SLOVENSKI STANDARD
oSIST prEN IEC 60584-3:2020

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Termočleni - 3. del: Podaljševalni in kompenzacijski kabli - Tolerance in sistemi identifikacije

Thermocouples - Part 3: Extension and compensating cables - Tolerances and identification system

Thermopaare - Teil 3: Thermoleitungen und Ausgleichsleitungen - Grenzabweichungen und Kennzeichnungssystem

Couples thermoélectriques - Partie 3: Câbles d'extension et de compensation - Tolérances et système d'identification

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ICS:

17.200.20	Instrumenti za merjenje temperature	Temperature-measuring instruments

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IEC SC 65B : MEASUREMENT AND CONTROL DEVICES

SECRETARIAT: United States of America	SECRETARY: Mr Angus Low
OF INTEREST TO THE FOLLOWING COMMITTEES:	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

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TITLE:

Thermocouples - Part 3: Extension and compensating cables - Tolerances and identification system

PROPOSED STABILITY DATE: 2024

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THERMOCOUPLES –

Part 3: Extension and compensating cables – Tolerances and identification system

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International Standard IEC 60584-3 has been prepared by subcommittee 65B: Devices and process analysis, of IEC Technical Committee 65: Industrial-process measurement, control and automation.

This third edition cancels and replaces the second edition of IEC 60584-3 issued in 2007. It constitutes a technical revision.

The significant technical changes with respect to the previous edition are shown as follows;

- Revision of the 5 (Tolerance values) in order to take recent technological advancement into account,

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- In 6 (Colour coding) new colour coding is added in response to the newly revised IEC60584-1,
- An Annex is created to give information on example of size for rod, flat wire and strip of the compensating and extending device for thermocouples.

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102 The text of this standard is based on the following documents:

FDIS	Report on voting
65B/XXX/FDIS	65B/XXX/RVD

103
104 Full information on the voting for the approval of this standard can be found in the report on
105 voting indicated in the above table.

106 This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

107 A list of all parts of the IEC 60584 series, under the general title *Thermocouples*, can be found
108 on the IEC website.

109 The committee has decided that the contents of this publication will remain unchanged until the
110 maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data
111 related to the specific publication. At this date, the publication will be

112 • reconfirmed,
113 • withdrawn,
114 • replaced by a revised edition, or
115 • amended.

116

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THERMOCOUPLES –

Part 3: Extension and compensating cables – Tolerances and identification system

1 Scope

This part of IEC 60584 specifies manufacturing tolerances for extension and compensating cables (other than mineral insulated cables) provided directly to users of industrial processes. These tolerances are determined with respect to the electro-motive force (abbreviated as e.m.f. hereafter) - temperature relationship of Part 1 of the standard.

The method for identification of insulated thermocouple extension and compensating cables other than mineral insulated cables is described.

Furthermore, requirements for extension and compensating cables for use in industrial process control are specified.

2 Normative references

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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.

IEC 60584-1 Thermocouples – Part 1 EMF specifications and tolerance.

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3 Definition

3.1
extension cables
are manufactured from conductors having the same nominal composition as those of the corresponding thermocouple.

Note 1 to entry; the cables are designated by the letter "X" following the designation of the thermocouple, for example "JX".

3.2
compensating cables
are manufactured from conductors having a composition different from the corresponding thermocouple.

Note 1 to entry; the cables are designated by the letter "C" following the designation of the thermocouple, for example "KC". In some cases different tolerances apply for the same thermocouple type over different temperature ranges. These are distinguished by additional letters such as, for example, RCA and RCB.

3.3
tolerance

the tolerance of extension or compensating cable is the maximum allowable deviation in microvolts caused by the introduction of the extension or compensating cable into the measuring circuit.

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4 General

Both of the extension and compensating wire are used for the electrical connection between the open ends of a thermocouple and the reference junction in those installations where the conductors of the thermocouple are not directly connected to the reference junction. A cable always consists from a specific pair; negative and positive conductor, to be connected to corresponding thermocouple. The thermoelectric properties of extension and compensating cables shall be close to the properties of the corresponding thermocouple. There are a few kinds of products for each type of thermocouples being developed to fit for the variety of needs. The key characteristic is the tolerance i.e. correctness of the temperature measurement.

5 Tolerance values

Table 1 shows the specified tolerance for extension and compensating cables when used at temperatures within the ranges indicated as "Temperature range of validity".

Table 1 –Tolerance classes for extension and compensating cables

Type	Tolerance class		Temperature range of validity	Measuring junction temperature
	1	2		
JX	±85 µV (±1,5 °C)	±140 µV (±2,5 °C)	–25 °C to +200 °C	500 °C
TX	±30 µV (±0,5 °C)	±60 µV (±1,0 °C)	–25 °C to +100 °C	300 °C
EX	±120 µV (±1,5 °C)	±200 µV (±2,5 °C)	–25 °C to +200 °C	500 °C
KX	±60 µV (±1,5 °C)	±100 µV (±2,5 °C)	–25 °C to +200 °C	900 °C
NX	±60 µV (±1,5 °C)	±100 µV (±2,5 °C)	–25 °C to +200 °C	900 °C
KCA	±60 µV (±1,5 °C)	±100 µV (±2,5 °C)	0 °C to +200 °C	900 °C
KCB	±60 µV (±1,5 °C)	±100 µV (±2,5 °C)	0 °C to +100 °C	900 °C
NC	±60 µV (±1,5 °C)	±100 µV (±2,5 °C)	0 °C to + 200°C	900 °C
RCA	±20 µV (±1,5 °C)	±30 µV (±2,5 °C)	0 °C to +100 °C	1 000 °C
RCB	±30 µV (±2,5 °C)	±60 µV (±5,0 °C)	0 °C to +200 °C	1 000 °C
SCA	±20 µV (±1,5 °C)	±30 µV (±2,5 °C)	0 °C to +100 °C	1 000 °C
SCB	±30 µV (±2,5 °C)	±60 µV (±5,0 °C)	0 °C to +200 °C	1 000 °C
BC		±40 µV (±3,5°C)	0 °C to +100 °C	1 400 °C
CC		±110 µV (±8,0°C)	0 °C to +200 °C	1 800 °C
ACA	±40 µV (±3,5 °C)		0 °C to +100 °C	1 800 °C
ACB		±70 µV (±5,0°C)	0 °C to +200 °C	1 800 °C

Note 1 Temperature range of validity may be restricted to figures lower than those shown in the table because of temperature limitations imposed by the insulant

Note 2 A cable comprising two copper conductors may be used with Type B thermocouples

Note 3 Tolerances are specified in microvolts. The table also includes, in parentheses, the approximate equivalent tolerances in degrees Celsius. Because thermocouple e.m.f.-temperature relationships are non-linear, the tolerance in degrees Celsius depends on the temperature of the measuring junction of the thermocouple where the reference junction is 0°C. The figures shown in the table are those appropriate to the measuring junction temperatures in the final column. In all cases the deviation (expressed in degrees Celsius) can vary at lower measurement temperatures

6 Colour coding

6.1 Negative conductor

The insulation of the negative conductor shall be coloured in WHITE for all thermocouple types.