

JIS

JAPANESE INDUSTRIAL STANDARD

**Cartridge Fuses for
Electronic Equipment**

JIS C 6575—1975

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In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

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Cartridge Fuses for Electronic Equipment

C 6575-1975
(Reaffirmed: 1988)1. Scope

This Japanese Industrial Standard specifies cartridge fuses with rated voltages a.c. 250 V or 125 V and d.c. 250 V, 125 V or 31.5 V and rated currents not exceeding 31.5 A which are mainly used for protection of electronic equipment (hereafter referred to as "fuses").

2. Definitions

For the purpose of this Standard the following principal definitions apply:

- (1) fuse The fuse means a switching device that, by the fusion of the fuse element resulted from its heat generation cause by flow of overcurrent through it, protects the associated circuit. The appearance is cylindrical and the insulating fuse-tube accommodating the fuse-element is equipped with end caps or terminals at both ends.
- (2) fuse-element The fuse-element means the component which melts due to the heat generated by itself when an overcurrent flows through it.
- (3) fuse-tube The fuse-tube means an insulating tube which includes the fuse-element in its interior.
- (4) end cap The end cap means a cylindrical terminating metal fitting which is fixed to both ends of a fuse-tube and comes in contact with the contact of fuse holder at its cylindrical part or flat part.
- (5) rated voltage The rated voltage means the maximum working voltage (r.m.s. value for a.c.) of a fuse.
- (6) rated current The rated current means the current marked on a fuse based on which the fuse complies with the prescribed test conditions.
- (7) fusion The fusion means such a phenomenon that the fuse-element breaks by melting after lapse of a prescribed time when a prescribed overcurrent is passed under a voltage not exceeding the rated voltage.

Applicable Standards:

JIS B 7502-Micrometer Callipers for External Measurement

JIS B 7507-Vernier Callipers

JIS C 1301-Insulation Resistance Testers (Magneto Generator Operated)

JIS C 5020-General Rules for Environmental Testing Method for Electronic Components

JIS C 5025-Vibration Testing Method for Electronic Components

JIS C 5028-Salt Mist Testing Method for Electronic Components

- (8) current carrying capacity The current carrying capacity means the value of current at which non-fusion of a fuse-element is ensured.
- (9) fusing current The fusing current means the current which causes fusion of a fuse-element.
- (10) pre-arcing time/current characteristic The pre-arcing time/current characteristic means the relationship between the time to fusion of a fuse-element and the current, at fusion of the fuse when a specified current is passed.
- (11) prospective short-circuit current The prospective short-circuit current means the current that would flow in a circuit if a fuse situated therein is replaced by a link of negligible impedance and the circuit is shorted. It shall be expressed in terms of the r.m.s. value of a.c. component for an a.c. circuit.
- (12) breaking capacity The breaking capacity means the limit of prospective short-circuit current of a circuit that a fuse is capable of breaking under prescribed conditions.
- (13) pre-arcing time The pre-arcing time means the time between the commencement of a current large enough to cause the fuse-element to melt by closing of a circuit and the instant when an arc is initiated.
- (14) arcing time The arcing time means the time between the completion of pre-arcing time and the instant of final arc extinction.
- (15) operating time The operating time means the sum of the pre-arcing time and the arcing time.
- (16) recovery voltage The recovery voltage means the power frequency a.c. voltage (r.m.s. value) or d.c. voltage which appears across the terminals of a fuse after the breaking of the current by the fuse.
- (17) overload breaking The overload breaking means such a phenomenon that the circuit is opened within a prescribed time due to fusion of the fuse-element when a prescribed overcurrent is passed under the rated voltage.
- (18) short-circuit breaking The short-circuit breaking means such a phenomenon that the circuit is opened instantaneously by passing a prescribed overcurrent under the rated voltage.
- (19) normal acting type The normal acting type means the one which has a pre-arcing time/current characteristic in which the pre-arcing time is not specially increased or decreased for a prescribed overcurrent.
- (20) time-lag acting type The time-lag acting type means the one which has a pre-arcing time/current characteristic in which the pre-arcing time is especially lengthened for a prescribed overcurrent.
- (21) quick-acting type The quick-acting type means the one which has a pre-arcing time/current characteristic in which the pre-arcing time is especially shortened for a prescribed overcurrent.

- (22) indicating type The indicating type means the one which is equipped with a device for displaying fusion of the fuse-element.

3. Classification

Fuses are classified according to the shape, pre-arcing time/current characteristic, rated voltage, rated current and breaking capacity.

3.1 Shape The shapes shall be as shown in Table 1.

Table 1

Symbol	External dimensions (diameter x length) mm	Material of fuse-tube	Shape of terminal
41	4.6 x 16.0	Glass	End-cap type
42	4.0 x 16.0	Glass	Lead-wire type
51	5.20 x 20.0	Glass	End-cap type
52	5.20 x 20.0	Glass	Lead-wire type
60*	6.40 x 30.0	Glass	End-cap type
61	6.35 x 31.8	Glass	End-cap type
62	6.35 x 31.8	Glass	Lead-wire type
64	6.35 x 31.8	Fiber	Indicating type
65	6.35 x 31.8	Ceramics	End-cap type
67	6.35 x 31.8	Plastics	End-cap type
94	9.50 x 30.0	Fiber	Indicating type
98	9.50 x 30.0	Plastics	Indicating type
01	10.31 x 38.1	Glass	End-cap type
03	10.31 x 38.1	Fiber	End-cap type
04	10.31 x 38.1	Fiber	Indicating type
05	10.31 x 38.1	Ceramics	End-cap type
07	10.31 x 38.1	Plastics	End-cap type

Remark: The shape with mark * is used for television and radio equipment only, shape 61 shall be used for other equipment.

3.2 Pre-Arcing Time/Current Characteristic The pre-arcing time/current characteristics shall be as given in Table 2.

Table 2

Symbol	Ratio to rated current			Remark	
	Current carrying capacity	Fusing current	Pre-arcing time		
NN	130 %	200 %	Within 30 s	Normal acting type	
NM	110 %	135 %	Within 1 h		
		200 %	Within 2 min		
NR	130 %	160 %	Within 1 h		
		200 %	Within 2 min		
		2000 %	0.01 s min.(¹)		
TS	110 %	135 %	Within 1 h	Time-lag acting type	
		300 %	3 s min.		
TL		135 %	Within 1 h		
		300 %	6 s min.		
SL		135 %	Within 1 h	Quick-acting type	
		250 %	Within 1 s		
SH		135 %	Within 6 min		
		200 %	Within 0.5 s		

Note ⁽¹⁾ This is applicable only when specified in Attached Figures.

3.3 Rated Voltage The rated voltages shall be as given in Table 3.

Table 3

Rated voltage			Remark
—	125 V	250 V	For a.c.
31.5 V	125 V	250 V	For d.c.

3.4 Rated Current The rated currents shall be as given in Table 4.

Table 4

Rated current							
2 mA	5 mA	10 mA	31.5 mA	63 mA	0.1 A	0.125 A	
0.16 A	0.2 A	0.25 A	0.315 A	0.5 A	0.63 A	0.8 A	1 A
1.25 A	1.6 A	2 A	2.5 A	3.15 A	4 A	5 A	6.3 A
10 A	12.5 A	16 A	20 A	25 A	31.5 A		

3.5 Beaking Capacity The breaking capacities shall be as given in Table 5.

Table 5

Symbol	Breaking capacity A	Remark
AC 01	100	For a.c.
AC 03	300	
AC 05	500	
AC 1	1000	
AC 2	2500	
AC 5	5000	
AC 10	10000	
DC 01	100	For d.c.
DC 03	300	
DC 05	500	
DC 1	1000	
DC 2	2500	
DC 5	5000	
DC 10	10000	

Remark: The breaking capacity of an a.c. fuse with a rated current of 1 A or more shall be not less than 20 times the rated current (300 A at the minimum).

4. Construction

4.1 Construction in General Fuses shall ensure safety and reliability and shall be structured as prescribed below.

- (1) The connection of fuse-element to end-caps shall be securely made by soldering or other means so that the fuse-element will not be damaged.

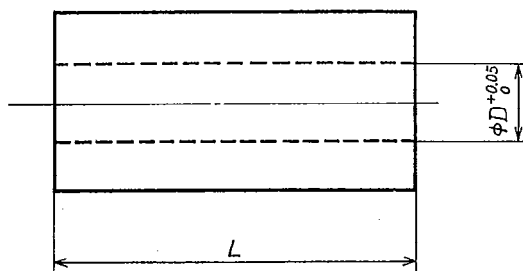
- (2) The fuse-element shall not be removed.
- (3) The filler shall not leak of the fuse includes filler in the interior of its tube.
- (4) The indicator of an indicating type fuse shall not cause electric shock or adversely affect fusion of the fuse, while the fuse is in service.
- (5) The joint between end-cap and fuse-tube shall be made firmly by means of an adhesive or the like.
- (6) The end cap shall be nickel or silver plated.

4.2 Dimension The dimensions shall be as given in Attached Figs. 1 to 17.

The dimensions shall be measured by the vernier calliper of grade 1 specified in JIS B 7507 or the micrometer of grade 1 specified in JIS B 7502, and the fuse shall pass through the metal gauge shown in Fig. 1 by its own weight.

Fig. 1

Unit: mm



ϕD	L	Shape symbol
4.88	20 min.	41
5.48	25 min.	51
6.63	35 min.	61, 64, 65, 67
6.68	35 min.	60
9.78	35 min.	94, 98
10.59	40 min.	01, 03, 04, 05, 07

5. Material

Materials prescribed below or that at least equivalent shall be used as the materials of fuses.

- (1) The fuse-tube shall be made from transparent glass, plastics, ceramics or fibers, and shall be free from such defects as cracks, chipping, pinholes, deformation and dirt.
- (2) The end cap shall be made from copper or copper alloys and shall be free from scratches, cracks and splits.
- (3) The fuse-element shall be made from zinc, tin, lead, silver, copper, nickel, white gold or alloys mainly composed of the said metals, and shall not easily deteriorate.
- (4) The material of filler shall not adversely affect the fuse-element or other components.

6. Performances

6.1 Electrical Performances

6.1.1 Current Carrying Capacity When the fuse to be tested (specimen) is mounted horizontally to the holder shown in Fig. 2 or Fig. 3 (the specimens are separated by 150 mm or more, if two or more specimens are tested simultaneously), and a current equal to the rated current multiplied by the rate of current carrying capacity corresponding to the symbol given in Table 2 is continuously passed until the temperature of the fuse-tube stabilizes, the specimen shall not melt or show damage at any part.

Fig. 2

