with this standard may use the Standards Mark in connection with his products only after having received a license from the Industrial Product Standards Council.

8. Sampling and Criteria for conformity

- 8.1 LOT: Fuses of the same symbol and type, made from the same kind of materials under the same condition from the same factory which are manufactured, delivered or purchased at one time.
- 8.2 Sampling and criteria for conformity shall comply with the following sampling plan or other technically equivalent plan.
- 8.2.1 Sampling
Four samples shall be taken at random for testing in the sequence as specified in Table 4.
- 8.2.2 Criteria for conformity
The lot shall be considered as complying with this standard provided that the samples meet all the requirements.

Table 4
Testing sequence
(clause 8.2.1)

Test order	Test description	Samples			
		1	2	3	4
1	Dimensions	X	X	X	X
2	Temperature rise	X	-	-	-
3	Current carrying test	-	X	-	-
4	Fusing	-	-	X	X
5	Durability of marking at fuse tip	X	X	X	X

Note: X means a test is required.

9. Tests

9.1 Dimensions

Dimensions of fuses shall be measured by suitable measuring apparatus.

9.2 Temperature rise

9.2.1 Apparatus

9.2.1.1 Fuse testing apparatus

Shape, dimensions and tolerances of fuse testing apparatus shall be as shown in Figure 3 and Table 5.

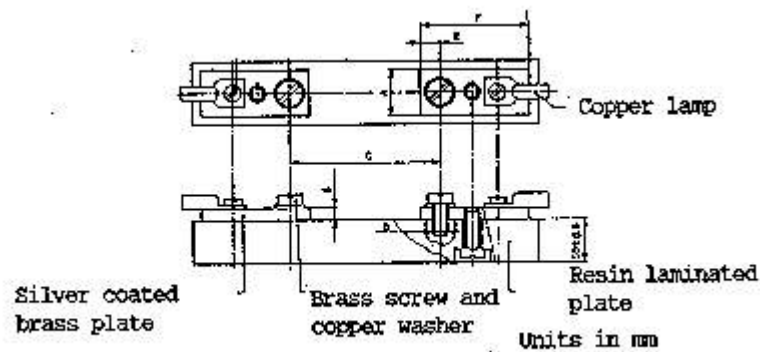


Figure 3 Shape and dimensions of fuse testing apparatus
(clause 9.2.1.1)

Table 5
Dimensions and tolerances of fuse testing apparatus
(clause 9.2.1.1)

Testing apparatus Type	Rated test current range A	Units in mm					
		A	B	C	D	E	F
1	3 to 15	10±0.3	6±0.3	45±1	4	5±0.3	24±1
2	20 to 30	12±0.3	6±0.3	45±1	5	6±0.3	30±1
3	40 to 60	14±0.5	6±0.3	55±1	6	8±0.3	38±1

9.2.1.2 Thermocouple or equivalent thermometer

9.2.2 Procedure

- 9.2.2.1 The fuse shall be mounted horizontally to the testing apparatus using rubber or polyvinyl-chloride insulated cable of voltage 750V and a cross-sectional area as specified in Table 6, tightened by a torque as in normal use. The ambient temperature of the room shall be controlled between 10°C to 30°C. The current of 1.1 times the rated current for fast interruption type and of 1.15 times the rated current for slow interruption type shall be passed through the fuse. The voltage lower than the rated value may be used for the test when 2 or more fuses are tested at the same time, the distance through air between fuses being not less than 150 mm.
- 9.2.2.2 When the temperature of each part becomes constant, the temperature rise at the head of screw clamping the fuse shall be recorded.

Table 6
Cross-sectional area of cable for temperature rise test
(clause 9.2.2.1)

Rated current A	Cross-sectional area mm ²
3 to 15	4
20 to 30	10
40 to 60	25

9.3 Non-fusing test

Test shall be carried out using the same procedure and under the same conditions specified in clause 9.2, but with the current of 1.15 times the rated current for fast interruption type and 1.3 times the rated current for slow interruption type passing through the fuse until the temperature of each part becomes constant. Inspect the fuse element.

9.4 Fusing test

Test shall be carried out using the same procedure and under the same conditions specified in clause 9.2, but with the current of 1.35 times the rated current for fast interruption type, 1.6 times the rated current for slow interruption type and 2 times the rated current for both types, passing through the fuse. The fusing time shall be recorded.

9.5 Durability

Inspect the marking at fuse tip after the tests of clauses 9.2 to 9.4.