SLOVENSKI STANDARD
SIST HD 60364-5-52:2011/oprA1:2023

01-maj-2023

Nizkonapetostne električne inštalacije - 5-52. del: Izbira in namestitev električne opreme - Inštalacijski sistemi - Dopolnilo A1

Low-voltage electrical installations - Part 5-52: Selection and erection of electrical equipment - Wiring systems

Errichten von Niederspannungsanlagen - Teil 5-52: Auswahl und Errichtung elektrischer Betriebsmittel - Kabel- und Leitungsanlagen

Installations électriques à basse-tension - Partie 5-52: Choix et mise en oeuvre des matériels électriques - Canalisations

Ta slovenski standard je istoveten z: **HD 60364-5-52:2011/prA1:2023**

ICS:

91.140.50 Sistemi za oskrbo z elektriko Electricity supply systems

SIST HD 60364-5-52:2011/oprA1:2023 **en**

64/2588/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER:	
IEC 60364-5-52/AMD1 ED3	
DATE OF CIRCULATION:	CLOSING DATE FOR VOTING:
2023-03-03	**2023-05-26**
SUPERSEDES DOCUMENTS:	
64/2511/CD, 64/2575/CC	

IEC TC 64 : ELECTRICAL INSTALLATIONS AND PROTECTION AGAINST ELECTRIC SHOCK	
SECRETARIAT: Germany	SECRETARY: Mr Wolfgang Niedenzu
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 20,TC 23,SC 23A,SC 23B,SC 23E,SC 23H,SC 23K,TC 32,SC 32A,SC 32B,TC 34,TC 44,TC 82,TC 121,SC 121A,SC 121B	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: ☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☒ SAFETY	
☒ SUBMITTED FOR CENELEC PARALLEL VOTING **Attention IEC-CENELEC parallel voting** The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

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Recipients of this document are invited to submit, with their comments, notification of

- any relevant patent rights of which they are aware and to provide supporting documentation,
- any relevant “in some countries” clauses to be included should this proposal proceed. Recipients are reminded that the enquiry stage is the final stage for submitting "in some countries" clauses. See AC/22/2007.

TITLE:

Amendment 1 - Low-voltage electrical installations - Part 5-52: Selection and erection of electrical equipment - Wiring systems

PROPOSED STABILITY DATE: 2027

NOTE FROM TC/SC OFFICERS:

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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LOW-VOLTAGE ELECTRICAL INSTALLATIONS –

Part 5-52: Selection and erection of electrical equipment - Wiring systems

FOREWORD

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IEC 60364-5-52 has been prepared by subcommittee MT2: Current carrying capacity of conductors and related overcurrent protection, of IEC technical committee TC64: Electrical installations and protection against electrical shock. It is an International Standard.

This 3rd edition and its amendment 1, cancels and replaces the 3rd edition published in [2009-10]. This edition constitutes a technical revision

This edition includes the following significant changes with respect to the previous edition:

a) New clause 524.2, and

b) New Annex 52E,

based in the revision of IEC 60346-4-43:2023.

The text of this International Standard is based on the following documents:

Draft	Report on voting
XX/XX/FDIS	XX/XX/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

LOW-VOLTAGE ELECTRICAL INSTALLATIONS –

Part 5-52: Selection and erection of electrical equipment - Wiring systems

Replace existing complete Clause 524.2 by following:

524.2 Cross-sectional area of the neutral conductor

The cross-sectional area of the neutral conductor, if any, shall be at least equal to the cross - sectional area of the line conductors:

– in single-phase circuits ; or

– in polyphase circuits where the cross-sectional area of the line conductors is less than or equal to 16 mm^2 copper or 25 mm^2 aluminium;

In all other cases, the cross-sectional area of the neutral conductor may be less than that of the line conductors and:

– shall be at least 16 mm² copper or 25 mm² aluminium; and

– shall not be less than 50 % of the cross-sectional area of the line conductors.

Where triplen harmonics are present, see 524.3.

Add the following new Clause:

524.3 Cross-sectional area of live conductors with triplen harmonics

In three-phase circuits where the third harmonic and multiples of third harmonic currents are expected to flow the cross-sectional area of the line conductors and the neutral conductor may be selected in accordance with Annex E.

Where cross-sectional areas are not selected in accordance with Annex E, consideration shall be given to IEC 60364-4-43:202X[1], 431.2.3.

Replace existing Complete IEC 60364-5-52:2009 Annex E by:

[1] Fourth edition under preparation. Stage at time of publication: 64/2545/CDV

Annex E
(normative)

Effect of harmonic currents on balanced three-phase systems

E.1 General

Subclause 523.6.3 states that where the neutral conductor carries current without a corresponding reduction in load of the line conductors, the current flowing in the neutral conductor shall be taken into account in ascertaining the current-carrying capacity of the circuit.

This annex is intended to cover the situation where there currents in the line conductors of a balanced three-phase system have triplen harmonics content which are superimposed in the neutral conductor. The magnitude of the current in the neutral conductor due to triplen harmonics can exceed the magnitude of the power frequency current in the line conductors. In such cases, the current in the neutral conductor will have a significant effect on the current-carrying capacity of the cables in the circuit.

The reduction factors given in this annex apply to balanced three-phase circuits; it is recognized that the situation is more onerous if only two of the three line conductors are loaded. In this situation, the neutral conductor will carry the harmonic currents in addition to the unbalanced current. Such a situation can lead to overloading of the neutral conductor.

Equipment likely to cause significant harmonic currents are, for example, LED lighting banks and DC power supplies such as those found in computers. Further information on harmonic disturbances can be found in the IEC 61000 series.

The tabulated reduction factors only apply to cables where the neutral conductor is of the same material as the line conductor and within a four-core or five-core cable or within a circuit of four adjacent single-core cables or insulated conductors. These reduction factors have been calculated based on triplen harmonic currents. The tabulated reduction factors, when applied to the current-carrying capacity of a cable with three loaded conductors, will give the current-carrying capacity of a cable with four loaded conductors where the current in the fourth conductor is due to harmonics. The reduction factors also take the heating effect of the harmonic current in the line conductors into account.

E.2 Reduction factors

The following symbols are used:

I_L power frequency load current in [A]

I_{lt} total current in line conductor (power frequency + THD_{i3n})

I_z current carrying capacity in [A]

I_{zB} current carrying capacity in [A] according to Annex B

k reduction factor

Pz losses per unit length [W/m], generated in cable with line conductors only

P_{zN} losses per unit length [W/m], generated in cable with line and neutral conductors

144 r_l resistance per unit length [Ω/m], of line conductors

145 r_N resistance per unit length [Ω /m], of the neutral conductor

146 THD_i total harmonic current content [%]

147 THD_{i3n} total 3n harmonic current content [%]

148 In the following it is considered that the total 3n harmonic current content, expressed as
149 THD_{i3n}, is not already included in the load current.

150 Where the 3n harmonic is not known the THD_i shall be used instead of THD_{i3n}.

151 The reduction factors provided in Table E.1 shall be applied.

152 **Table E.1 – Reduction factors**

THD_{i3n} [%]	Reduction factor k for Neutral CSA equal to the Line CSA	Reduction factor k for Neutral CSA half the Line CSA
5	0,99	0,99
10	0,98	0,97
15	0,96	0,93
20	0,93	NA
25	0,89	NA
30	0,86	NA
35	0,82	NA
40	0,78	NA
45	0,74	NA
50	0,71	NA
NA: not applicable, see 523.6.3		

153 NOTE The triplen harmonics current in the neutral conductor is, due to the superimposing, 3 times the triplen
154 harmonics current in the line conductors.

155 The minimum cross-sectional area of the conductors shall be selected to provide a current -
156 carrying capacity not less than the power frequency load current, thus:

$$I_L \leq I_Z = k\, I_{ZB} \quad (1)$$

157 The reduction factors given in Table 52A.1 are based on the following:

158 The current-carrying capacity, I_{zB}, of a three-phase loaded cable is the current that could flow
159 in the live conductors where the heat generated by the losses in the conductors are balanced
160 with the heat dissipation from the cable without causing the temperature of the insulation of the
161 conductors to exceed its maximum allowed temperature under normal operation. The losses of
162 the cable are then:

$$P_z = 3 r_l I_{zB}^2 \quad (2)$$

163 When a harmonic current, given as a THD_{i3n} of the line current is added to the line current, the
164 total line current will be: