INTERNATIONAL STANDARD

ISO 8820-2

Second edition
2005-04-15

Road vehicles — Fuse-links —

Part 2:
User's guide

Véhicules routiers — Liaisons fusibles —

Partie 2: Guide de l'utilisateur

Reference number
ISO 8820-2:2005(E)

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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 8820-2 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 3, *Electrical and electronic equipment*.

This second edition cancels and replaces the first edition (ISO 8820-2:1994). The fuse-links of ISO 8820-2:1994 have been combined with ISO 8820-3:2002. (The optional fuse-links of the former Annex A have been suppressed.)

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)*

— *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 fixtures*

The following parts are under preparation:

— *Part 6: Single-bolt fuse-links*

— *Part 7: Fuse-links with rated voltage of 450 V (type BZ)*

Road vehicles — Fuse-links —

Part 2:
User's guide

1 Scope

This part of ISO 8820 gives guidance for the choice and application of automotive fuse-links (see Annex A). It describes the various parameters which have to be taken into account when selecting fuse-links.

It is intended to be used in conjunction with the other parts 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.

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 Rated voltage and system voltage

The fuse rated voltage shall always be higher than the nominal voltage of the electrical system of the vehicle, to allow for possible overvoltage conditions.

5 Rated current and continuous current

The rated current (I_N) is the current used for identifying the fuse-link.

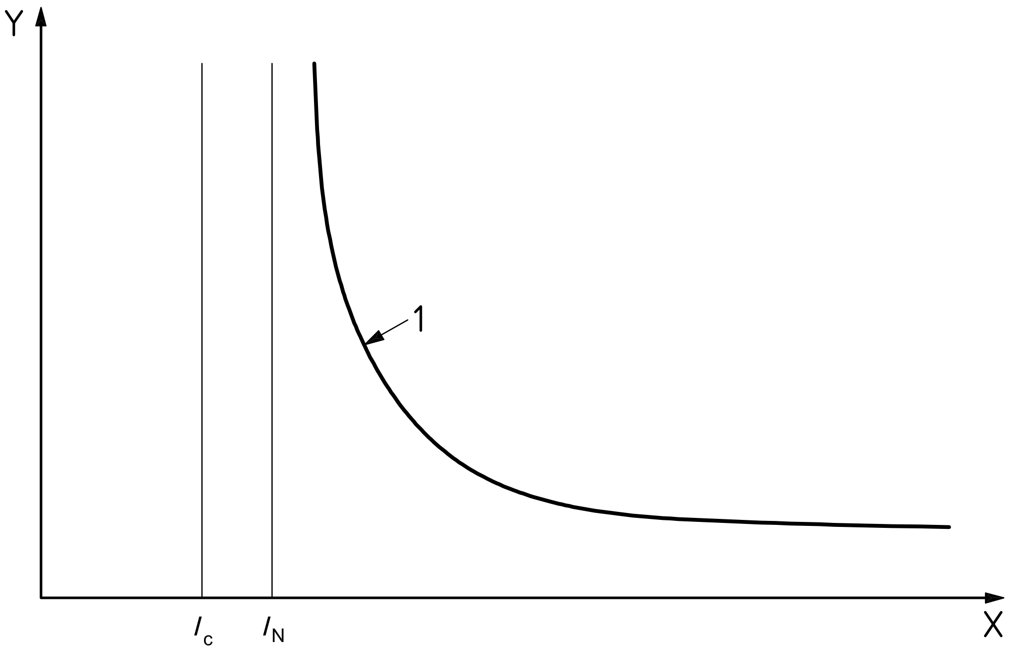
The continuous current (I_c) in Figure 1 is the maximum current flowing continuously through the circuit (fuse-link, contacts, holder and cables) at a maximum ambient temperature. The continuous current is lower than the rated current.

6 Cold resistance

The cold resistance is the resistance of a fuse-link without self heating at a defined ambient temperature. It can be calculated by the voltage drop across the contacts of a fuse-link at a certain test current.

The spread of fuse-link cold resistance due to volume production results in a spread in power dissipation and a spread in time-current characteristic (see Figure 2).

Figures 2 and 3 show the variation of melting-time and voltage drop versus cold resistance for a given test current.



Key

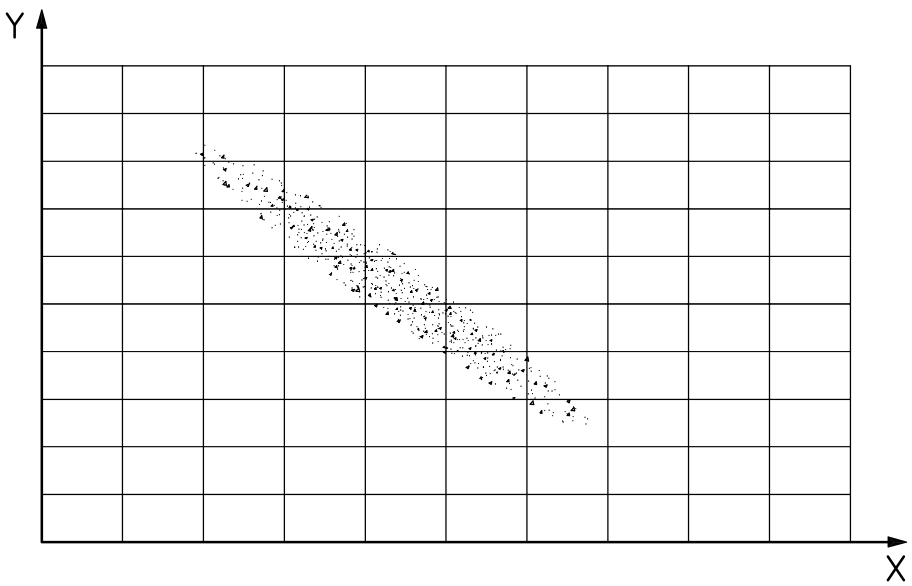
Y operating time, t

X current, I

1 time-current characteristic

Figure 1 — Rated current, continuous current and time-current characteristic

The rise of the temperature in the circuit depends on current and time.

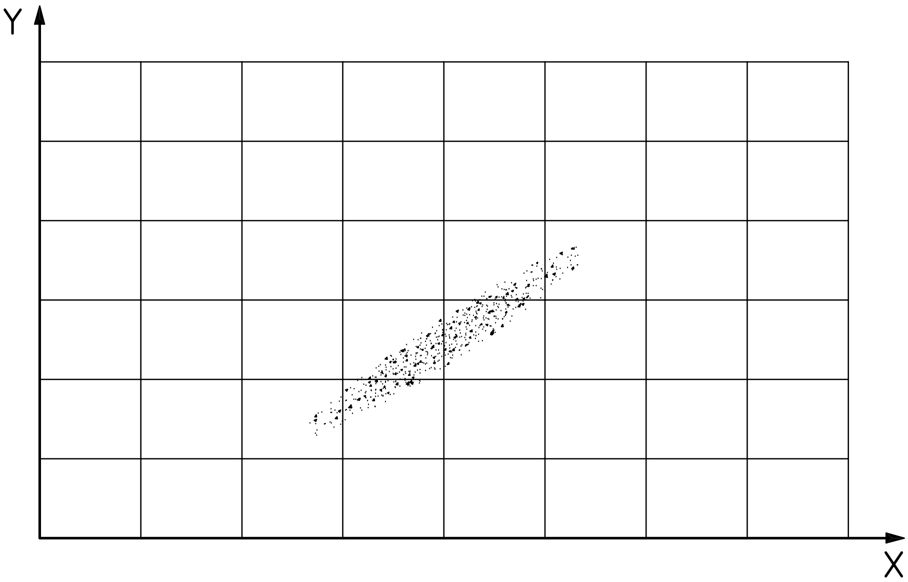


Key

Y melting time

X cold resistance

Figure 2 — Cold resistance versus melting time



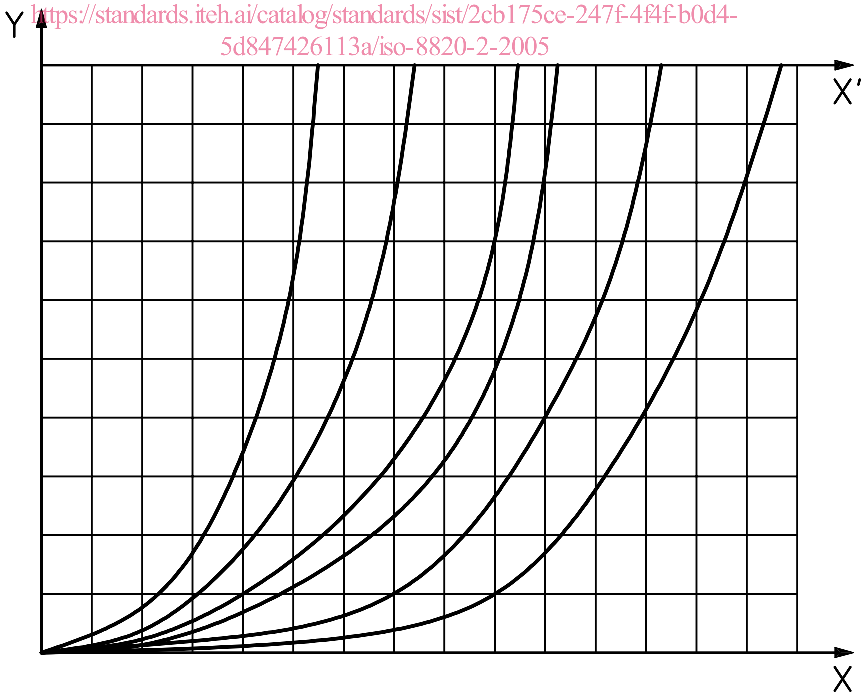
Key

Y voltage drop
X cold resistance

Figure 3 — Cold resistance versus voltage drop

7 Current and conductors

The temperature rise of a cable is a function of current, conductor cross section and time duration. Figure 4 shows stabilized temperature rise for various conductor cross sections.



Key

Y conductor temperature
X current, I
X′ conductor cross section

Figure 4 — Conductor temperatures for different conductor cross sections versus current

8 Current and contact resistance

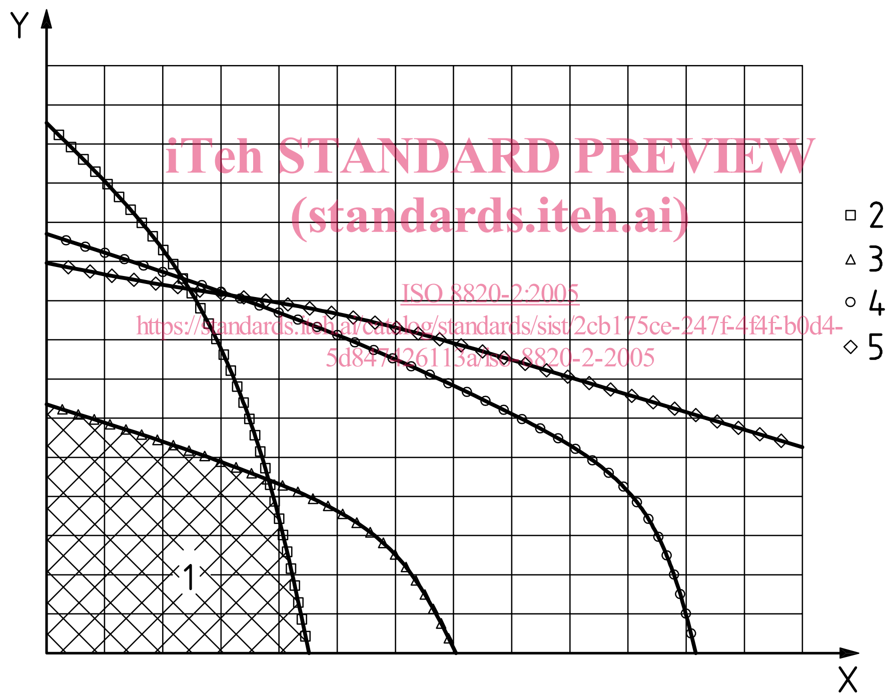
A higher resistance of mated contacts will result in a temperature rise and reduced thermal conduction away from the fuse-link. Hence, the temperature of the fuse-link terminal will be higher and the continuous current for the application lower.

A temperature rise test may be conducted using fuse-links, fuse holders and connections as specified by the vehicle manufacturer. At a specified test current, the temperature of the connections shall be measured at the point where the fuse-link terminals protrude from the base of the fuse-link body. After thermal equilibrium has been achieved, the temperature rise of the connection shall not exceed the limits as specified for connection and cable.

9 Current and ambient temperature

All components of a circuit and their parts have their own characteristic curve, as shown in Figure 5.

Each component in a circuit has an upper temperature limit. An increase of temperature beyond this limit can result in increased resistance, which by itself increases the temperature. As a result, the fuse-link may open.



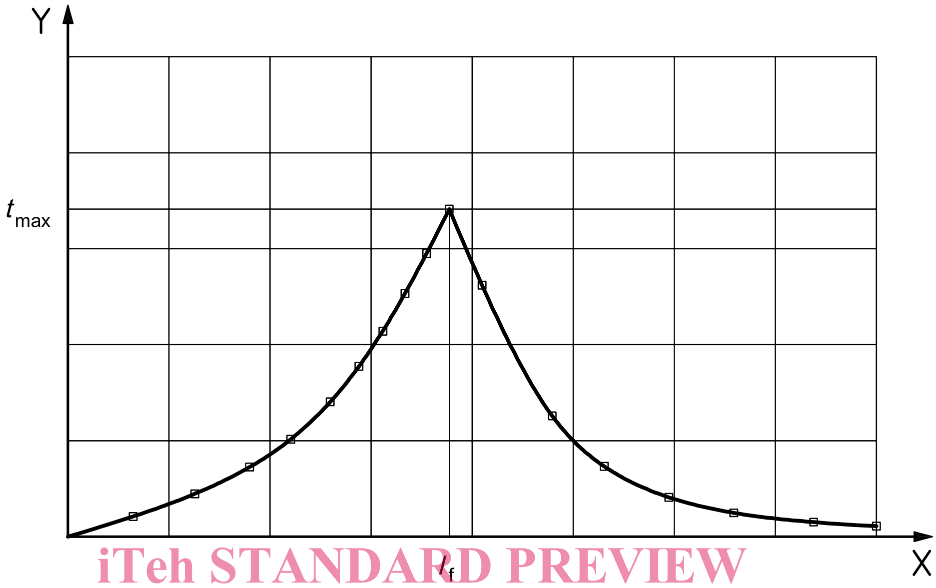
Key

Y current
X ambient temperature
1 application area
2 cable
3 connection
4 insulator
5 fuse element

Figure 5 — Maximum continuous currents of circuit components versus ambient temperature

10 Cable protection versus time-current characteristics

To ensure satisfactory cable protection, fuse-links shall be chosen such that they will always open before the maximum allowed cable temperature t_{max} is exceeded. Figure 6 shows the correct fuse-link selection. The maximum allowed temperature is never exceeded, because above a certain minimal fusing current I_f, the fuse-link will open the circuit before the maximum permitted temperature of the cable is exceeded.



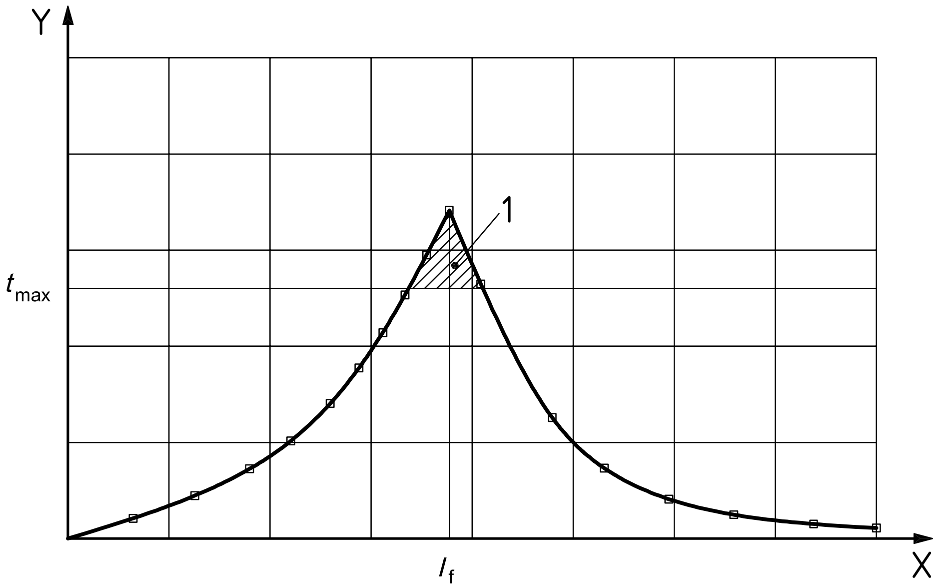
Key

Y cable temperature, T

X current, I

Figure 6 — Correct fuse selection

Figure 7 shows incorrect fuse selection. The fuse-link allows some potentially damaging current I_f to flow for too long, causing the cable to overheat.



Key

Y cable temperature, T

X current, I

1 unprotected region

Figure 7 — Incorrect fuse selection

