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**Road vehicles — Fuse-links —**

Part 12:

**Fuse-links with tabs (blade type) Type  
N (sub miniature)**

*Véhicules routiers — Liaisons fusibles —*

*Partie 12: Liaison fusible à languette (type lame) Type N (micro)*

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# Contents

	Page
<b>Foreword</b> .....	<b>iv</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Marking, labelling and colour coding</b> .....	<b>1</b>
<b>5 Tests and requirements</b> .....	<b>2</b>
5.1 General.....	2
5.1.1 Test criteria.....	2
5.1.2 Test sequence.....	2
5.2 Voltage drop.....	3
5.2.1 Tests.....	3
5.2.2 Requirements.....	4
5.3 Transient current cycling.....	5
5.3.1 Test.....	5
5.3.2 Requirements.....	5
5.4 Environmental conditions.....	6
5.5 Operating time-rating.....	6
5.5.1 Test.....	6
5.5.2 Requirement.....	6
5.6 Current steps.....	6
5.6.1 Test.....	6
5.6.2 Requirement.....	6
5.7 Breaking capacity.....	6
5.7.1 Test.....	6
5.7.2 Requirement.....	6
5.8 Strength of terminals.....	7
5.8.1 Test.....	7
5.8.2 Requirements.....	7
5.9 Test cable sizes.....	7
5.10 Temperature rise.....	8
<b>6 Dimensions</b> .....	<b>8</b>
6.1 Fuse-links Type N.....	8
6.2 Designation example.....	10
<b>Annex A (informative) Temperature rise test</b> .....	<b>11</b>
<b>Bibliography</b> .....	<b>12</b>

## 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.

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](http://www.iso.org/directives)).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 32, *Electrical and electronic components and general system aspects*.

A list of all parts in the ISO 8820 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

# Road vehicles — Fuse-links —

## Part 12:

# Fuse-links with tabs (blade type) Type N (sub miniature)

## 1 Scope

This document specifies fuse-links with tabs (blade-type) Type N (sub miniature), for use in road vehicles. It establishes, for this fuse-link type, the rated current, test procedures, performance requirements and dimensions.

This document is applicable for fuse-links with a rated voltage of 32 V a current rating of  $\leq 30$  A and a breaking capacity of 1 000 A intended for use in road vehicles.

This document 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 document.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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*

## 3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

## 4 Marking, labelling and colour coding

See ISO 8820-1 and [Table 1](#).

Table 1 — Fuse-link colour coding

Rated Current, $I_R$ (A)	Colour Type N
3	Violet
4	Pink
5	Tan/light brown
7,5	Brown
10	Red
15	Blue
20	Yellow
25	White <sup>a</sup>
30	Green

<sup>a</sup> For transparent fuse bodies, "white" means no colour is added to the plastic material.

## 5 Tests and requirements

### 5.1 General

#### 5.1.1 Test criteria

In addition to carrying out the test procedures in accordance with ISO 8820-1, the following criteria 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](#). The connection resistance shall be  $\leq 0,8 \text{ m}\Omega$  for Type N fuse-links to ensure the proper function of the test fixture.

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

#### 5.1.2 Test sequence

Table 2 — Test sequence

No.	Test		(Sub)clause	Sample groups						
				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	—	—	—
6		Chemical load		—	—	—	—	X	—	—
7		Mechanical load		—	—	—	—	—	X	—
8	Transient current cycling		5.3	—	—	—	—	—	—	X
9	Fuse-link voltage drop		5.2	—	—	—	X	X	X	X
10	Current steps		5.6	—	—	X	—	—	—	—
11	Breaking capacity		5.7	X	—	—	—	—	—	—
12	Operating time rating test	1,10 $I_R$	5.5	—	X	—	X	X	X	X
		1,35 $I_R$		—	Y	—	Y	Y	Y	Y
		1,60 $I_R$		—	Y	—	Y	Y	Y	Y
		2,00 $I_R$		—	Y	—	Y	Y	Y	Y
		3,50 $I_R$		—	Y	—	Y	Y	Y	Y
		6,00 $I_R$		—	Y	—	Y	Y	Y	Y
13	Strength of terminals		5.8	X	X	X	X	X	X	X

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

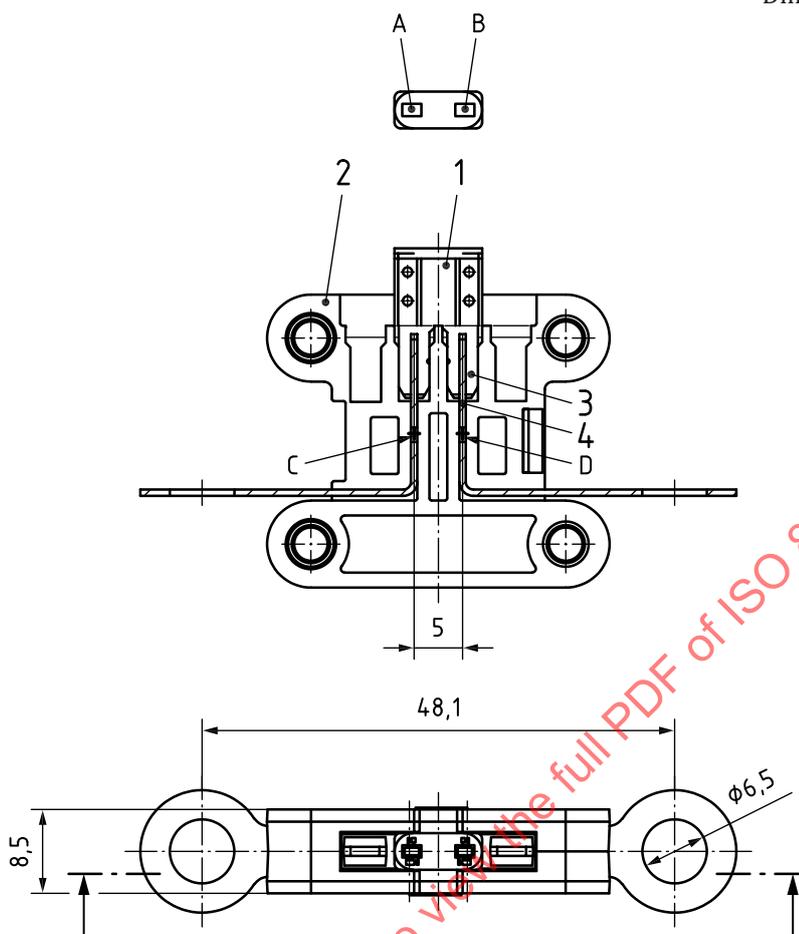
For the operating time rating tests marked “Y” the sample groups 2, 4, 5, 6 and 7 shall be divided equally. These fuse-links are intended to be subjected to a single operating time-rating test only.

NOTE A dash (—) indicates that the test is not required.

## 5.2 Voltage drop

### 5.2.1 Tests

The voltage drop  $U_{AB}$  shall be measured at points A and B across the fuse-link tabs as shown in [Figure 1](#).



**Key**

- 1 fuse-link
- 2 test fixture
- 3 fuse blade
- 4 test clip (cantilevered contact system, receptacle to accept tabs as defined in [Table 7](#))

NOTE Points A and B are the measuring points for the voltage drop. Points A-C and B-D are the measuring points for connection resistance.

**Figure 1 — Test schematic**

**5.2.2 Requirements**

See [Table 3](#).

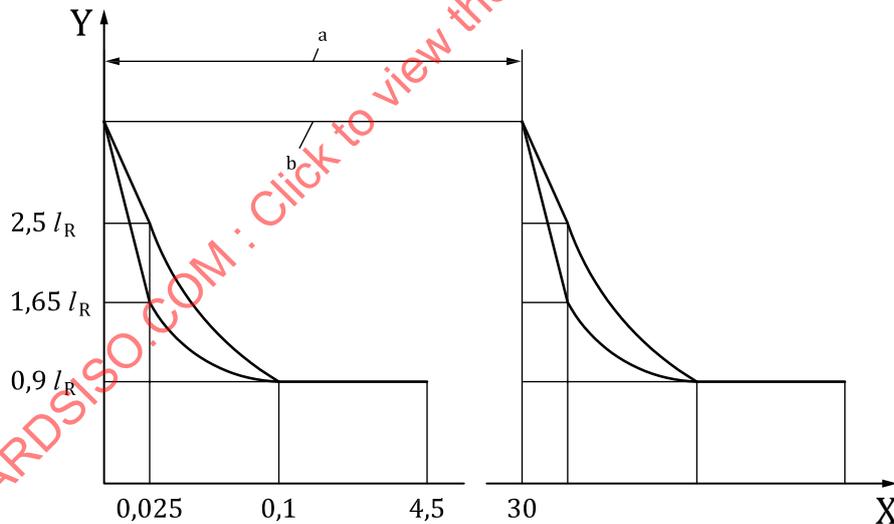
Table 3 — Voltage drop

Rated Current, $I_R$ (A)	Max. voltage drop, $U_{AB}$ (mV)
3	200
4	
5	
7,5	175
10	150
15	140
20	
25	
30	120

### 5.3 Transient current cycling

#### 5.3.1 Test

See [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 shall the steady state current fall below  $0,9 I_R$ .



#### Key

X time (s)

Y current

a One cycle.

b  $(5,6 \dots 6) I_R$  for  $I_R > 5$  A;  $(4,6 \dots 5) I_R$  for  $I_R \leq 5$  A.

Figure 2 — Transient current cycling

#### 5.3.2 Requirements

See ISO 8820-1.

## 5.4 Environmental conditions

See ISO 8820-1.

## 5.5 Operating time-rating

### 5.5.1 Test

See ISO 8820-1. For  $I_R$  the test duration is 100 h.

### 5.5.2 Requirement

See [Table 4](#).

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

**Table 4 — Operating times**

Test current (A)	Operating time (s)	
	Min.	Max.
$1,1 I_R$	360 000	$\infty$
$1,35 I_R$	0,75	120
$1,6 I_R$	0,25	50
$2,0 I_R$	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

See ISO 8820-1.

### 5.6.2 Requirement

See 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

See ISO 8820-1.

Fuse-link shall be capable of interrupting  $1000 \left( \begin{smallmatrix} +50 \\ 0 \end{smallmatrix} \right) \text{A}$  at  $32 \left( \begin{smallmatrix} +1,6 \\ 0 \end{smallmatrix} \right) \text{V DC}$  with any time constant up to 2,5 ms.

### 5.7.2 Requirement

See ISO 8820-1

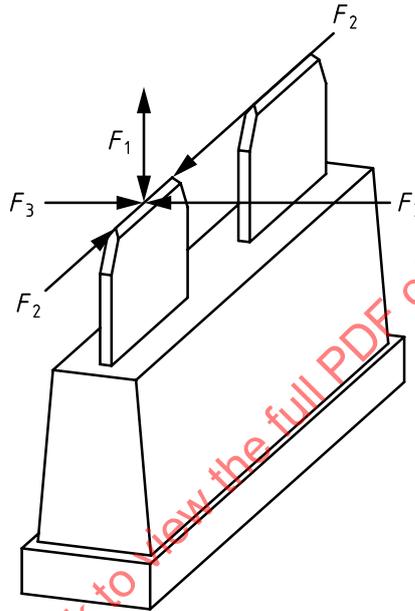
After the test, the current through the fuse-link shall not exceed 0,5 mA at the rated voltage of the fuse-link.

## 5.8 Strength of terminals

See [Table 5](#).

**Table 5 — Terminal forces**

$F_1$	$F_2$	$F_3$
(N)	(N)	(N)
$50 \pm 1$	$10 \pm 1$	$5 \pm 1$



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

**Figure 3 — Application of 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 [Figure 3](#). 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.

## 5.9 Test cable sizes

Test cable sizes shall be as given in [Table 6](#). 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 6 — Test cable sizes

Rated current, $I_R$ (A)	Conductor cross-sectional area <sup>a</sup> (mm <sup>2</sup> )	Length (mm)
3	0,35	500 ± 50
4		
5	0,5	
7,5	0,75	
10	1,0	
15	1,5	
20	2,5	
25		
30	4,0	

<sup>a</sup> Conductor material according ISO 6722-1.

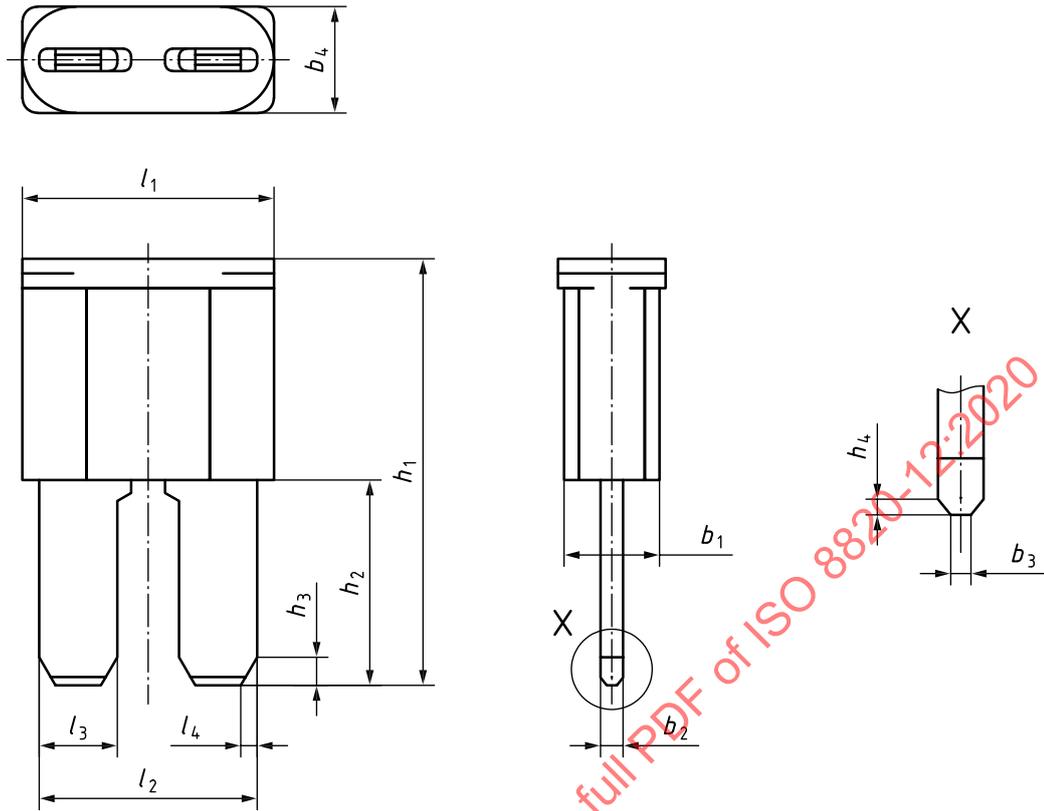
### 5.10 Temperature rise

The terminal temperature rise shall be measured. [Annex A](#) gives an example of a suitable method.

## 6 Dimensions

### 6.1 Fuse-links Type N

See [Figure 4](#) for a fuse-link Type N. Refer to [Table 7](#) for the dimensions of fuse-links with tabs, Type N.



a Detail of X.

Figure 4 — Fuse-link Type N

Table 7 — Dimensions of fuse-links with tabs, Type N

Dimensions in millimetres

Dimension	Type N	
	Value	Tolerance
$l_1$	9	$\pm 0,2$
$l_2$	7,8	+0,3
		-0,5
$l_3$	2,8	$\pm 0,15$
$l_4$	0,4	+0,2
		-0,24
$b_1$	3,4	$\pm 0,2$
$b_2$	0,8	+0,06
		-0,01
$b_3$	0,56	Max.
$b_4$	3,8	$\pm 0,2$
$h_1$	15,3	$\pm 0,3$
$h_2$	7,4	$\pm 0,2$
$h_3$	1,1	$\pm 0,6$
$h_4$	0,7	+0,5
		-0,4

## 6.2 Designation example

Designation of a fuse-link Type N in accordance with this document for the rated current of 25 A:

**Fuse-link ISO 8820 — N - 25**

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