SLOVENSKI STANDARD
SIST EN 60282-1:2001/A2:2001

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High-voltage fuses - Part 1: Current-limiting fuses

High-voltage fuses -- Part 1: Current-limiting fuses

Hochspannungssicherungen -- Teil 1: Strombegrenzende Sicherungen

Fusibles à haute tension -- Partie 1: Fusibles limiteurs de courant

Ta slovenski standard je istoveten z: **EN 60282-1:1996/A2:1997**

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English version

High-voltage fuses
Part 1: Current-limiting fuses
(IEC 60282-1:1994/A2:1997)

Fusibles à haute tension
Partie 1: Fusibles limiteurs de courant
(CEI 60282-1:1994/A2:1997)

Hochspannungssicherungen
Teil 1: Strombegrenzende Sicherungen
(IEC 60282-1:1994/A2:1997)

This amendment A2 modifies the European Standard EN 60282-1:1996; it was approved by CENELEC on 1997-10-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This amendment exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of document 32A/188/FDIS, future amendment 2 to IEC 60282-1:1994, prepared by SC 32A, High-voltage fuses, of IEC TC 32, Fuses, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as amendment A2 to EN 60282-1:1996 on 1997-10-01.

The following dates were fixed:

- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1998-07-01
- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 1998-07-01

Endorsement notice

The text of amendment 2:1997 to the International Standard IEC 60282-1:1994 was approved by CENELEC as an amendment to the European Standard without any modification.

NORME INTERNATIONALE

INTERNATIONAL STANDARD

CEI
IEC
60282-1

1994

AMENDEMENT 2
AMENDMENT 2

1997-09

Amendement 2

Fusibles à haute tension –

Partie 1:
Fusibles limiteurs de courant

Amendment 2

High-voltage fuses –

Part 1:
Current-limiting fuses

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FOREWORD

This amendment has been prepared by subcommittee 32A: High-voltage fuses, of IEC technical committee 32: Fuses.

The text of this amendment is based on the following documents:

FDIS	Report on voting
32A/188/FDIS	32A/191/RVD

Full information on the voting for the approval of this amendment can be found in the report on voting indicated in the above table.

Page 47

13.1.1 Description of tests to be made

Replace the existing text of the fourth paragraph by the following new text:

Test duty 3: Verification of operation at current I_3 (see note 1):

- for back-up fuses, I_3 is the rated minimum breaking current;
- for general purpose fuses, I_3 is the current that causes melting in one hour or more;
- for full-range fuses, I_3 is equal to the rated current of the fuse-link, except where the fuse-link is designed for use in a surrounding temperature above 40 °C, in which case tests shall be performed in accordance with 13.1.5 (see note 6).

Add, on page 49, at the end of 13.1.1 the following note 6:

NOTE 6 – Some types of full-range fuses are designed specifically for use in conditions of high surrounding temperature, above the limits for normal service conditions, see 2.1 a), for example inside a transformer tank. Such conditions may result in the fuse elements melting at a lower current than the fuse-link rated current. Special tests to take account of this onerous application are detailed in 13.1.5.

Page 55

Add, after subclause 13.1.4.2, the following new subclauses:

13.1.5 Description of test duty 3 for full-range fuses designed for use in high surrounding temperatures

When a full-range fuse is designed for use in a surrounding temperature higher than 40 °C, test duty 3 shall be performed according to the following procedure.

The test current I_3, in this case, is a current below the minimum continuous current that causes melting of the fuse-element(s) when the fuse is applied at the maximum surrounding temperature specified by the manufacturer. See 13.1.5.1 for the method of determining this minimum test current.

13.1.5.1 Method of determining the minimum test current I_3 of a full-range fuse

This procedure may be performed by the fuse manufacturer.

Three fuse samples of any given rated current shall be tested as described in a) below:

a) Each sample is to be placed in a static thermal environment, maintained at the maximum surrounding temperature at which the manufacturer rates the fuse for use (maximum application temperature).

   Once the fuse-link body has stabilized at the precribed temperature, current is applied until the fuse body temperature has again stabilized. Circulating air ovens may be used if the fuse is to be heated but the air should be static, except for natural convection, while the current is being applied to the sample. Temperature stability is defined as being stable when three successive temperature-rise readings, taken at half hour intervals, are within 2 %. The temperature rise in this context is the one of the fuse-link body compared to its surrounding medium. At the end of this period, the current is increased. This process is repeated until the fuse elements melt.

b) For each sample tested per item a) above, the highest current that did not cause the fuse to melt is considered. The minimum test current I_3 is 90 % of the lowest of these three values.

NOTE – No specific range of increase is specified in a) above. A typical range is 5 % to 10 %. It should be recognized that larger increases will reduce the number of steps but may make testing more onerous. Smaller steps may result in a slightly higher minimum test current but may increase the time required to find the minimum test current. The 90 % level is chosen to allow for manufacturing tolerances.

13.1.5.2 Method of testing the interrupting capability at the minimum test current of the fuse

The test method shall be as follows:

a) The fuse should be physically mounted in the orientation that duplicates an actual orientation in use and results in the most onerous duty.

b) The fuse to be tested is to be immersed in a static thermal environment that is at the highest temperature at which the fuse manufacturer rates the fuse. Circulating air ovens may be used while the fuse is being heated, but the air should be static, except for natural convection, while the current is being applied to the sample.

c) The fuse is to be tested at the minimum test current. The test may be done:

   1) in a circuit with full voltage and current applied for the full duration of the test;

   or

   2) in a low-voltage circuit, set to a current slightly higher than the minimum test current, then switched over to a high-voltage circuit, set to the minimum test current, as the fuse-elements melt.

The melting current shall be set at a level to cause melting in at least one hour. The requirements detailed in 13.2.2.1.a1) and a2) shall be followed if switchover test method c)2) is used.

Temperatures higher than the maximum application temperature may be used by agreement with the manufacturer, to accelerate melting. Use of test method c)1) above would require this procedure. In all cases the melting time shall be at least one hour.

Page 57

Modifiy the first sentence of item a1) of 13.2.2.1 as follows:

The following test method may be used for back-up fuses and general purpose fuses.

Page 59

Modify the first paragraph of item a2) of 13.2.2.1 and the following note to read:

The following method is applicable for full-range fuses.

Subject to the agreement of the manufacturer, this method may also be used for back-up and general purpose fuses. In this method, because all the parallel main elements have melted before the switchover to the high voltage source, it may be more severe than the direct test or method a1) but it is particularly useful for test current I_3 associated with long pre-arcing times.

NOTE – Since method a1) is closer to service conditions, in the case of failure with back-up and general-purpose fuses with test method a2), it is permissible to repeat test duty 3 using test method a1) where practicable.

Add to item 2) of 13.2.2.1.a2) after "at least one hour" the following sentence:

For back-up fuses, however, the low voltage pre-heating current shall be equal to the minimum breaking current.

Add, at the end of item 2 of 13.2.2.1.a2) the following new paragraph:

For full-range fuses tested in accordance with 13.1.5, the high-voltage circuit shall be pre-adjusted to provide the test current specified in 13.1.5.1. The circuit parameters in table 4 shall apply.

At the beginning of item 4 of 13.2.2.1.a2), insert the following words to read:

For general purpose fuses and full-range fuses, the value of the high-voltage current...

Notes 1 and 2 of item 4 of 13.2.2.1.a2) shall be replaced by the following:

NOTE 1 – If the claimed value of I_3 is required to be lower than 70 % of the current corresponding to the one hour pre-arcing time, (which will normally be the case when testing full-range fuses), then lower values of preheating current and longer pre-arcing times will be necessary. However, in order to avoid unnecessary long testing times, the fuse-link under test may be installed in an enclosure with restricted cooling to reduce the pre-arcing time; but this reduced time shall be not less than one hour.

NOTE 2 – With some fuse-links even the use of such a heat restricting enclosure may not be sufficient to ensure melting of the fuse-element(s) under the conditions of note 1 above. In such cases, and with the agreement of the manufacturer, it is permissible to test the fuse-links in accordance with 13.1.5.

Page 61

13.2.4 Parameters to be used for tests

Delete, on page 63, note 5 to table 4.

Page 81

18 List of ratings and characteristics

Add to d) the following new item:

7 Maximum application temperature of full-range fuses.

Page 93

18.9 Time-current characteristics

Add at the end of 18.9 the following new paragraph:

For the purpose of co-ordination between fuses or between fuses and other protective devices, the relevant time-current characteristics may be employed for time periods down to 0,1 s.

Where higher fault levels result in fuse operation in times less than 0,1 s, the relevant pre-arcing I^2t and operating I^2t data (see notes 1 and 2 of 3.11) may be used.

Page 99

Add, after table 12, the following new subclause:

18.14 Maximum application temperature of full-range fuses

For full-range fuses, the manufacturer shall provide data in respect of the maximum temperature for which the fuse is designed. This is the maximum temperature of the surrounding medium in contact with the fuse-link at which the fuse is suitable for use.

Page 111

Add, after subclause 22.6, the following new subclause:

22.7 Time-current characteristics of high-voltage fuses

As stated in 22.2, the rated current of a high-voltage fuse, although important, is only one of a number of factors to be considered when choosing a fuse for a given application.

A factor of particular relevance when selecting such a fuse is the time-current characteristic. This characteristic is of importance in relation to:

a) fuse withstand against transient surge currents, for example, transformer magnetising inrush current, motor starting current;