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**Road vehicles — Fuse-links —**

Part 5:

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

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*Véhicules routiers — Liaisons fusibles —*

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*Partie 5: Liaisons fusibles avec languettes axiales (liaisons fusibles  
électriques) des types SF 30 et SF 51, et montages d'essai*

ISO 8820-5:2015

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ISO copyright office  
Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

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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 General test conditions.....	2
5.1.2 Test sequence.....	3
5.1.3 Test cable sizes.....	3
5.2 Voltage drop.....	4
5.2.1 Purpose.....	4
5.2.2 Test.....	4
5.2.3 Requirement.....	4
5.3 Transient current cycling.....	5
5.3.1 Purpose.....	5
5.3.2 Test.....	5
5.3.3 Requirement.....	6
5.4 Environmental conditions.....	6
5.5 Operating time rating.....	6
5.5.1 Purpose.....	6
5.5.2 Test.....	6
5.5.3 Requirements.....	6
5.6 Current steps.....	7
5.6.1 Purpose.....	7
5.6.2 Test.....	7
5.6.3 Requirements.....	7
5.7 Breaking capacity.....	7
5.7.1 Purpose.....	7
5.7.2 Test.....	7
5.7.3 Requirement.....	8
5.8 Strength of terminals.....	8
5.8.1 Purpose.....	8
5.8.2 Test.....	8
5.8.3 Requirement.....	8
<b>6 Dimensions and designation examples</b> .....	<b>9</b>
6.1 Type SF 30.....	9
6.1.1 Dimensions.....	9
6.1.2 Designation example.....	9
6.2 Type SF 51.....	10
6.2.1 Dimensions.....	10
6.2.2 Designation example.....	10
<b>7 Test fixture</b> .....	<b>10</b>
7.1 General.....	10
7.2 Materials and dimensions.....	10
<b>Bibliography</b> .....	<b>15</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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary Information](#)

The committee responsible for this document is ISO/TC 22, *Road vehicles*, Subcommittee SC 3, *Electric and electronic equipment*.

This second edition cancels and replaces the first edition (ISO 8820-5:2007), which has been technically revised.

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 guidelines*
- *Part 3: Fuse-link 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 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)*
- *Part 10: Fuse-links with tabs Type L (high current miniature)*

# Road vehicles — Fuse-links —

## Part 5:

# Fuse-links with axial terminals (Strip fuse-links) Types SF 30 and SF 51 and test fixtures

## 1 Scope

This part of ISO 8820 specifies fuse-links with axial terminals (Strip fuse-links) Type SF 30 and SF 51 and test fixtures for fuses 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 32 V, a current rating of 30 A to 500 A, and a breaking capacity of 2 000 A intended for use in the electrical system of road vehicles with a nominal voltage of 12 V and/or 24 V.

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 (standards.iteh.ai)

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 4017, *Fasteners — Hexagon head screws — Product grades A and B*

ISO 4032, *Hexagon regular nuts (style 1) — Product grades A and B*

ISO 7089, *Plain washers — Normal series — Product grade A*

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

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

## 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

The requirements given in [Table 1](#) and ISO 8820-1 shall apply.

Table 1 — Fuse-link colour coding

Fuse-link current rating A	Fuse-link type SF 30	Fuse-link type SF 51
30	orange	X
40	green	
50	red	
60	yellow	
70	brown	
80	white	red
100	blue	yellow
125	pink	green
150	grey	orange
175	light brown (tan)	white
200	violet	blue
225	X	light brown (tan)
250		pink
300		grey
350		dark green
400		violet
450		gold/dark yellow
500		brown

## 5 Tests and requirements

### 5.1 General

#### 5.1.1 General test conditions

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 4](#) to [Figure 7](#). The connection resistance shall be a maximum of 1,0 mΩ for SF 30 fuse-links and a maximum of 0,35 mΩ for SF 51 fuse-links to ensure the proper function of the test fixture;
- terminals shall have a suitable finish which will ensure corrosion protection and shall have satisfactory mechanical and electrical properties.

Fuse-link type SF 30 with a rated current of 150 A...200 A and fuse-link type SF 51 with a rated current of 300 A ... 500 A shall only be used for short circuit protection and have to be tested with a cable, the insulation of which will withstand the test without deterioration.

5.1.2 Test sequence

Table 2 — Test sequence

No	Test	Clause	Sample groups <sup>a</sup>							
			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	Terminal strength	5.8	X	X	X	X	X	X	X	
4	Fuse-link voltage drop	5.2	X	X	X					
5	Climatic load	5.4				X				
6	Chemical load	5.4					X			
7	Mechanical load	5.4						X		
8	Transient current cycling	5.3							X	
9	Fuse-link voltage drop	5.2				X	X	X	X	
10	Current step	5.6			X					
11	Breaking capacity	5.7	X							
12	Operating time rating	5.5	0,75 $I_R$ , 1,0 $I_R$ , or 1,1 $I_R$		X		X	X	X	X
			1,35 $I_R$ or 1,5 $I_R$		Y <sup>b</sup>		Y	Y	Y	Y
			2,0 $I_R$		Y		Y	Y	Y	Y
			3,0 $I_R$ or 3,5 $I_R$		Y		Y	Y	Y	Y
			5,0 $I_R$ or 6,0 $I_R$		Y		Y	Y	Y	Y
13	Terminal strength (removal)	5.8	X	X	X	X	X	X	X	
<sup>a</sup> Each sample group shall contain a minimum of eight fuse links. <sup>b</sup> For these operating time tests noted with a Y, the sample groups 2, 4, 5, 6, and 7 each current rating shall be divided equally. These fuses are intended to be subjected to a single operating time test only.										

5.1.3 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 does not necessarily indicate the size of cable to be used in the vehicle application.

Table 3 — Test cable sizes

Current rating A	Conductor cross sectional area <sup>a</sup> mm <sup>2</sup>		
	for fuse-link types SF 30	fuse-link types SF 51	
30	2,5	X	
40	4,0		
50	6,0		
60			
70	10,0		
80	25,0	10,0	
100		16,0	
125		25,0	16,0
150			25,0
175			25,0
200	X	35,0	
225		50,0	
250		70,0	
300			
350			
400			
450			
500			

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

## 5.2 Voltage drop

### 5.2.1 Purpose

This test defines and measures the energy consumption of the fuse-link which creates a temperature rise.

### 5.2.2 Test

The test given in ISO 8820-1 shall apply. Measure the voltage drop at the points as indicated (see [Figure 4](#) to [Figure 6](#)) using the test fixtures of [Clause 7](#).

This test shall be performed at 0,75  $I_R$  for the following:

- SF 30 - 150A ... 200 A;
- SF 51 - 300 A ... 500A.

### 5.2.3 Requirement

The requirements given in [Table 4](#) shall apply.



Table 4 — Voltage drop

Current rating A	Max voltage drop mV		
	for fuse-link types SF 30	for fuse-link types SF 51	
30	105	X	
40	90		
50	80		
60			
70			
80	75	110	
100			
125			
150			
175	70		
200			
225			
250	X		80
300			
350			
400			
450			
500			

### 5.3 Transient current cycling

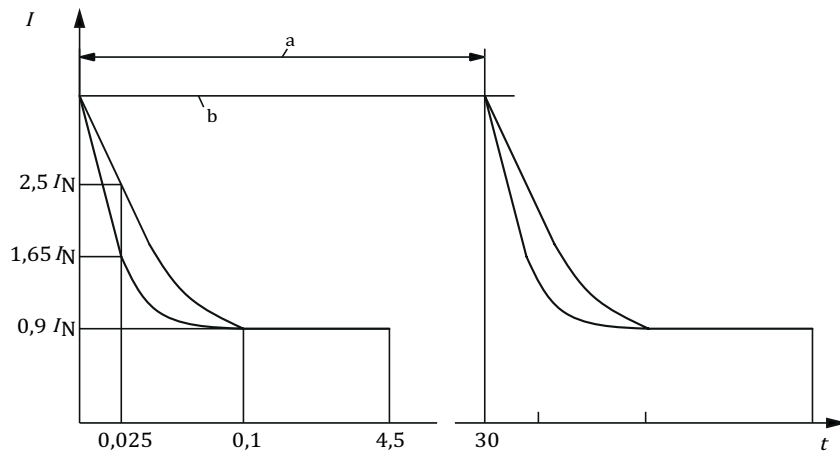
#### 5.3.1 Purpose

This test evaluates the ability of the fuse-link to withstand the energy volume of transient pulses.

#### 5.3.2 Test

[Figure 1](#) and the test given in ISO 8820-1 shall apply. 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 shall the steady-state current fall below  $0,9 I_R$ .

This test does not apply to fuse-links type SF 30 current ratings of 150 A and above and type SF 51 current ratings of 300 A and above. For those fuse-links, agreements have to be taken between manufacturer and supplier.



**Key**

- $I$  current
- $t$  time in s
- a One cycle.
- b Initial applied current  $4,0 I_R$ .

**Figure 1 — Transient current cycling**  
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**5.3.3 Requirement**

The requirements given in ISO 8820-1 shall apply. [ISO 8820-5:2015](https://standards.iteh.ai/catalog/standards/sist/f30ef7d2-b256-4fe8-a505-b0fcdc27d68c/iso-8820-5-2015)

<https://standards.iteh.ai/catalog/standards/sist/f30ef7d2-b256-4fe8-a505-b0fcdc27d68c/iso-8820-5-2015>

**5.4 Environmental conditions**

The tests and requirements given in ISO 8820-1 shall apply

**5.5 Operating time rating**

**5.5.1 Purpose**

This test evaluates the ability of the fuse-links to function when subjected to electrical overloads.

**5.5.2 Test**

The test given in ISO 8820-1 shall apply.

**5.5.3 Requirements**

The requirements given in [Table 5](#) shall apply.

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 currents	Operating times s							
	SF 30				SF 51			
	30 A ... 125 A		150 A ... 200 A		80 A ... 250 A		300 A ... 500 A	
	min	max	min	max	min	max	min	max
0,75 $I_R$	— <sup>b</sup>	—	360 000	$\infty$	—	—	14 400	$\infty$
$I_R$	360 000	$\infty$	—	—	14 400	$\infty$	—	—
1,1 $I_R$	14 400	$\infty$	—	—	—	—	—	—
1,35 $I_R$	—	—	—	—	120	1 800	—	—
1,5 $I_R$	90	3 600	—	—	—	—	—	—
2,0 $I_R$	3	100	1	15	1	15	1	15
3,0 $I_R$	0,3	3	—	—	—	—	—	—
3,5 $I_R$	—	—	0,3	5	0,3	5	0,5	5
5,0 $I_R$	0,1	1	—	—	—	—	—	—
6,0 $I_R^a$	—	—	0,1	1	0,1	1	0,1	1

<sup>a</sup> Not for  $\geq 350$  A.  
<sup>b</sup> Not specified.

## 5.6 Current steps

### 5.6.1 Purpose

This test evaluates the ability of the fuse-link components to withstand the prolonged heating due to low level overloads.

### 5.6.2 Test

The test given in ISO 8820-1 shall apply.

NOTE This test does not apply for fuse types SF 30 – 150 A to 200 A ... SF 51 – 300 A ... 500 A.

### 5.6.3 Requirements

The requirement given in ISO 8820-1 shall apply. 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 Purpose

This test evaluates the ability of the fuse-links to withstand the rated breaking current.

### 5.7.2 Test

The test given in ISO 8820-1 shall apply.

Test at 2 000 A with cable sizes as shown in [Table 3](#).