



# SLOVENSKI STANDARD

## SIST R064-002:2000

01-februar-2000

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### Vodilo za električne inštalacije – 52. del: Izbira in namestitve električne opreme – Inštalacijski sistemi – Omejitev segretka na priključkih

Electrical installation guide -- Part 52: Selection and erection of electrical equipment - Wiring systems - Limitation of temperature rise of connecting interfaces

Leitfaden für elektrische Anlagen -- Teil 52: Auswahl und Errichtung von elektrischen Betriebsmitteln - Kabel- und Leitungssysteme (-anlagen) - Begrenzung des Temperaturanstiegs bei Schnittstelleanschlüssen

Guide pour les installations électriques -- Partie 52: Choix et mise en oeuvre des matériels électriques - Canalisations - Limitation des échauffements dus aux interfaces de connexion

**Ta slovenski standard je istoveten z: R064-002:1994**

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#### **ICS:**

91.140.50      Sistemi za oskrbo z elektriko    Electricity supply systems

**SIST R064-002:2000**

**en**

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English version

**Electrical installation guide**  
**Part 52: Selection and erection of electrical equipment**  
**Wiring systems**  
**Limitation of temperature rises of connecting interfaces**

Guide pour les installations électriques  
Partie 52: Choix et mise en oeuvre des  
matériels électriques - Canalisations  
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Leitfaden für elektrische Anlagen  
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elektrischen Betriebsmitteln  
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Begrenzung des Temperaturanstiegs  
bei Schnittstellenanschlüssen

This CENELEC Report has been prepared by CENELEC Technical Sub-committee SC 64B, Electrical installations of buildings: protection against thermal effects. It was approved by CENELEC on 1993-12-08.

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**CENELEC**

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

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## INTRODUCTION

When designing an installation or during initial verification, it is sometimes observed that the temperatures reached by interfaces between terminals and conductors are higher than those which could be withstood by insulation in normal service.

In this case, precautions shall be taken so that the temperature attained by terminals in normal service shall not impair the effectiveness of the insulation of conductors connected to them or supporting them. See HD 384-5-52.

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## ELECTRICAL INSTALLATION GUIDE

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

#### 52.1 General

##### 52.1.1 Scope

This technical report is for use as a guide for electrical installations. It is applicable to the limitation of temperature rises of connecting interfaces.

##### 52.1.2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this report. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this report are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of CLC and CEN maintain registers of currently valid standards.

EN 60439-1:1994, Low-voltage switchgear and controlgear assemblies - Part 1: Type-tested and partially type-tested assemblies (IEC 439-1:1992)

EN 60439-3:1991, Low-voltage switchgear and controlgear assemblies - Part 3: Particular requirements for low-voltage switchgear and controlgear assemblies intended to be installed in places where unskilled persons have access for their use - Distribution boards (IEC 439-3:1990, modified)

HD 384.5.523:1991, Electrical installations of buildings - Part 5: Selection and erection of electrical equipment - Chapter 52: Wiring systems - Section 523: Current-carrying capacities (IEC 364-5-523:1983, modified)

HD 528 S1:1989, A method of temperature-rise assessment by extrapolation for partially type-tested assemblies (PTTA) of low-voltage switchgear and controlgear (IEC 890:1987)

IEC 943:1989, Guide for the specification of permissible temperature and temperature rise for parts of electrical equipment, in particular for terminals

#### 52.2 Maximum temperatures of terminals in normal service conditions

52.2.1 The temperature of a terminal is the sum of the ambient temperature and its temperature rise in normal service.

Product standards give conventional limit values for temperature rise under defined test conditions, but do not indicate, in general, limits for permissible temperature rises in service conditions. Relevant standards in this respect are EN 60439-1, EN 60439-3 and HD 528.

**52.2.2** The temperatures of terminals are affected by the heat dissipated in normal service by the equipment. This heat may be caused by internal losses dissipated in the equipment and by neighbouring internal and external heat sources, if any.

The temperatures of terminals are also related to the way in which they are used, which could affect their electrical resistance and dissipation of heat.

**52.2.3** Compatibility between temperatures of terminals of equipment and temperatures permitted for the insulation of the conductors and cables shall be obtained by appropriate arrangement during installation.

Clauses, sub-clauses	Recommendations
<b>52.3</b> Means for limiting temperatures of terminals in service or their effects	<p>Recommendations for the choice of methods for limiting temperatures of terminals in service on their effects</p> <p>Recommendations are given below on the selection of methods according to local conditions of installation, practicability of installation, nature of equipment.</p>
<b>52.3.1</b> Temperatures of terminals can be limited by one or more of the following measures:	
<b>52.3.1.1</b> Limitation of contents of enclosures (cubicles, cabinets, trunkings, conduits).	<p>The limitation of contents of trunkings and conduits is recommended when a great number of circuits issue from the same panel; in this case it is preferable to use several runs of trunking or conduit.</p>
<b>52.3.1.2</b> Spacing between equipment in order to improve natural ventilation.	<p>Spacing between adjacent equipment permits better dissipation of heat. It is necessary to refer to manufacturer's instructions. This solution is especially recommended when a great number of items of equipment are installed in the same enclosure (cubicle or cabinet).</p>
<b>52.3.1.3</b> Appropriate arrangement of equipment dissipating heat inside enclosures.	<p>It is recommended that equipment dissipating heat is installed in an appropriate way so that the correct operation of other equipment will not be impaired. Other means, such as the interposition of screens or deflectors, may be used for this purpose.</p>

Clauses, sub-clauses	Recommendations														
<p><b>52.3.1.4</b> Natural or forced ventilation or air-conditioning of cubicles, cabinets or locations.</p>	<p>Forced ventilation of the equipment may be necessary in specific applications, for examples to protect against ingress of dust.</p>														
<p><b>52.3.1.5</b> Derating of equipment by use of equipment having higher rated current, consequently dissipating less heat.</p>	<p>Derating of equipment can be used to reduce the temperature of terminals, provided that such derating is permitted for the equipment.</p>														
<p><b>52.3.1.6</b> Selection of material for enclosures of cubicles or cabinets in which terminals are installed, in order to improve the thermal dissipation.</p>	<p>Arrangements shall be made to ensure the maintenance of clamping pressure of conductors in their terminals. Such arrangements may be built-in (for example, use of resilient connections) or result from instructions for the inspection of the installation.</p>														
<p><b>52.3.1.7</b> Maintenance of correct clamping of conductors in the terminals.</p>	<p>Arrangements shall be made to ensure the maintenance of clamping pressure of conductors in their terminals. Such arrangements may be built-in (for example, use of resilient connections) or result from instructions for the inspection of the installation.</p>														
<p><b>52.3.2</b> The effects of temperature rise of terminals in normal service can be limited by one or more of the following means:</p>	<p>If elastomeric insulation rather than thermoplastic is used in order to utilize their higher thermal ratings, it may be necessary to derate the equipment to which they are connected</p>														
<p><b>52.3.2.1</b> Selection of the insulation of conductors in relation to the presumed temperatures rises.</p>	<p>If elastomeric insulation rather than thermoplastic is used in order to utilize their higher thermal ratings, it may be necessary to derate the equipment to which they are connected</p>														
<p>Persmissible temperatures in steady-state service for some types of insulation of conductors are determined by TC 20 :</p>	<p>If elastomeric insulation rather than thermoplastic is used in order to utilize their higher thermal ratings, it may be necessary to derate the equipment to which they are connected</p>														
<table> <tr> <td>ordinary EPR</td> <td>60 °C</td> </tr> <tr> <td>PVC normal</td> <td>70 °C</td> </tr> <tr> <td>PVC temperature resistant</td> <td>90 °C</td> </tr> <tr> <td>XLPE</td> <td>90 °C</td> </tr> <tr> <td>Silicone rubber</td> <td>180 °C</td> </tr> <tr> <td>EVA rubber</td> <td>110 °C</td> </tr> <tr> <td>Polyolefin halogen free</td> <td>90 °C</td> </tr> </table>	ordinary EPR	60 °C	PVC normal	70 °C	PVC temperature resistant	90 °C	XLPE	90 °C	Silicone rubber	180 °C	EVA rubber	110 °C	Polyolefin halogen free	90 °C	<p>If elastomeric insulation rather than thermoplastic is used in order to utilize their higher thermal ratings, it may be necessary to derate the equipment to which they are connected</p>
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Clauses, sub-clauses	Recommendations
<p>Current-carrying capacities of conductors, the values of which are given in tables of HD 384-5-523, are calculated so that the temperature on the cores does not exceed the permissible temperature determined by the selection of the insulation.</p>	<p>Increasing the cross-sectional area of conductors for other reasons (voltage drop, withstand of short-circuit currents, reduction of the fault loop impedance) improves the thermal withstand of the conductors.</p>
<p>A steady-state service implies that overcurrents are infrequent and of limited duration in order not to affect seriously the life of the insulation.</p>	<p>Interposing of an intermediate terminal outside the equipment enables a conductor of larger cross-section or a higher temperature type of cable to be connected.</p>
<p><b>52.3.2.2</b> Connection of a short length of conductor whose cross-sectional area may be chosen to be larger than that required by the current.</p>	<p>Insulated conductors which permit temperatures at least to 110 °C are recommended for the supply to equipment operating at a high temperature, such as some luminaires or heating appliances.</p>
<p><b>52.3.2.3</b> Replacement of the insulation of the conductors by a sleeve which permits a higher temperature or replacement of the conductors by conductors insulated appropriately, for a sufficient length.</p>	<p>Choice of a sufficient length for the separation may be based on experiment or on a calculation according to IEC 943.</p>
<p><b>52.3.2.4</b> Separation of conductors of multicore cables between the end of the sheath and the terminal leads to a decrease in the temperature to a value compatible with the permissible temperature of the insulation of the conductors.</p>	

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