SLOVENSKI STANDARD

SIST HD 60364-5-51:2006

september 2006

Električne inštalacije zgradb – 5-51. del: Izbira in namestitev električne opreme – Splošna pravila (IEC 60364-5-51:2001, spremenjen)

Electrical installations of buildings - Part 5-51: Selection and erection of electrical equipment - Common rules (IEC 60364-5-51:2001, modified)

ICS 91.140.50

Referenčna številka
SIST HD 60364-5-51:2006(en)

HARMONIZATION DOCUMENT

DOCUMENT D'HARMONISATION

HARMONISIERUNGSDOKUMENT

HD 60364-5-51

April 2006

ICS 13.260; 91.140.50

Supersedes HD 384.5.51 S2:1996

English version

Electrical installations of buildings
Part 5-51: Selection and erection of electrical equipment - Common rules
(IEC 60364-5-51:2001, modified)

Installations électriques des bâtiments
Partie 5-51: Choix et mise en oeuvre des matériels électriques - Règles communes
(CEI 60364-5-51:2001, modifiée)

Elektrische Anlagen von Gebäuden
Teil 5-51: Auswahl und Errichtung elektrischer Betriebsmittel - Allgemeine Bestimmungen
(IEC 60364-5-51:2001, modifiziert)

This Harmonization Document was approved by CENELEC on 2005-09-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for implementation of this Harmonization Document at national level.

Up-to-date lists and bibliographical references concerning such national implementations 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, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the 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

Ref. No. HD 60364-5-51:2006 E

Foreword

The text of the International Standard IEC 60364-5-51:2001, 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 and protection against electric shock, was submitted to the formal vote and was approved by CENELEC as HD 60364-5-51 on 2005-09-01.

This European Standard supersedes HD 384.5.51 S2:1996.

The following dates were fixed:

–	latest date by which the existence of the HD has to be announced at national level	(doa)	2006-03-01
–	latest date by which the HD has to be implemented at national level by publication of a harmonized national standard or by endorsement	(dop)	2006-11-01
–	latest date by which the national standards conflicting with the HD have to be withdrawn	(dow)	2008-09-01

Annexes ZA, ZB, ZC, ZD and ZE have been added by CENELEC.

Clauses, subclauses, notes, tables and figures which are additional to those in IEC 60364-5-51 are prefixed "Z".

Common modifications are indicated by a vertical line in the left margin of the text.

510 Introduction

510.1 Scope

This part of HD 60364 deals with the selection of equipment and its erection. It provides common rules for compliance with measures of protection for safety, requirements for proper functioning for intended use of the installation, and requirements appropriate to the external influences.

510.2 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.

Publication	Year	Title	EN/HD	Year
IEC 60068-2-11	1981	*Environmental testing - Part 2: Tests - Test Ka: Salt mist*	EN 60068-2-11	1999
IEC 60073	2002	*Basic and safety principles for man-machine interface, marking and identification – Coding principles for indicators and actuators*	EN 60073	2002
IEC 60079	series	*Electrical apparatus for explosive gas atmospheres*	EN 60079	series
IEC 60255-22-1	1988	*Electrical relays – Part 22: Electrical disturbance tests for measuring relays and protection equipment Section 1: 1 MHz burst disturbance tests*	-	-
IEC 60364-3 (mod)	1993	*Electrical installation of buildings Part 3: Assessment of general characteristics*	HD 384.3	1995
IEC 60364-4-41	2001 [1)]	*Part 4-41: Protection for safety – Protection against electric shock*	HD 384.4.41 + A1	1996 2002
IEC 60364-4-42	2001 [2)]	*Part 4-42: Protection for safety - Protection against thermal effects*	HD 384.4.42 + A1	1985 1992
IEC 60364-4-44	2001	*Part 4-44: Protection for safety - Protection against voltages disturbances and electromagnetic disturbances*	-	-
IEC 60364-5-52	2001 [3)]	*Part 5-52: Selection and erection of electrical equipment – Wiring systems*	HD 384.5.52 + A1 + corr. September	1995 1998 1998
IEC 60364-5-54 (mod)	1980	*Part 5-54: Selection and erection of electrical equipment – Earthing arrangements and protective conductors*	HD 384.5.54	1988

1) IEC 60364-4-41:1992 + A2:1999, mod., are harmonized as HD 384.4.41 S2:1996 + A1:2002.

2) IEC 60364-4-42:1980, mod., is harmonized as HD 384.4.42 S1:1985.

3) IEC 60364-5-52:1993, mod., is harmonized as HD 384.5.52 S1:1995.

Publication	Year	Title	EN/HD	Year
IEC 60446 + corr. July	1999 2002	*Basic and safety principles for man-machine interface, marking and identification - Identification of conductors by colours or numerals*	EN 60446	1999
IEC 60447	1993	*Man-machine interface (MMI) – Actuating principles*	EN 60447	1993
IEC 60617	series	*Graphical symbols for diagrams*	EN 60617	series
IEC 60707	1999	*Flammability of solid non-metallic materials when exposed to flame sources List of test methods*	EN 60707	1999
IEC 60721-3-0 + A1	1984 1987	*Classification of environmental conditions Part 3-0: Classification of groups of environmental parameters and their severities – Introduction*	EN 60721-3-0	1993
IEC 60721-3-3 + A1 A2	1994 1995 1996	*Part 3-3: Classification of groups of environmental parameters and their severities – Stationary use at weather-protected locations*	EN 60721-3-3 A2	1995 1997
IEC 60721-3-4 A1	1995 1996	*Part 3-4: Classification of groups of environmental parameters and their severities - Stationary use at non-weather protected locations*	EN 60721-3-4 A1	1995 1997
IEC 61000	series	*Electromagnetic compatibility (EMC)*	EN 61000	series
IEC 61000-2	series	*Electromagnetic compatibility (EMC) – Part 2: Environment -*	EN 61000-2	series
IEC 61000-2-1	1990	*Electromagnetic compatibility (EMC) – Part 2: Environment - Section 1: Description of the environment for low-frequency conducted disturbances and signalling in public power supply systems*	-	-
IEC 61000-2-2	2002	*Electromagnetic compatibility (EMC) – Part 2: Environment - Section 2: Compatibility levels for low-frequency conducted disturbances and signalling in public power supply systems*	EN 61002-2-2	2002
IEC 61000-2-5	1995	*Electromagnetic compatibility (EMC) – Part 2: Environment - Section 5: Classification of electromagnetic environments – Basic EMC publication*	-	-
IEC 61000-4	series	*Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques*	EN 61000-4	Series
IEC 61000-4-2 A1 A2	1995 1998 2000	*Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 2: Electrostatic discharge immunity test*	EN 61000-4-2 A1 A2	1995 1998 2001
IEC 61000-4-3 A1	2002 2002	*Electromagnetic compatibility (EMC) – Section 3: Radiated, radiofrequency, electromagnetic field immunity test*	EN 61000-4-3 A1	2002 2002

Publication	Year	Title	EN/HD	Year
IEC 61000-4-4 A1 A2	1995 2000 2001	*Electromagnetic compatibility (EMC) – Section 4: Electrical fast transient/burst immunity test*	EN 61000-4-4 A1 A2	1995 2001 2001
IEC 61000-4-6 A1	1996 2000	*Electromagnetic compatibility (EMC) – Section 6: Immunity to conducted disturbances, induced by radio-frequency fields*	EN 61000-4-6 A1	1996 2001
IEC 61000-4-8 A1	1993 2000	*Electromagnetic compatibility (EMC) – Section 8: Power frequency magnetic field immunity test*	EN 61000-4-8 A1	1993 2001
IEC 61000-4-12 A1	1995 2000	*Electromagnetic compatibility (EMC) – Section 12: Oscillatory waves immunity test*	EN 61000-4-12 A1	1995 2001
IEC 61024-1	1990	*Protection of structures against lightning Part 1: General principles*	–	–
IEC 61082	series	*Preparation of documents used in electrotechnology*	EN 61082	series
IEC 61140	2001	*Protection against electric shock – Common aspects for installation and equipment*	EN 61140	2002
IEC 61346-1	1996	*Industrial systems, installations and equipment and industrial products – Structuring principles and reference designations – Part 1: Basic rules*	EN 61346-1	1996
IEC 62262	2002	*Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)*	EN 62262	2002
–	–	*Identification of cores in cables and flexible cords*	HD 308 S2	2001

510.3 General

Every item of equipment shall be selected and erected so as to allow compliance with the rules stated in the following clauses of this part of HD 384/60364 and the relevant rules in other parts of the HD 384/60364 series.

511 Compliance with standards

511.1 Every item of equipment shall comply with the appropriate European Standards (EN) or Harmonization Documents (HD) or national standard implementing the HD. In absence of an EN or HD, the equipment shall comply with the appropriate national standard. In all other cases, reference should be made to the appropriate IEC standard or to an appropriate national standard of another country

511.2 Where there are no applicable standards, the item of equipment concerned shall be selected by special agreement between the person specifying the installation and the installer.

512 Operational conditions and external influences

512.1 Operational conditions

512.1.1 Voltage

Equipment shall be suitable for the nominal voltage (r.m.s. value for a.c.) of the installation.

If, in IT installations, the neutral conductor is distributed, equipment connected between phase and neutral shall be insulated for the voltage between phases.

NOTE For certain equipment, it may be necessary to take account of the highest and/or lowest voltage likely to occur in normal service.

512.1.2 Current

Equipment shall be selected for the design current (r.m.s. value for a.c.) which it has to carry in normal service.

Equipment shall also be capable of carrying the currents likely to flow in abnormal conditions for such periods of time as are determined by the characteristics of the protective devices.

512.1.3 Frequency

If frequency has an influence on the characteristics of equipment, the rated frequency of the equipment shall correspond to the frequency of the current in the circuit concerned.

512.1.4 Power

Equipment selected for its power characteristics shall be suitable for the normal operational conditions taking account of the load factor.

512.1.5 Compatibility

Unless other suitable precautions are taken during erection, all equipment shall be selected so that it will not cause harmful effects on other equipment nor impair the supply during normal service, including switching operations.

NOTE Information on the parameters to be considered is given in Chapter 33 and Clause 444.

512.1.Z1 Impulse voltage withstand

Equipment shall be selected so that its rated impulse voltage withstand is at least equal to the prospective overvoltage at the point of installation as defined in Clause 443.

512.2 External influences

(see Annex ZA)

513 Accessibility

513.1 General

All equipment, including wiring, shall be arranged so as to facilitate its operation, inspection and maintenance and access to its connections. Such facilities shall not be significantly impaired by mounting equipment in enclosures or compartments.

514 Identification

514.1 General

Labels or other suitable means of identification shall be provided to indicate the purpose of switchgear and controlgear, unless there is no possibility of confusion.

Where the functioning of switchgear and controlgear cannot be observed by the operator and where this might cause a danger, a suitable indicator, complying where applicable with EN 60073 and EN 60447, shall be fixed in a position visible to the operator.

514.2 Wiring systems

Wiring shall be so arranged or marked that it can be identified for inspection, testing, repairs or alteration of the installation.

514.3 Identification of neutral and protective conductors

514.3.1 General

Unless otherwise stated in 514.3.1.Z1 to 514.3.Z5, the identification of conductors shall comply with EN 60446, Basic and safety principles for man-machine interface, marking and identification - Identification of conductors by colours or numerals.

514.3.1.Z1 Neutral or mid-point conductor

Neutral or mid-point conductors shall be identified by the colour blue throughout their length.

NOTE For certain type of wiring, see 514.3.Z2 up to 514.3.Z5.

514.3.1.Z2 Protective conductor

Protective conductors shall be identified by the bi-colour combination green-and-yellow and this combination shall be used for no other purposes.

NOTE For certain type of wiring, see 514.3.Z2, 514.3.Z3 and 514.3.Z5.

514.3.2 PEN conductor

PEN conductors shall, when insulated, be marked by one of the following methods:

- green-and-yellow throughout their length with, in addition, blue markings at the terminations; or
- blue throughout their length with, in addition, green-and-yellow markings at the terminations.

NOTE The choice of method, or methods, for identifying PEN conductors is intended to be made by National Committees, see Annex ZB.

514.3.Z1 Other conductors

Other conductors shall be identified by colours or numerals taking into account the requirements of 514.3.Z2 to 514.3.Z5.

514.3.Z2 Identification of cores in multi-core cables and flexible cords

The identification of insulated conductors in rigid and flexible cables and cords with 2 to 5 conductors shall comply with HD 308, see Annex ZC. The line conductors shall be identified, throughout their length, by the colours brown or black or grey, the neutral conductor by the colour blue and the protective conductor by the bi-colour combination green-and-yellow.

For cables and cords having more than 5 conductors, each conductor shall be identified by colours or by numerals according to EN 60446. Conductors identified by numerals and used as a protective conductor or neutral conductor shall be marked green-and-yellow or blue, respectively, at each termination.

514.3.Z3 Identification of single-core cables and insulated conductors

Line conductors shall be identified throughout their length by the colours brown or black or grey. The use of one of these colours for all of the line conductors in a circuit is permitted.

Sheathed single-core cables and insulated conductors in compliance with their relevant standard which are not available with green-and-yellow or blue insulation, e.g. in case of large cross-sectional areas, larger than 16 mm², may be used as:

- protective conductor if a green-and-yellow marking is provided at each termination;
- PEN conductor if a green-and-yellow marking and a blue marking is provided at each termination;
- neutral conductor if a blue marking is provided at each termination.

514.3.Z4 Use of a blue conductor for certain applications

For certain applications, provided that confusion is not possible and there is no neutral conductor, a blue conductor may be used as a line conductor or for any other purpose, except as a protective conductor.

NOTE This could be the case, for example, in part of a circuit between a switch and current-using equipment.

514.3.Z5 Omission of identification

Identification by colour or marking is not required

- for concentric conductors of cables,
- for metal sheath or armour, of cables, that is used as a protective conductor,
- for bare conductors in cases where a permanent identification is not possible due to the external influences, e.g. aggressive atmosphere and pollution,
- for metal structural parts of the structure or extraneous conductive parts used as protective conductors,
- for bare overhead wiring.

Identification by colour is not required for the conductors of flat flexible cables without a sheath or cables having insulation materials which cannot be identified by colour, for example mineral insulated cables. For these cables the cores used as protective conductors or PEN or neutral conductors shall be provided with markings of the relevant colour (see 514.3.Z3, last paragraph) at their termination

514.4 Protective devices

The protective devices shall be arranged and identified so that the circuits protected may be easily recognized; for this purpose it may be convenient to group them in distribution boards.

514.5 Diagrams

514.5.1 Where appropriate, diagrams, charts or tables in accordance with EN 61346-1 and the EN 61082 series shall be provided, indicating in particular:

– the type and composition of circuits (points of utilization served, number and size of conductors, type of wiring);

– the characteristics necessary for the identification of the devices performing the functions of protection, isolation and switching and their locations.

For simple installations the foregoing information may be given in a schedule.

NOTE Diagrams and documents should include the following detailed information:

- type and cross sectional areas of conductors;
- length of circuits;
- nature and type of protective devices;
- rated current or adjustment of the protective devices;
- prospective short-circuit currents and breaking capacities of the protective devices.

This information should be provided for each circuit of the installation.

It is recommended that this information is updated after each modification to the installation. Drawings and documents should indicate the location of any concealed devices.

514.5.2 The symbols used shall be chosen from the EN 60617 series.

515 Prevention of mutual detrimental influence

515.1 Equipment shall be so selected and erected as to avoid any harmful influence between the electrical installation and any non-electrical installations.

Equipment not provided with a backplate shall not be mounted on a building surface unless the following requirements are satisfied:

– a voltage transfer to the building surface is prevented;

– fire segregation is provided between the equipment and a combustible building surface.

If the building surface is non-metallic and non-combustible, no additional measures are required. If not, these requirements may be satisfied by one of the following measures:

– if the building surface is metallic, it shall be bonded to the protective conductor (PE) or to the equipotential bonding conductor of the installation, in accordance with HD 384.4.41 and HD 384.5.54;

– if the building surface is combustible, the equipment shall be separated from it by a suitable intermediate layer of insulating material having a flammability rating of FH1 according to EN 60707.

515.2 Where equipment carrying currents of different types or at different voltages is grouped on a common assembly (such as a switchboard, a cubicle or a control desk or box), all the equipment belonging to any one type of current or any one voltage shall be effectively segregated wherever necessary to avoid mutual detrimental influence.

515.3 Electromagnetic compatibility

515.3.1 Choice of the immunity and emission levels

515.3.1.1 The immunity levels of equipment shall be taken into account the electromagnetic influences (see Table ZA.1) that can occur when connected and erected as for normal use, and taking into account the intended level of continuity of service necessary for the application.

515.3.1.2 Equipment shall be chosen with sufficiently low emission levels so that it cannot cause electromagnetic interference by electrical conduction or propagation in the air with other electrical equipment inside or outside the building. If necessary, means of mitigation shall be installed to minimize the emission (see IEC 60364-4-44).

NOTE Appliances or equipment should comply with CISPR 11, CISPR 12, CISPR 13, CISPR 14, CISPR 15, CISPR 22 and IEC TC 77 standards (harmonized as EN 61000 series), as relevant.