



**SLOVENSKI STANDARD**  
**SIST HD 384.4.43 S2:2003**

**01-junij-2003**

---

9`Y\_f] bY]býHJUMY'n[ fUXV'È( "XY.'NUý ]Hb]i\_fYd]È(' "dc[ `Uj ^.'NUý ]HJdfYX  
bUXlc\_]f197 \* \$' \* (!(!(' .% ++ Ž'5%% - +žgdfYa Yb^bŁ

Electrical installations of buildings -- Part 4: Protection for safety -- Chapter 43:  
Protection against overcurrent

Elektrische Anlagen von Gebuden -- Teil 4: Schutzmaßnahmen -- Kapitel 43: Schutz  
gegen berstrom

Installations lectriques des btiments -- Partie 4: Protection pour assurer la scurit --  
Chpitre 43: Protection contre les surintensits

**Ta slovenski standard je istoveten z: HD 384.4.43 S2:2001**

**ICS:**

29.120.50	Xæ[ çæ\ ^/æ /æi\ ~ * æ { ^âq \ [ ç} æÁ æz ææ	Fuses and other overcurrent protection devices
91.140.50	Sistemi za oskrbo z elektriko	Electricity supply systems

**SIST HD 384.4.43 S2:2003 en**

# **iTeh STANDARD PREVIEW** **(standards.iteh.ai)**

SIST HD 384.4.43 S2:2003

<https://standards.iteh.ai/catalog/standards/sist/0e4b1b53-d07b-4307-8301-30847e80b428/sist-hd-384-4-43-s2-2003>

English version

**Electrical installations of buildings**  
**Part 4: Protection for safety**  
**Chapter 43: Protection against overcurrent**  
(IEC 60364-4-43:1977 + A1:1997, modified)

Installations électriques des bâtiments  
Partie 4: Protection pour assurer  
la sécurité  
Chapitre 43: Protection contre  
les surintensités  
(CEI 60364-4-43:1977 + A1:1997,  
modifiée)

Elektrische Anlagen von Gebäuden  
Teil 4: Schutzmaßnahmen  
Kapitel 43: Schutz gegen Überstrom  
(IEC 60364-4-43:1977 + A1:1997,  
modifiziert)

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST HD 384.4.43 S2:2003](https://standards.iteh.ai/catalog/standards/sist/0e4b1b53-d07b-4307-8301-30847e80b428/sist-hd-384-4-43-s2-2003)

<https://standards.iteh.ai/catalog/standards/sist/0e4b1b53-d07b-4307-8301-30847e80b428/sist-hd-384-4-43-s2-2003>

This Harmonization Document was approved by CENELEC on 1999-08-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for implementation of this Harmonization Document on a national level.

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

This Harmonization Document exists in three official versions (English, French, German).

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

# CENELEC

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

**Central Secretariat: rue de Stassart 35, B - 1050 Brussels**

**Foreword**

The texts of the International Standard IEC 60364-4-43:1977 + amendment 1:1997, prepared by IEC TC 64, Electrical installations and protection against electric shock, together with the common modifications prepared by SC 64B, Protection against thermal effects, of Technical Committee CENELEC TC 64, Electrical installations of buildings, were submitted to the formal vote and were approved by CENELEC as HD 384.4.43 S2 on 1999-08-01.

The following dates were fixed:

- latest date by which the existence of the HD has to be announced at national level (doa) 2000-02-01
- latest date by which the HD has to be implemented at national level by publication of a harmonized national standard or by endorsement (dop) 2002-06-01
- latest date by which the national standards conflicting with the HD have to be withdrawn (dow) 2002-08-01

In this Harmonization Document, the common modifications to the International Standard are indicated by a vertical line in the left margin of the text.

(X) CENELEC common modifications to the International Standard IEC 60364-4-43:1977, for which justifications are given in annex I, are marked with a vertical line and the number of the respective justification is indicated in the lefthand margin of the text.

IEC alterations to IEC 60364-4-43:1977 due to amendment 1:1997 are marked with a wavy line in the lefthand margin of the text.

**iTeh STANDARD PREVIEW**

Annexes designated "normative" are part of the body of the standard.  
Annexes designated "informative" are given for information only.

In this Harmonization Document, annex ZA is normative and annexes I to IV and ZB are informative.

SIST HD 384.4.43 S2:2003

<https://standards.iteh.ai/catalog/standards/sist/0e4b1b53-d07b-4307-8301-30847e80b428/sist-hd-384-4-43-s2-2003>

## Contents

	<i>page</i>
<b>Preface</b> .....	<b>4</b>
<b>43 Protection against overcurrent</b> .....	<b>5</b>
431 General.....	5
432 Nature of protective devices.....	5
433 Protection against overload current.....	6
434 Protection against short-circuit current.....	6
435 Co-ordination of overload and short-circuit protection.....	8
436 Limitation of overcurrent by characteristics of supply.....	8
<b>Annex I (informative) Justification for CENELEC modifications</b> .....	<b>9</b>
<b>Annex II (informative) Explanatory notes</b> .....	<b>10</b>
<b>Annex III (informative) Definitions</b> .....	<b>12</b>
<b>Annex IV (informative) Chapter 53: Selection and erection of switchgear and controlgear</b> .....	<b>13</b>
531 Common requirements.....	13
533 Devices for protection against overcurrent.....	13
533.1 General requirements.....	13
533.2 Selection of devices for protection against overloads .....	13
533.3 Selection of devices for protection against short-circuits.....	13
<b>Annex ZA (normative) Normative references to international publications with their corresponding European publications</b> .....	<b>16</b>
<b>Annex ZB (informative) A–deviations</b> .....	<b>17</b>

ITC STANDARD PREVIEW  
(standards.iteh.ai)

<https://standards.iteh.ai/catalog/standards/sist/0e4b1b53-d07b-4307-8301-3664c609426/sist-hd-384-43-2001>

## Preface

### 1 Reference document

The reference document for this Harmonization Document is the International Standard IEC 60364-4-43:1977 and its amendment 1:1997 prepared by IEC TC 64: Electrical installations of buildings.

IEC 60364: Electrical installations of buildings, is a composite publication of a number of Parts, each dealing with a particular aspect of electrical installation. Part 4 is concerned with protection for safety and within that Part, chapter 43 specifies measures for protection against overcurrents. Other parts of the publication will deal with the selection, application and co-ordination of measures for protection against overcurrent, for the selection and erection of the appropriate electrical equipment and for the verification of installations.

### 2 Scope

The scope of this Harmonization Document is CENELEC Harmonization Document HD 384.1.

### 3 CENELEC common modifications

CENELEC common modifications of the Reference Document are numbered and indicated by marginal side-lining. Justification for the common modifications are stated in annex I.

### 4 Explanations of certain requirements

Some explanations considered to be useful for interpretation of some requirements of the Reference Document text are given in annex II.

### 5 Definitions

Pending the production of an IEC Publication suitable for treatment as a Reference Document, specifications used for the development of this Harmonization Document are provided for guidance only in annex III.

### 6 Annex IV: Chapter 53, Switchgear (Protection, isolation and switching)

Sections 531 (Common requirements) and 533 (Devices for protection against overcurrent)

The rules relating to the selection and erection of switchgear are currently being considered by IEC/TC 64. In the meantime, it has seemed necessary to give the conditions for the selection and erection of protective devices complying with the rules of chapter 43, based on draft IEC 64(Secretariat)2.

Countries are free to decide whether or not to take account of the indications thus given for the selection and erection of protective devices.

Chapter 53 will later form the subject of a Harmonization Document.

### 43 Protection against overcurrent

#### 431 General

**431.1** Live conductors shall be protected by one or more devices for automatic interruption of the supply in the event of overload (see section 433) and short-circuit (section 434) except where the overcurrent is limited in accordance with section 436. Further, protection against overload and against short-circuit shall be coordinated in accordance with section 435.

NOTE 1 Live conductors protected against overload in accordance with section 433 are considered to be protected also against faults likely to cause overcurrent of a magnitude similar to overload currents.

NOTE 2 For conditions of application, see HD 384.4.473.

(1) NOTE 3 The protection of flexible cables in fixed installations is included in these rules. Flexible cables connecting equipment by plugs and socket-outlet to fixed installations are not necessarily protected against overload; the protection of such cables against short-circuits is under consideration.

#### 432 Nature of protective devices

The protective devices shall be chosen from among those indicated by clauses 432.1 to 432.3.

##### 432.1 Devices ensuring protection against both overload current and short-circuit current

These protective devices shall be capable of breaking any overcurrent up to and including the prospective short-circuit current at the point where the device is installed. They shall satisfy the requirements of section 433 and subclause 434.3.1. Such protective devices may be

- circuit breaker incorporating overload release <sup>\*)</sup>,
- circuit breakers in conjunction with fuses,
- fuses having fuse-links with gG characteristics <sup>\*\*)</sup>.

NOTE 1 The fuse comprises all the parts that form the complete protective device.

NOTE 2 The use of a protective device having a breaking capacity below the value of the protective short-circuit current at its place of installation is subject to the requirement of subclause 434.3.1.

NOTE 3 This subclause does not preclude the use of protective devices having other characteristics providing that the requirements of 433.2 are met.

##### 432.2 Devices ensuring protection against overload current only

These are generally inverse-time-lag protective device whose interrupting capacity may be below the value of the prospective short-circuit current at the point where the device is installed. They shall satisfy the requirement of section 433.

##### 432.3 Devices ensuring protection against short-circuit current only

These devices may be installed where overload protection is achieved by other means or where HD 384.4.473 allows overload protection to be dispensed with. The device shall be capable of breaking short-circuit currents up to and including the prospective short-circuit current. They shall satisfy the requirements of section 434.

Such devices may be

- circuit breakers with short-circuit releases <sup>\*)</sup>,
- fuses <sup>\*\*)</sup>.

##### 432.4 Protection of conductors in parallel

Methods of protecting conductors in parallel against overload current and short-circuit current are given in chapter 47.

##### 432.5 Characteristics of protective devices

(2) The time/current characteristics of overcurrent protective devices shall comply with those specified in Harmonization Document HD ...(documents under consideration, based on IEC 60157-1, 60157-2, 60269-2, 60269-3 and 60292-1).

<sup>\*)</sup> IEC 60898, IEC 60947-2 and IEC 61009.

<sup>\*\*)</sup> IEC 60269-1, IEC 60269-2 and IEC 60269-3.

NOTE The use of other devices is not excluded provided that their time/current characteristics provide an equivalent level of protection to that specified in this clause.

### 433 Protection against overload current

#### 433.1 General

Protective devices shall be provided to break any overload current flowing in the circuit conductors before such a current could cause a temperature rise detrimental to insulation, joints, terminations or surroundings of the conductors.

#### 433.2 Co-ordination between conductors and protective devices

The operating characteristics of a device protecting a cable against overload shall satisfy the following conditions:

$$1) I_b \leq I_n \leq I_z$$

$$2) I_2 \leq 1,45 I_z$$

$I_b$  Design current of the circuit,

$I_z$  Continuous current carrying capacity of the cable (see section 523),

$I_n$  Nominal current of the protective device.

NOTE For adjustable protective devices, the nominal current  $I_n$  is the current setting selected.

$I_2$  Current ensuring effective operation in conventional time of the protective device and generally given in the product standard.

NOTE Protection in accordance with this clause does not ensure complete protection in certain cases, for example against sustained overcurrents less than  $I_2$ , nor will it necessarily result in the most economic solution. Therefore, it is assumed that the circuit is so designed that small overloads of long duration will not frequently occur.

- (3) **433.4 Protection of ring final circuits** [SIST HD 384.4.43 S2:2003](https://standards.iteh.ai/catalog/standards/sist/0e4b1b53-d07b-4307-8301-30847e80b428/sist-hd-384-4-43-s2-2003)  
(under consideration) <https://standards.iteh.ai/catalog/standards/sist/0e4b1b53-d07b-4307-8301-30847e80b428/sist-hd-384-4-43-s2-2003>

### 434 Protection against short-circuit current

- (4) NOTE This document only considers the case of short-circuit anticipated between conductors belonging to the same circuit.

#### 434.1 General

Protective devices shall be provided to break any short-circuit current flowing in the conductors before a current could cause danger due to thermal and mechanical effects produced in conductors and connections.

#### 434.2 Determination of prospective short-circuit current

The prospective short-circuit current at every relevant point of the installation shall be determined. This may be done either by calculation or by measurement.

#### 434.3 Characteristics of short-circuit protective devices

Each short-circuit protective device shall meet the two following conditions:

**434.3.1** The breaking capacity shall be not less than the prospective short-circuit current at the place of installation except where the following paragraph applies.

A lower breaking capacity is permitted if another protective device having the necessary breaking capacity is installed on the supply side. In that case, the characteristics of the devices must be co-ordinated so that the energy let through by these two devices does not exceed that which can be withstood without damage by the device on the load side and the conductors protected by these devices.

NOTE In certain cases, other characteristics may need to be taken into account, such as dynamic stresses and arcing energy, for the device on the load side. Details of the characteristics needing co-ordination should be obtained from the manufacturers of the devices concerned.

**434.3.2** All currents caused by a short-circuit occurring at any point of the circuit shall be interrupted in a time not exceeding that which brings the conductors to the admissible limit temperature.



For short-circuits of duration up to 5 s, the time  $t$  in which a given short-circuit current will raise the conductors from the highest admissible temperature in normal duty to the limit temperature can as an approximation be calculated from the formula:

$$\sqrt{t} = k \cdot \frac{S}{I}$$

where:

$t$  duration in second,

$S$  cross sectional area in  $\text{mm}^2$ ,

$I$  effective short-circuit current in A expressed as r.m.s. value,

$k$  a factor taking account of the resistivity, temperature coefficient and heat capacity of the conductor material, and the appropriate initial and final temperatures. For conductor insulating material in common use, the value of  $k$  for live conductors are shown in table 43A.

**Table 43A – Values of  $k$  live conductors**

	Conductor isolation							
	PVC 70°C ≤ 300 mm <sup>2</sup>	PVC 70°C > 300 mm <sup>2</sup>	PVC 90°C ≤ 300 mm <sup>2</sup>	PVC 90°C > 300 mm <sup>2</sup>	PR/EPR	Rubber 60 °C	Mineral	Mineral
							With PVC	Bare
Initial temperature °C	70	70	90	90	90	60	70	105
Final temperature °C	160	140	160	140	250	200	160	250
Material of conductor								
Copper	115	103	100	86	143	141	115 *)	135
Aluminium	76	68	66	57	94	93	-	-
Tin-soldered joints in copper conductors	115	-	-	-	-	-	-	-

\*) This value shall be used for bare cables exposed to touch.

NOTE 1 For very short duration (< 0,1s) where asymmetry of the current is of importance and for current limiting devices,  $k^2 S^2$  shall be greater than value of the let-through energy ( $I^2 t$ ).

NOTE 2 Other values of  $k$  are under consideration for

- small conductors (particularly for cross-sectional areas less than 10  $\text{mm}^2$ ),
- durations of short-circuit exceeding 5 s,
- other types of joints in conductors,
- bare conductors.

NOTE 3 The nominal current of the short-circuit protective device may be greater than the current carrying capacity of the cable.

NOTE 4 The factors shown in Table 43A are based on IEC 60724.

#### 434.4 Protection of conductors in parallel against short-circuit

A single device may protect several conductors in parallel against short-circuit provided that the operating characteristics of the device and the method of installation of the parallel conductors are suitably co-ordinated; for the selection of the protective device, see chapter 53.

NOTE Account should be taken of the conditions that would occur in the event of a short-circuit which does not affect all of the conductors.

Detailed requirements are under consideration.

(5)