BS ISO 8820-8:2012

BSI Standards Publication

Road vehicles — Fuse-links

Part 8: Fuse-links with bolt-in contacts (Type H and J) with rated voltage of 450 V

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee AUE/16, Electrical and electronic equipment.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Road vehicles — Fuse-links —

Part 8: Fuse-links with bolt-in contacts (Type H and J) with rated voltage of 450 V

Véhicules routiers — Liaisons fusibles —

Partie 8: Liaisons fusibles avec contacts boulonnés (type H et J) à tension nominale de 450 V

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 8820-8 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 3, *Electrical and electronic equipment*.

ISO 8820 consists of the following parts, under the general title *Road vehicles — Fuse-links*:

— *Part 1: Definitions and general test requirements*

— *Part 2: User's guide*

— *Part 3: Fuse-links with tabs (blade type) Type C (medium), Type E (high current) and Type F (miniature)*

— *Part 4: Fuse-links with female contacts (type A) and bolt-in contacts (type B) and their test fixtures*

— *Part 5: Fuse-links with axial terminals (Strip fuse-links) Types SF 30 and SF 51 and test fixtures*

— *Part 6 Single-bolt fuse-links*

— *Part 7: Fuse-links with tabs (Type G) with rated voltage of 450V*

— *Part 8: Fuse-links with bolt-in contacts (Type H and J) with rated voltage of 450V*

— *Part 9: Fuse-links with shortened tabs (Type K)*

The following part is under preparation:

— *Part 10: Fuse-links with tabs Type L (high current miniature)*

INTERNATIONAL STANDARD **ISO 8820-8:2012(E)**

Road vehicles — Fuse-links —

Part 8: Fuse-links with bolt-in contacts (Type H and J) with rated voltage of 450 V

1 Scope

This part of ISO 8820 specifies fuse-links with bolt-in contacts (Type H and J) and test fixtures for the fuse-links for use in road vehicles. It establishes, for these fuse-link types, the rated current, test procedures, performance requirements and dimensions.

This part of ISO 8820 is applicable to fuse-links with a rated voltage of 450 V d.c., a current rating of ≤ 400 A and a breaking capacity of 2 000 A intended for use in road vehicles.

This part of ISO 8820 is intended to be used in conjunction with ISO 8820-1 and with ISO 8820-2. The numbering of its clauses corresponds to that of ISO 8820-1 whose requirements are applicable, except where modified by requirements particular to this part of ISO 8820.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 8820-1, *Road vehicles — Fuse-links — Part 1: Definitions and general test requirements*

ISO 8820-2, *Road vehicles — Fuse-links — Part 2: User's guide*

ISO 6722, *Road vehicles — 60 V and 600 V single-core cables*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 8820-1 apply.

4 Marking, labelling

The rated current, manufacturer's name or trademark and "450 V d.c." shall be permanently marked on the body of the fuse-link.

5 Tests and requirements

5.1 General

In addition to carrying out the test procedures in accordance with ISO 8820-1, the following criteria apply.

All tests shall be performed as specified in Table 1.

The test fixtures for electrical tests shall be designed in accordance with Figure 4. The connection resistance shall be not higher than 0,35 mΩ to ensure the proper function of the test fixture. As two or more fuse-links are tested in series, they shall be mounted not less than 150 mm apart.

5.1.1 Test sequence

Table 1 — Test sequence

No	Test		Clause	Sample group[a]						
				1	2	3	4	5	6	7
1	Dimensions		6	X	X	X	—	—	—	—
2	Marking, labelling		4	X	X	X	X	X	X	X
3	Strength of terminals		5.8	X	X	X	X	X	X	X
4	Fuse-link voltage drop		5.2	X	X	—	—	—	—	—
5	Environmental condition	Climatic load	5.4	—	—	X	—	—	—	—
		Chemical loads		—	—	—	X	—	—	—
		Mechanical load		—	—	—	—	X	—	—
6	Transient current cycling		5.3	—	—	—	—	—	X	—
7	Temperature rise		5.9	—	—	—	—	—	—	X
8	Resistance against temperature shock		5.10	—	—	—	—	—	—	X
9	Breaking capacity		5.7	X	—	—	—	—	—	—
10	Fuse-link voltage drop		5.2	—[c]	—	X	X	X	X	X
11	Operating time-rating	$1{,}1I_R$	5.5	—	X	X	X	X	X	X
		$1{,}35I_R$		—	Y[b]	Y	Y	Y	Y	Y
		$1{,}5I_R$		—	Y	Y	Y	Y	Y	Y
		$2{,}0I_R$		—	Y	Y	Y	Y	Y	Y
		$3{,}0I_R$		—	Y	Y	Y	Y	Y	Y
		$5{,}0I_R$		—	Y	Y	Y	Y	Y	Y
12	Strength of terminals		5.8	X	X	X	X	X	X	X

[a] Each sample group shall contain a minimum of 10 fuse-links.

[b] For operating times, tests marked with "Y" in sample groups 2, 3, 4, 5, 6 and 7 shall be divided equally. These fuse-links are intended to be subjected to a single operating time test only.

[c] For sample groups marked with "—" tests are not required.

5.1.2 Test cable sizes

Test cable sizes shall be as given in Table 2. All tests for a particular fuse-link rating shall be performed using the same cable size.

Test cable sizes are specified to allow comparative fuse-link tests to be carried out. The cable size specified does not necessarily indicate the size of cable to be used in the vehicle application.

Only thick wall cables as specified in ISO 6722 shall be used for testing.

Table 2 — Test cable sizes

Rated current, I_R A	**Conductor cross-sectional area**[a] mm^2	**Cable length** mm
10	2,0	500 ± 50
15		
20	3,0	
30	5,0	
40		
50		
60		
100	20,0	
125		
150	40,0	

[a] Conductor material in accordance with ISO 6722.

5.2 Voltage drop

5.2.1 Test

The voltage drop U_{ab} shall be measured at points a and b across the fuse-link tabs as shown in Figure 4 after carrying a current equal to 100 % of rated current for 15 min.

5.2.2 Requirement

See Table 3.

Table 3 — Fuse-link voltage drop

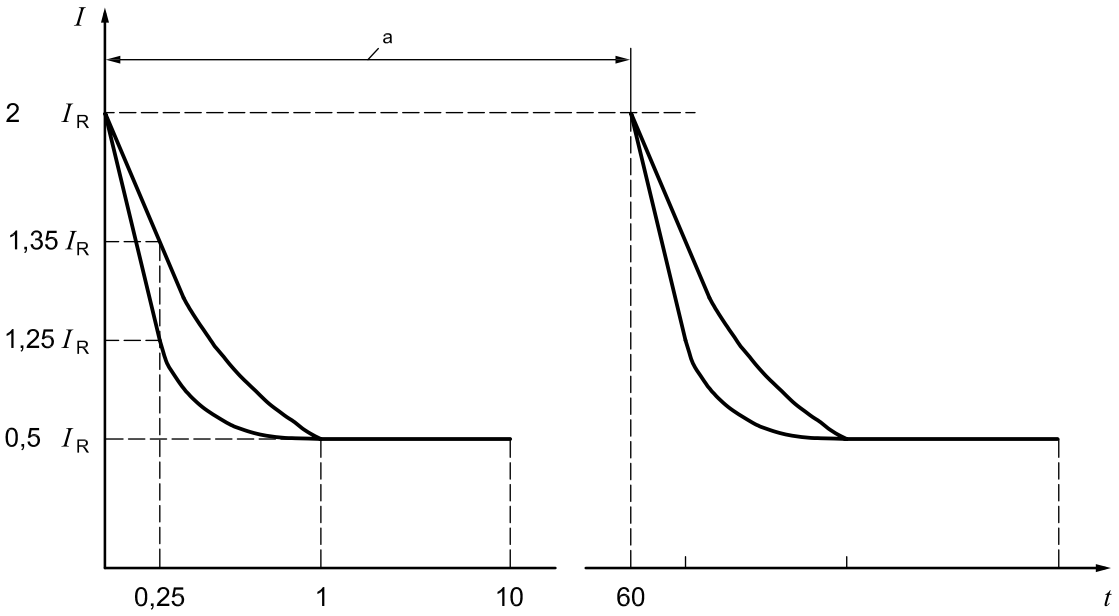
Rated current, I_R A	**Maximum voltage drop**, U_{ab} mV	
	Type H	**Type J**
10	—	350
15	200	—
20	—	350
30	200	
40		—
50		
60	—	250
100		
125		200
150		180

— not applicable

5.3 Transient current cycling

5.3.1 Test

See Figure 1 and ISO 8820-1. At an elapsed time of 0,25 s on-time, the current shall fall to a value between $1{,}25I_R$ and $1{,}35I_R$. During the first 10 s of each cycle, the steady-state current shall never fall below $0{,}5I_R$.



Key

t time
I current

[a] One cycle.

Figure 1 — Transient current cycling

5.3.2 Requirement

The fuse-link shall meet the values given in appropriate Table 3 and 4.

5.4 Environmental conditions

See ISO 8820-1.

For chemical load tests, the samples shall not be immersed. A wipe test instead has to be agreed between fuse manufacturer and vehicle manufacturer.

5.5 Operating time rating

5.5.1 Test

Stabilize the test fixture and the fuse-links at room temperature prior to testing. After adjusting the power supply to the test current as specified in Table 4, apply this current to the fuse-links. Then measure the time it takes the fuse-link to be activated. Especially when testing a large number of fuse-links, allow sufficient cooling time to prevent the test fixture from overheating.

The rated voltage U_R shall be maintained during a period of at least 30 s after the fuse-link is activated.

Table 4 — Operating times

Test current A	Operating time s					
	Fuse-links < 60 A		Fuse-links ≥ 60 A			
	Type H1, H2, H3 and J3		Type J1		Type J2 and J4	
	min.	max.	min.	max.	min.	max.
$1{,}1I_R$	14 400	∞	14 400	∞	14 400	∞
$1{,}35I_R$ [a]	150	3 600	—	—	150	3 600
$1{,}5I_R$	10	1 000	5	3 600	20	1 500
$2{,}0I_R$	0,5	100	1	300	1	300
$3{,}0I_R$	0,1	15	0,2	30	0,2	30
$5{,}0I_R$	0,05	1,0	0,05	1,0	0,05	1,0

— not applicable

[a] For H1 fuse-links and J3 fuse-links rated 10 A and 20 A, this test is not required. They are intended for device protection only.

NOTE The values given here are the total time values, including pre-arcing time and arcing time.

5.5.2 Requirement

The fuse-links shall meet the values given in Table 4 and shall meet the requirements as given in ISO 8820-1. The fuse construction material shall stay inside within the body of the fuse-link.

After activation, the current through the fuse-link shall not exceed 0,5 mA at the rated voltage of the fuse-link.

5.6 Current steps

Not applicable.

5.7 Breaking capacity

5.7.1 Test

A current of 2 000 A shall be applied to the fuse-links at a test voltage of 450 V d.c.. The test circuit shall be in accordance with ISO 8820-1.

Test cable sizes shall be in accordance with Table 2.

5.7.2 Requirement

After the test, insulators shall not be damaged. After activation, the current through the fuse-link shall not exceed 0,5 mA at the rated voltage of the fuse-link.

5.8 Strength of terminals

5.8.1 Test

Install the fuse-links in the test fixture (see Figure 4) with the mounting torque according to Table 5. This test is performed without cables and terminals.

Table 5 — Mounting torque and bolt sizes

Fuse-link type	Mounting torque Nm	Bolt size
H1, H2	2 ± 0,5	M 4
H3	4,5 ± 1	M 5
J1, J2	6 ± 1	M 6
J3, J4	12 ± 1	M 8

For mounting in the vehicle, the specific procedure (greasing, surface materials, surface roughness, etc.) shall be agreed upon between the fuse manufacturer, the fuse-box manufacturer and the vehicle manufacturer.

NOTE Test number 12 in Table 1 “Test sequence” is just a removal from the test fixture.

5.8.2 Requirement

The fuse-links shall remain physically intact.

5.9 Temperature rise test

5.9.1 Test

The temperature rise shall be measured at the temperature-rise measuring points a or b in the standard test fixture as shown in Figure 4 after supplying the test current as shown in Table 6 for 40 min.

Table 6 — Test current

Rated current, I_R A	Test current A
10	7
15	10,5
20	14
30	21
40	24
50	30
60	
100	50
125	62,5
150	75

5.9.2 Requirement

The temperature rise shall not exceed 50 °C.

5.10 Resistance against temperature shock

5.10.1 Test

See ISO 8820-1.

The fuse-links shall be subjected to 48 temperature shock cycles as follows (see Figure 2):

(1) 20 min at a temperature of (−40 ± 2) °C;

(2) 15 s max. transition time;

(3) 20 min at the temperature of (100 ± 2) °C; and

(4) 15 s max. transition time.

After completion of the test, the operating time-rating test shall be conducted according to 5.7.

The above-described cycle (1) through (4) shall complete at 40 min.

5.10.2 Requirement

The fuse-link shall meet the values given in appropriate Table 3 and 4.

6 Dimensions

6.1 Type H

For the dimensions see Table 7.

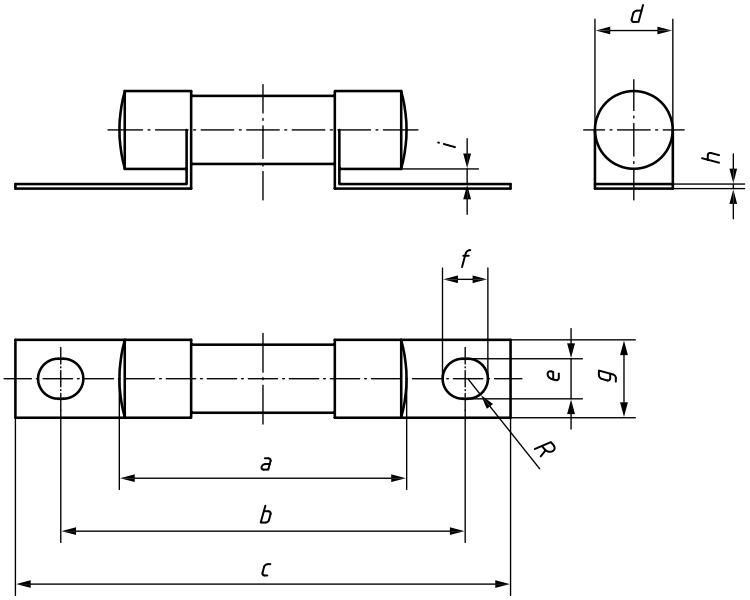


Figure 2 — Type H

Table 7 — Fuse-link Type H dimensions

Dimensions in millimetres

Dimension	H1		H2		H3	
	Value	Tolerance	Value	Tolerance	Value	Tolerance
a	31,8	±0,8	38	±0,8	38	±0,8
b	45	±0,5	51,2	±0,5	53,5	±0,5
c	55	±0,8	61,2	±0,8	65,5	±0,8
d	6,45	±0,05	6,6	±0,2	10,3	±0,2
e	4,2	±0,1	4,2	±0,1	5,3	±0,1
f	5	±0,1	5	±0,1	6	±0,1
g	10	±0,15	10	±0,15	10,3	±0,15
h	0,34	±0,16	0,34	±0,16	0,6	±0,16
i	2,5	±2,5	2,5	±2,5	2	±0,25

6.2 Type J

For the dimensions see Table 8.

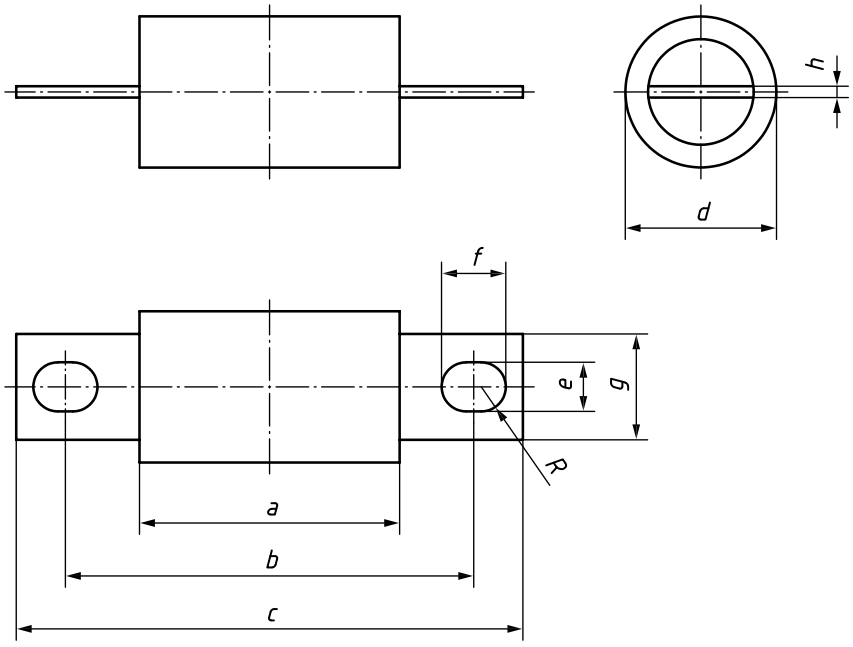


Figure 3 — Type J

Table 8 — Fuse-link Type J dimensions

Dimensions in millimetres

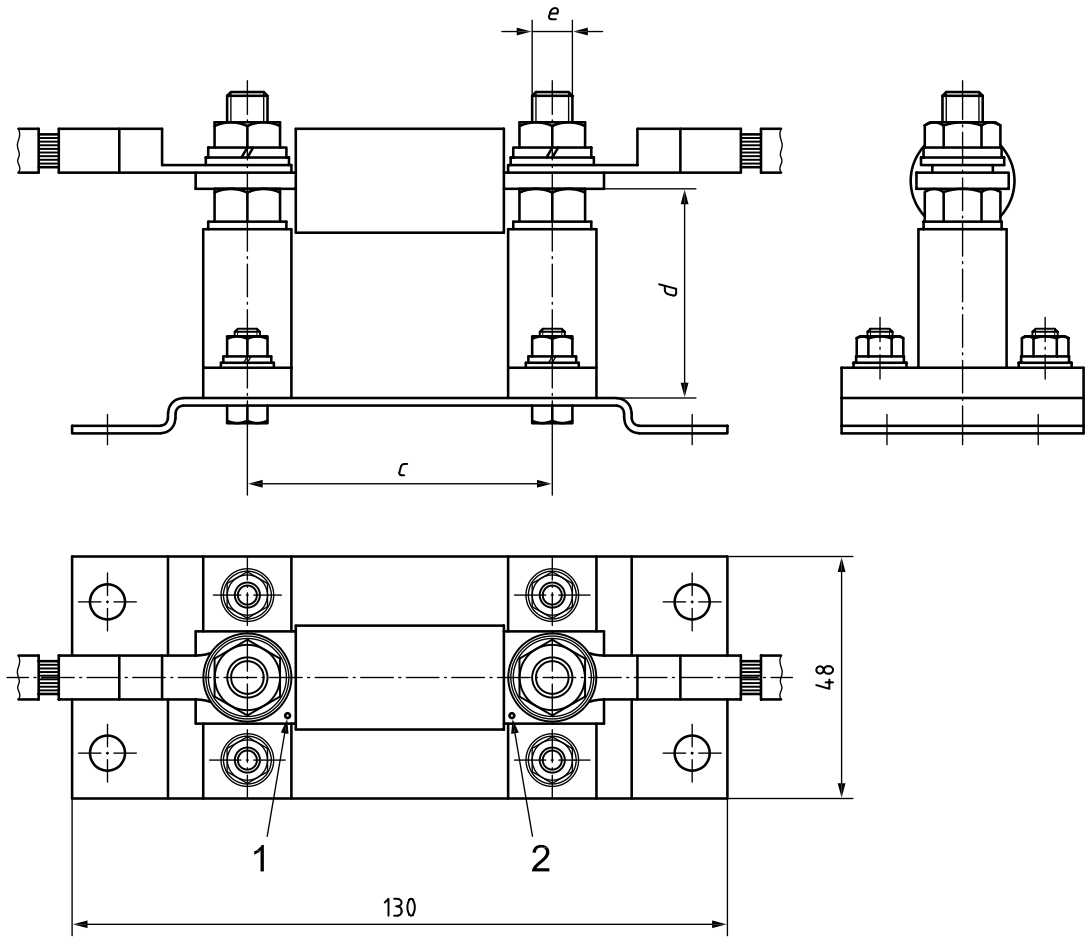
Dimension	J1		J2		J3		J4	
	Value	Tolerance	Value	Tolerance	Value	Tolerance	Value	Tolerance
a	34,4	±0,8	41,5	±1	41,3	±0,7	54	±0,7
b	54	±1	60	±0,5	60,45	±0,65	72,65	±0,75
c	67	±1	73	±0,5	81	±0,7	92,1	±0,7
d	20	±1	20	±0,5	20,6	±0,5	25,4	±0,5
e	6,5	±0,5	6,5	±0,3	8,7	±0,5	8,7	±0,5
f	8,5	±0,5	6,5	±0,3	11,85	±0,55	13,05	±0,55
g	14	±0,5	14,25	±0,25	18,3	±0,5	19	±0,5
h	1,5	±0,1	0,65	±0,15	3,2	±0,5	3,2	±0,5

7 Test fixture

7.1 Test fixture for fuse-links Type H and Type J

For the dimensions see Table 9.

Dimensions in millimetres



Key

1, 2 voltage drop and temperature rise measuring points

Figure 4 — Test fixture for fuse-links

Table 9 — Test fixture dimensions

Dimensions in millimetres

Part	**Bolt-in type**						
	Type H			**Type J**			
	H1	H1	H1	**J1**	**J2**	**J3**	**J4**
c	45	51,2	53,5	54	60	60,5	73
d	41,5						
e	M4		M5	M6		M8	

Annex A
(informative)

Classification

The following fuse-links actually exist as shown in Table A.1

Table A.1 — Classification

Rated current, I_R A	**Type H**			**Type J**			
	H1	**H2**	**H3**	**J1**	**J2**	**J3**	**J4**
10	—	—	—	—	—	X	—
15	X	—	—	—	—	-	—
20	—	—	—	—	—	X	—
30	—	X	—	—	—	X	—
40	—	—	X	—	—	—	—
50	—	—	X	—	—	—	—
60	—	—	—	—	X	—	—
100	—	—	—	X	—	—	X
125	—	—	—	X	X	—	—
150	—	—	—	X	—	—	—
— not applicable							

Bibliography

[1] ISO 8092-1, *Road vehicles — Connections for on-board electrical wiring harnesses — Tabs for single-pole connections — Dimensions and specific requirements*

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