INTERNATIONAL STANDARD

ISO 8820-1

Second edition
2002-06-15

Road vehicles — Fuse-links —

Part 1: Definitions and general test requirements

Véhicules routiers — Liaisons fusibles —

Partie 1: Définitions et exigences générales d'essai

Reference number
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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 3.

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 part of ISO 8820 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 8820-1 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 8820-1:1994), 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 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*

The following parts are under preparation:

— *Part 2: User's guide*

— *Part 5: Strip fuse-links (type SF 30 and SF 51) and test fixtures*

Road vehicles — Fuse-links —

Part 1:
Definitions and general test requirements

1 Scope

This part of ISO 8820 defines terms and specifies general test requirements for low-voltage fuse-links with a rated voltage of 32 V and a breaking capacity of 1 000 A intended for use in road vehicles at a nominal voltage of 12 V or 24 V. It establishes, for each fuse-link type, the characteristics, construction, operating conditions, marking and test conditions, so that an initial investigation of the fuse-link can be performed.

This part of ISO 8820 is intended to be used in conjunction with the other parts of ISO 8820, to which its requirements are applicable except where modified by the particular requirements of another part.

It is not applicable to the fuse holders used in the vehicles.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 8820. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 8820 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 1817, *Rubber, vulcanized — Determination of the effect of liquids*

ISO 6722-3, *Road vehicles — Unscreened low-tension cables — Part 3: Conductor sizes and dimensions for thick-wall insulated cables*

ISO 6722-4, *Road vehicles — Unscreened low-tension cables — Part 4: Conductor sizes and dimensions for thin-wall insulated cables*

IEC 60809, *Filament lamps for road vehicles — Dimensional, electrical and luminous requirements*

3 Terms and definitions

For the purposes of this part of ISO 8820, the following terms and definitions apply.

3.1
fuse
protective device that interrupts the circuit involved when the current flow reaches a specified value for a specific time

NOTE The fuse is an assembly of all parts forming the protective device. This includes the fuse holder and the fuse-link.

3.1.1
fuse holder
device connecting the fuse-link to the vehicle wiring harness

3.1.2
fuse-link
interchangeable part of the fuse, consisting of an insulator and electrical conducting parts such as the terminals and the fuse element

3.1.2.1
insulator
electrical non-conductive mechanical support for the electrical conductive parts of the fuse-link

3.1.2.2
terminal
part of the fuse-link that makes the mechanical and electrical conductive connection of the fuse-link to the fuse holder

3.1.2.3
fuse-element
active part of the fuse-link, which interrupts the current and opens the circuit permanently in the case of an over current.

3.2
rated current
I_N
current used for identifying the fuse-link, according to specified tests

NOTE The continuous current is lower than the rated current.

3.3
rated voltage
U_N
maximum voltage for which the fuse-link is designed

3.4
voltage drop
U_D
voltage across the fuse-link, measured at rated current after a specified duration and under specified conditions

3.5
breaking capacity
I_B
value of prospective breaking current a fuse-link is capable of breaking at a stated voltage and under prescribed conditions of use and behaviour

3.6
time constant
time required for a physical quantity to rise from 0 to 1 – 1/e (i.e. 63,2 %) of its final steady value when it varies with time, t, as $1 - e^{-kt}$

3.7
time/current characteristics
relation of operating time and current

3.8
risetime
time for the output quantity to rise from 10 % to 90 % of its amplitude

4 Rated current and identification

4.1 The rated current shall be permanently marked on the top face of the fuse-link body as the principal means of identification. Secondary identification of the current rating shall be by colour coding, in accordance with the applicable part of ISO 8820.

4.2 The manufacturer's name, mark or symbol shall be marked on the fuse-link body.

4.3 The maximum operating voltage shall be shown on the fuse-link body.

5 Test procedures

5.1 General

All fuse-links shall comply with the performance requirements of clause 6 when tested in accordance with the following procedures.

Except as applicable to the vibration and accelerated ageing tests, the fuse-links shall be mounted in the horizontal plane.

Carry out all electrical tests using direct current maintained within a tolerance of ± 1 %, at an ambient temperature of (23 ± 5) °C, unless otherwise stated.

Mount the fuse-links in a standard test fixture as specified in the applicable part of ISO 8820, or in an alternative fixture with equivalent electrical, mechanical and thermal properties. Connections, except as applicable to 5.3 and 5.8, shall be made to the fuse-links using not less than 600 mm of copper cable of 4 mm^2 cross-sectional area conforming to ISO 6722-3 or ISO 6722-4. When two or more fuse-links are tested in series, they shall be mounted not less than 150 mm apart.

Make the voltage checks using either a fuse-link or a solid copper-alloy dummy of the dimensions specified in the applicable part of ISO 8820.

Carry out the vibration and environmental exposure tests without current passing through the fuse-links.

When removing the fuse-links, the pulling force shall be applied to the insulator 2 min after current interruption.

5.2 Voltage drop

Measure the voltage drop, expressed in millivolts, at measuring points a and b across the fuse-link terminals, as specified in the applicable part of ISO 8820, after 15 min of applied rated current.

5.3 Transient current cycling

Apply a resistive load in order to adjust the initial peak transient current to the percentage of fuse-link rating and the initial steady-state current, as given in the applicable part of ISO 8820.

If this is achieved through the use of lamp bulbs as the load, the bulbs shall conform to IEC 60809 or equivalent.

5.4 Vibration

Subject suitably mounted samples to a simple harmonic motion having an amplitude of 0,75 mm travel (1,5 mm peak-to-peak). Vary the frequency uniformly between the limits of 10 Hz and 55 Hz. The entire range increasing from 10 Hz to 55 Hz and returning to 10 Hz shall be traversed in approximately 1 min. Apply the motion for 2 h in each of the three mutually perpendicular directions, two of which shall be horizontal.

Additional, alternative test procedures may be agreed between the fuse-link and vehicle manufacturers.

5.5 Environmental exposure

5.5.1 Accelerated ageing

Subject the fuse-links to a temperature/humidity cycling test as shown in Figure 1.

The test sequence shall be as follows.

a) Hold the samples at room (chamber) temperature, t_c, (23 ± 5) °C for 4 h at 45 % to 75 % relative humidity (RH).

b) Raise t_c to (55 ± 2) °C at 95 % to 99 % RH within 0,5 h.

c) Hold t_c at (55 ± 2) °C at 95 % to 99 % RH for 10 h.

d) Lower t_c to (–40 ± 2) °C within 2,5 h.

e) Hold t_c at (–40 ± 2) °C for 2 h.

f) Raise t_c to (120 ± 2) °C within 1,5 h from (–40 ± 2) °C.

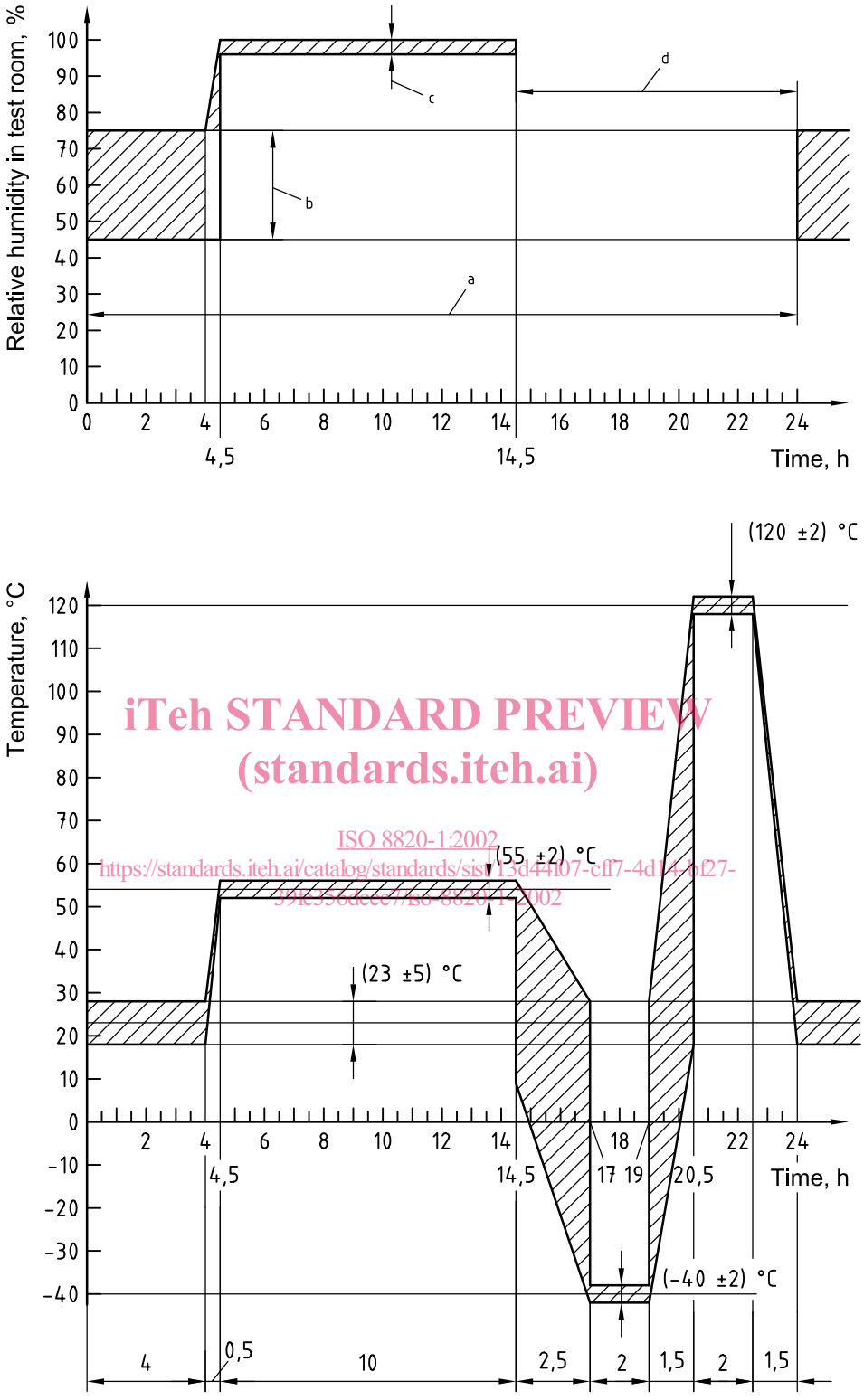
g) Hold t_c at (120 ± 2) °C for 2 h.

h) Allow a return to room temperature (23 ± 5) °C within 1,5 h.

NOTE 1 One cycle consists of 24 h (complete hours).

NOTE 2 For periods d), e), f), g) and h), the humidity is uncontrolled.

At weekends, samples should remain in the humidity cabinet at room temperature.



NOTE Hatched areas indicate allowed temperature/humidity tolerance.

[a] One cycle

[b] (45 to 75) %

[c] (95 to 99) %

[d] Uncontrolled humidity

Figure 1 — Temperature/humidity cycling