

BS ISO 8820-9:2014



BSI Standards Publication

Road vehicles — Fuse-links

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

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National foreword

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Road vehicles — Fuse-links —

Part 9:

**Fuse-links with shortened tabs (Type
K)**

Véhicules routiers — Liaisons fusibles —

Partie 9: Liaisons fusibles à languettes raccourcies (Type K)



Reference number
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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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The committee responsible for this document is 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-link's 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) Type SF 30 and SF 51 and test fixture*
- *Part 6 Single-bolt fuse-links*
- *Part 7: Fuse-links with tabs (Type G) with rated voltage of 450 V*
- *Part 8: Fuse-links with bolt-in contacts (Type H and J) with rated voltage of 450 V*
- *Part 9: Fuse-links with shortened tabs (Type K)*

Road vehicles — Fuse-links —

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

1 Scope

This part of ISO 8820 specifies fuse-links with shortened tabs (Type K) 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 58 V, a current rating of ≤ 30 A, and a breaking capacity of 1 000 A intended for use in road vehicles.

This part of ISO 8820 is intended to be used in conjunction with ISO 8820-1 and ISO 8820-2. The numbering of clauses in this part of ISO 8820 corresponds to that of ISO 8820-1. This part of ISO 8820 includes additional or modified requirements that are intended to be applied in addition to those given in ISO 8820-1.

2 Normative references

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

ISO 6722-1, *Road vehicles — 60 V and 600 V single-core cables — Part 1: Dimensions, test methods and requirements for copper conductor cables*

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

3 Terms and definitions

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

4 Marking, labelling and colour coding

Marking, labelling, and colour coding shall be in accordance with ISO 8820-1 and [Table 1](#).

Table 1 — Fuse-link colour coding

Current rating A	Colour
1	Black
2	Grey
3	Violet
4	Pink
5	Tan/Light brown
7,5	Brown
10	Red
15	Blue
20	Yellow
25	White ^a
30	Green

^a For transparent fuse bodies, “white” means no colour in the plastic material is added.

5 Tests and requirements

5.1 General

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

Tests shall be performed following the test sequences in [Table 2](#);

The test fixtures for electrical tests shall be designed in accordance with [Figure 1](#);

Fuse-links according to this part of ISO 8820 shall provide for visible evidence of an open fuse element.

5.1.1 Test sequence

Table 2 — Test sequence

No	Test		Clause	Sample groups ^a						
				1	2	3	4	5	6	7
1	Dimensions		6	X	X	X	-	-	-	-
2	Marking, labelling, and colour coding		4	X	X	X	X	X	X	X
3	Fuse-link voltage drop		5.2	X	X	X	-	-	-	-
4	Strength of terminals		5.8	X	X	X	-	-	-	-
5	Environmental conditions	Climatic load	5.4	-	-	-	X	-	-	-
		Chemical load		-	-	-	-	X	-	-
		Mechanical load		-	-	-	-	-	X	-
6	Transient current cycling		5.3	-	-	-	-	-	-	X
7	Fuse-link voltage drop		5.2	-	-	-	X	X	X	X
8	Current steps		5.6	-	-	X	-	-	-	-
9	Breaking capacity		5.7	X	-	-	-	-	-	-
10	Operating time rating test	1,1 I_R	5.5	-	X	-	X	X	X	X
		1,35 I_R		-	Y	-	Y	Y	Y	Y
		1,6 I_R		-	Y	-	Y	Y	Y	Y
		2 I_R		-	Y	-	Y	Y	Y	Y
		3,5 I_R		-	Y	-	Y	Y	Y	Y
		6 I_R		-	Y	-	Y	Y	Y	Y
11	Strength of terminals		5.8	X	X	X	X	X	X	X

Y For these operating time tests, the sample groups 2, 4, 5, 6, and 7 shall be divided equally; these fuse-links are intended to be subjected to a single operating time test only.

- Not required.

^a Each sample group should contain a minimum of 10 fuse-links for each current rating.

5.1.2 Test cable sizes

Test cable sizes shall be as given in [Table 3](#). 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 herein does not necessarily indicate the size of cable to be used in the vehicle application.

Table 3 — Test cable sizes

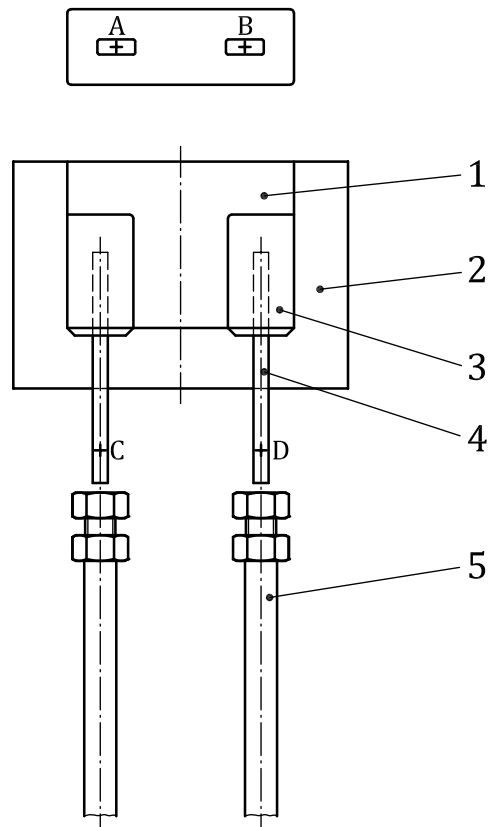
Rated current I_R A	Conductor cross-sectional area ^a mm ²	Length mm
1	0,35	500 ± 50
2		
3		
4		
5	0,5	
7,5	0,75	
10	1,0	
15	1,5	
20	2,5	
25		
30	4,0	

^a Conductor material according ISO 6722-1.

5.2 Voltage drop and connection resistance

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 1](#). The connection resistance shall be measured at the points A, C and B, D.



Key

- 1 fuse-link
- 2 test fixture
- 3 fuse blade
- 4 test clip (as defined in [Table 9](#))
- 5 cable size according to [Table 3](#)

NOTE 1 Points A and B are the measuring points for the voltage drop.

NOTE 2 Points A, C and B, D are the measuring points for connection resistance.

Figure 1 — Test schematic (type K)

5.2.2 Requirements

The requirements shall be in accordance with [Table 4](#).

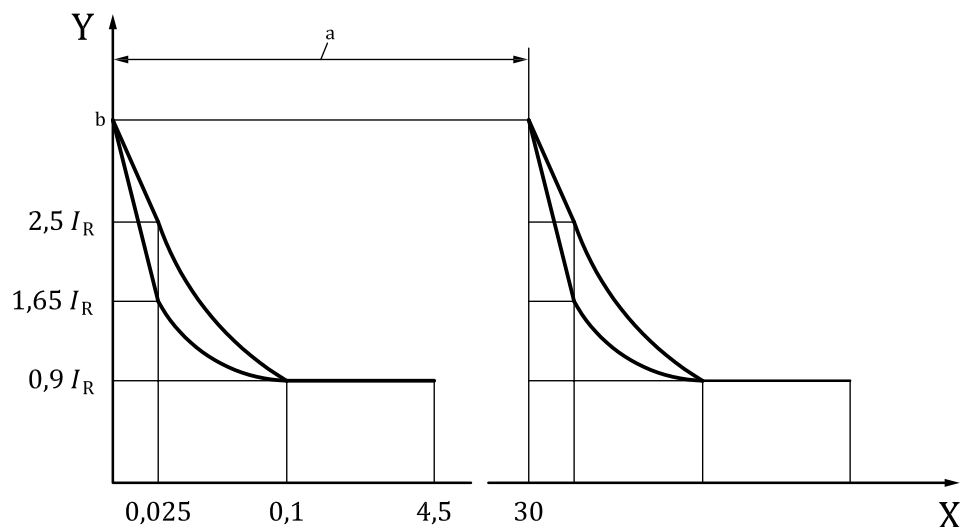
Table 4 — Voltage drop and connection resistance

Fuse rating A	Max. voltage drop U_{AB} mV	Max. connection resistance m Ω
1	250	0,8
2	225	
3	200	
4		
5	175	
7,5	150	
10	140	
15	125	
20		
25		
30	120	

5.3 Transient current cycling

5.3.1 Test

The test shall be in accordance with [Figure 2](#) and ISO 8820-1. At an elapsed time of 0,025 s on-time, the current shall fall to a value between $1,65 I_R$ and $2,5 I_R$. At no time during the first 4,5 s of each cycle, the steady-state current shall fall below $0,9 I_R$.



Key

- X time(s)
- Y current(I_R)
- a One cycle.
- b $(5,6 \dots 6) I_R$ for $I_R > 5A$ and $(4,6 \dots 5) I_R$ for $I_R \leq 5A$.

Figure 2 — Transient current cycling

5.3.2 Requirement

The requirement shall be in accordance with ISO 8820-1.

5.4 Environmental conditions

The environmental conditions shall be in accordance with ISO 8820-1.

5.5 Operating time-rating

5.5.1 Test

The test shall be in accordance with ISO 8820-1. For $1,1 I_R$, the test duration is 100 h.

5.5.2 Requirements

The requirements shall be in accordance with [Table 5](#).

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

Table 5 — Operating times

Test current A	Operating time s	
	min.	max.
$1,1 I_R$	360 000	∞
$1,35 I_R^a$	0,75	600
$1,6 I_R^a$	0,25	50
$2 I_R$	0,15	5
$3,5 I_R$	0,04	0,5
$6 I_R$	0,02	0,1

5.6 Current steps

5.6.1 Test

The test shall be in accordance with ISO 8820-1.

5.6.2 Requirement

The requirement shall be in accordance with ISO 8820-1. After activation, the current, through the fuse-link, shall not exceed 0,5 mA at the rated voltage of the fuse-link.

5.7 Breaking capacity

5.7.1 Test

The test shall be in accordance with ISO 8820-1.

Test at 1 000 A with cable sizes as shown in [Tables 3](#).

Use appropriate test dummy according to [Figure 3](#).

5.7.1.1 Test dummy

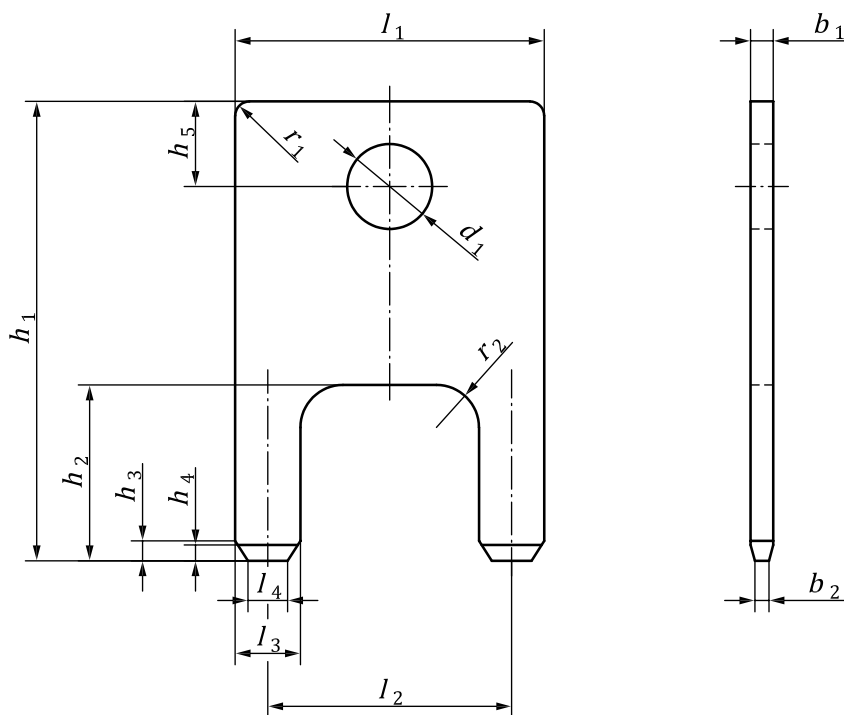


Figure 3 — Test dummy for Type K fuse-links

Table 6 — Dimensions of Test dummy for Type K fuse-links

Dimension	Test dummy for Type K fuse-links	
	Value mm	Tolerance mm
l_1	(10,9)	-
l_2	8,6	$\pm 0,05$
l_3	2,3	$+0/-0,05$
l_4	1,4	$\pm 0,3$
b_1	0,8	$\pm 0,02$
b_2	0,5	$\pm 0,1$
d_1	3,0	$\pm 0,15$
h_1	16,2	$\pm 0,15$
h_2	6,2	$\pm 0,15$
h_3	0,7	$\pm 0,15$
h_4	0,56	max
h_5	3,0	$\pm 0,15$
r_1	0,5	$\pm 0,15$
r_2	1,5	$\pm 0,15$

5.7.2 Requirements

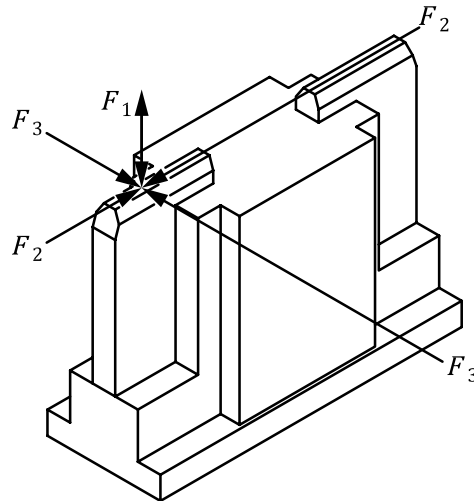
The requirements shall be in accordance with ISO 8820-1.

After the test, 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

Table 7 — Terminal forces

Fuse-link size	F_1 N	F_2 N	F_3 N
Type K	50 ± 1	10 ± 1	5 ± 1



NOTE The arrows indicate the directions of applied forces $F_1 \dots F_3$.

Figure 4 — Application forces

5.8.1 Test

A force ($F_1 \dots F_3$) shall be applied to each of the tabs of the fuse-link in accordance with [Table 7](#) and [Figure 4](#). The force shall be held for 2 s. The test force shall not be applied abruptly.

5.8.2 Requirements

The deformation of the test sample shall not exceed 0,5 mm. After the test, the insulator shall be intact and the terminals shall not be removed from the insulator.

6 Dimensions

6.1 Basic dimensions of fuse-link

Dimensions in millimetres

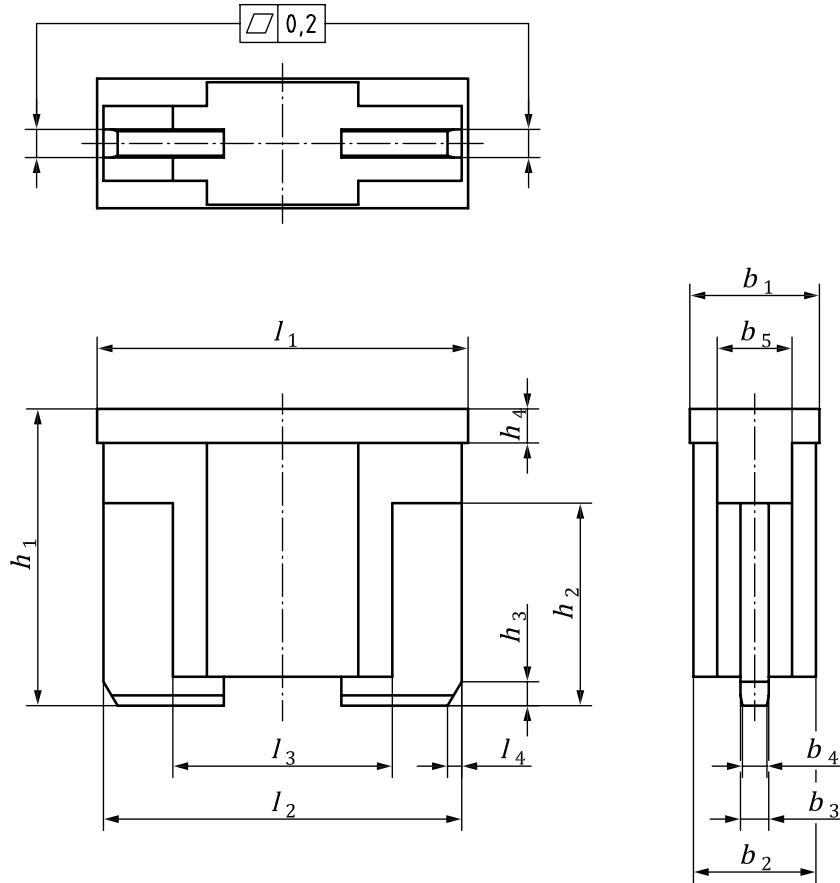


Figure 5 — Fuse-links Type K

Table 8 — Dimensions of fuse-links Type K

Dimension	Type K	
	Value mm	Tolerance mm
l_1	10,9	$\pm 0,15$
l_2	10,53	$\pm 0,68$
l_3	6,45	$\pm 0,16$
l_4	0,42	$\pm 0,19$
b_1	3,81	$\pm 0,16$
b_2	3,6	$\pm 0,20$
b_3	0,83	$\pm 0,04$
b_4	0,72	max.
b_5	2,2	$\pm 0,2$
h_1	8,72	$\pm 0,47$
h_2	5,95	$\pm 0,5$
h_3	0,7	$\pm 0,3$
h_4	1,0	$\pm 0,15$

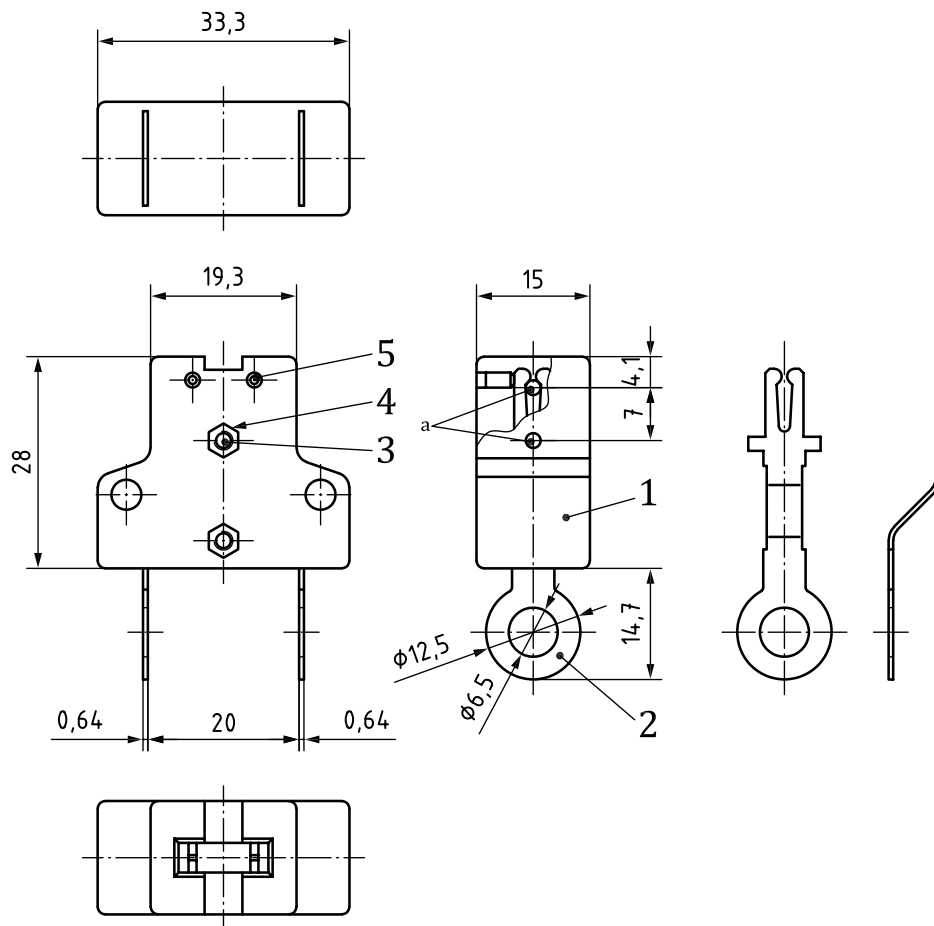
6.2 Designation example

Designation of a fuse-link Type K in accordance with this part of ISO 8820 for a nominal current of 15 A:

Fuse-link ISO 8820 - K - 15

7 Test fixture

See [Figure 1](#) for electrical measurements.



Key

a Voltage drop measurement hole.

Figure 6 — Test fixture

Table 9 — Parts list and material specifications

Reference No. in Figure 6	Description	Material specifications, finish and coating	Quantity
1	Test fixture insulating body	Thermoset plastic	2
2	Terminal	Copper alloy, gal. Sn	2
3	Cross recessed head screw: ISO 7045-M2x10-8	Steel, gal. Zn	2
4	Nut: ISO 4032-M2-8	Steel, gal. Zn	2
5	Hexagon socket set screw: ISO 4026-M2.5x4-45H	Steel, gal. Zn	4

Bibliography

- [1] ISO 8820-2, *Road vehicles — Fuse-links — Part 2: User guidelines*

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