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JAPANESE INDUSTRIAL STANDARD

**General Requirements for Fuses for
the Protection of Low-Voltage
Cables and Lines**

JIS C 8352—1983

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General Requirements for Fuses
for the Protection of Low-Voltage Cables and Lines

C 8352-1983

1. Scope

This Japanese Industrial Standard specifies general matters common to various fuses intended for protecting electric lines of not exceeding a. c. 600 V at a frequency of 50 Hz or 60 Hz or not exceeding d.c. 750 V, herein-after referred to as the "fuses". Fuses for only short-circuit protection and those for only vehicles or communication circuits are, however, excluded.

2. Definitions

For the purpose of this standard, the principal definitions shall comply with JIS C 0201.

3. Standard Service Condition

The fuses specified in this standard shall, as standard, be used under the conditions prescribed below.

If the fuses are used under other conditions than those prescribed below, agreement should be made between the parties concerned.

- (1) The altitude is not exceeding 2000 m.
- (2) The ambient temperature is within the range of the maximum 40 °C and the minimum - 5 °C. Provided that the average temperature during 24 h shall not exceed 35 °C.
- (3) Not affected by abnormal vibration and/or shock.
- (4) No excessive steam, oil vapour, smoke, dust, salt, nor corrosive substance exist.

Applicable Standards:

JIS C 0201-Glossary of Terms for Fuses

JIS C 1302-Insulation Resistance Testers (Battery Operated)

JIS P 0138-Trimmed Sizes of Paper

Corresponding International Standard:

IEC 269-1 - Low-voltage fuses, Part 1: General requirements

Reference Standards:

JIS C 8313-Particular Requirements for Link-Fuses

JIS C 8314-Particular Requirements for Low-Voltage Cartridge Fuses

JIS C 8319-Particular Requirements for Screw Fuses and D-type Fuses

2
C 8352-1983

4. Ratings

4.1 Rated Voltage The rated voltages of fuses shall be as given in Table 1.

Table 1

Unit: V

Classification of a. c. and d. c.	Rated voltage
A. C.	125 250 500 600
D. C.	125 250 500 750

4.2 Rated Current

4.2.1 Fuse-Link The rated currents of fuse-links shall be as given in Table 2.

Table 2

Unit: A

Rated currents of fuse-link															
1	3	5	10	15	20	30	40	50	60	75	100	125	150	200	250
300	400	500	600	(700)	800	1 000									

Remark: The value in parentheses should not be used as possible.

4.2.2 Fuse-Holder The rated currents of fuse-holders shall be as given in Table 3.

Table 3

Unit: A

Rated currents of fuse-holder									
15	30	60	100	200	400	600	1 000		

4.3 Rated Frequency The fuses shall be rated for both of 50 Hz and 60 Hz as their frequency rating.

4.4 Classification by Rated Breaking Capacity The classification by rated breaking capacity shall be as given in Table 4.

Table 4

Classification of a. c. or d. c.	Rated breaking capacity kA	Grade	
		Non-current- limiting fuse	Current- limiting fuse
For a. c.	1.6	AC 1	—
	2.5	AC 2	—
	5	AC 5	—
	10	AC 10	ACL 10
	20	AC 20	ACL 20
	31.5 (35)	—	ACL 30 (35)
	50	—	ACL 50
	100	—	ACL 100
	160	—	ACL 160
	200	—	ACL 200
For d. c.	1	DC 1	—
	2.5	DC 2	—
	5	DC 5	—
	10	DC 10	DCL 10
	20	DC 20	DCL 20
	31.5 (35)	—	DCL 30 (35)
	50	—	DCL 50
	100	—	DCL 100

Remark: The values in parentheses should not be used as possible.

5. Classification

Fuses are classified into class A and class B in accordance with their pre-arcing time/current characteristics.

6. Performances and Characteristics

6.1 Temperature Rise The temperature rise of each part of fuse shall not exceed the appropriate value given in Table 5, when tested in accordance with 8.3.

Table 5

Unit: °C

Classification by measuring point, material and insulation class		Temperature- rise limit	Maximum permissible temperature	
Insulating material (fuse-link tube, insulating material of fuse-holder, etc.)	Class A insulation	65	105	
	Class E insulation	80	120	
	Class B insulation	90	130	
	Class F insulation	115	155	
	Class H insulation	140	180	
	Class C insulation	140	180	
Contact part	Pressurised by spring	Copper and copper alloy	45	85
		Tin or nickel plating	55	95
		Silver plating	65	105
	Clamped by screw or bolt	Copper and copper alloy	50	90
		Silver, tin or nickel plating	65	105
		Metal part acting as spring		— (1)
Terminal	Copper and copper alloy	50	90	
	Silver, tin or nickel plating	65	105	

Note (1) A temperature up to which the material does not lose its elasticity.

Remark: Limit of ambient temperature is 40 °C.

6.2 Conventional Non-Fusing Characteristic The conventional non-fusing currents and conventional time shall be as given in Table 6, and the fuses shall not melt when tested in accordance with 8.4.

6.3 Conventional Fusing Characteristic The conventional fusing currents shall be as given in Table 6, and the fuses shall melt within the appropriate time given in Table 6 when tested in accordance with 8.5.1.

Table 6

Rated current of fuse-link (I_n) A	Conventional non- fusing current		Conventional fusing current		Conven- tional time min
	Class A	Class B	Class A	Class B	
$1 \leq I_n \leq 60$	$1.1 I_n$	$1.3 I_n$	$1.35 I_n$	$1.6 I_n$	60
$60 < I_n \leq 200$					120
$200 < I_n \leq 400$					180
$400 < I_n \leq 1\,000$					240

6.4 Pre-arcing Time/Current Characteristic The pre-arcing time/current characteristic declared by the manufacturer shall satisfy the specification of Table 7, and when a fuse is tested in accordance with 8.5.2, the test results shall lie within the guaranteed error range (maximum $\pm 15\%$ on current axis to the average characteristic) of the above pre-arcing time/current characteristic.

When the pre-arcing time/current characteristic is presented, it shall be made as follows:

- (1) The time range shall, at least, be 10^{-2} to 10^4 sec., the characteristic is expressed in the average value at an ambient temperature of 20°C , and the graphical representation shall be made on a both logarithmic scaled paper of A 3 or A 4 specified in JIS P 0138 with the ratio of one decade dimension of ordinate (time axis) to that of abscissa (current axis) is 1 to 2 or 1 to 1.
- (2) The current shall be expressed by prospective current and the time shall be expressed by conventional time.

Table 7

Rated current of fuse-link (I_n) A	Range of pre-arcing time/ current characteristic			
	Non-current- limiting fuse	Current-limiting fuse		
		$2 I_n$	$2 I_n$	$6.3 I_n$
	Pre-arcing time ¹			
	Maximum value (min)	Maximum value (min)	Minimum value (sec.)	Maximum value (sec.)
1	2	2	—	0.016
3			—	0.10
5			—	0.56
10			—	0.71
15			0.008	0.90
20			0.010	1.0
30			0.016	1.2
40	4	4	0.020	2.1
50			0.025	3.0
60			0.032	3.2
75	6	6	0.063	3.6
100			0.080	4.0
125	8	8	0.12	4.5
150			0.13	5.6
200			0.14	7.1
250	10	10	0.16	9.0
300			0.18	11.0
400			0.20	12.0
500	12	12	0.32	14.0
600			0.40	16.0
(700)			0.45	17.0
800	20	20	0.50	18.0
1000			0.56	21.0

Remark: The value in parentheses should not be used as possible.

6.5 Permissible Time/Current Characteristic The current-limiting fuse shall withstand the repeated current passing test when tested in accordance with 8.6, and the results of the fusing test in succession shall show that the time/current characteristic lies within the guaranteed error range of the pre-arcing time/current characteristic declared by manufacturer.

For representation of the permissible time/current characteristic, the graph paper specified in 6.4 (1) shall be used.