BRITISH STANDARD

BS EN
60584-2:1993

Reprinted, incorporating AMD 7864

Thermocouples —

Part 2: Tolerances

The European Standard EN 60584-2:1993 has the status of a British Standard

UDC 621.362.1.015:537.32:001.4

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Industrial-process Measurement and Control Standards Policy Committee (PCL/-) to Technical Committee PCL/1, upon which the following bodies were represented:

British Coal Corporation
British Gas plc
Department of Energy (Gas and Oil Measurement Branch)
Electricity Industry in United Kingdom
Energy Industries Council
Engineering Equipment and Materials Users' Association
GAMBICA (BEAMA Ltd.)
Health and Safety Executive
Institution of Gas Engineers

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

British Cable Makers' Confederation
British Pressure Gauge Manufacturers' Association
Department of Trade and Industry (National Physical Laboratory)
Engineering Industries Association
Institute of Metals
Society of Glass Technology

This British Standard, having been prepared under the direction of the Industrial-process Measurement and Control Standards Policy Committee, was published under the authority of the Standards Board and comes into effect on
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The following BSI references relate to the work on this standard:
Committee reference PCL/1
Draft for comment 91/28132 DC

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Amendments issued since publication

Amd. No.	Date	Comments
7864	July 1993	Standard renumbered from BS 4937-20:1991 to BS EN 60584-2:1993

Contents

National foreword

This Part of BS 4937 has been prepared under the direction of the Industrial-process Measurement and Control Standards Policy Committee. It implements CENELEC HD 446.2 S2 1990 and is identical with IEC 584-2:1982 *"Thermocouples — Part 2: Tolerances"* published by the International Electrotechnical Commission (IEC) together with Amendment No. 1:1989. It supersedes BS 4937-20:1983, which is withdrawn.

In 1993 the European Committee for Electrotechnical Standardization (CENELEC) accepted IEC 584-2:1982 and Amendment 1:1989 as European Standard EN 60584-2:1993. As a consequence of implementing the European Standard this British Standard is renumbered BS EN 60584-2 and any reference to BS 4937-20 should be read as a reference to BS EN 60584-2. EN 60584-2:1993 supersedes HD 446.2 S2:1990.

In order to clarify the scope it should be noted that the tolerance values are specified in three classes and that eight types of thermocouples are divided into six groups.

Attention is drawn to the fact that whenever the words "Part 1" appear, they should be read as "Parts 1 to 8 of BS 4937".

Cross-references

International standard	Corresponding British Standard
IEC 584-1:1977	BS 4937 International thermocouple reference tables Part 1:1973 Platinum — 10 % rhodium/platinum thermocouples. Type S (Technically equivalent) Part 2:1973 Platinum — 13 % rhodium/platinum thermocouples. Type R (Technically equivalent) Part 3:1973 Iron/copper-nickel thermocouples. Type J (Technically equivalent) Part 4:1973 Nickel-chromium/nickel-aluminium thermocouples. Type K (Technically equivalent) Part 5:1974 Copper/copper-nickel thermocouples. Type T (Technically equivalent) Part 6:1974 Nickel-chromium/copper-nickel thermocouples. Type E (Technically equivalent) Part 7:1974 Platinum 30 % rhodium/platinum 6 % rhodium thermocouples. Type B (Technically equivalent)

For type N thermocouples, refer to BS 4937-8:1986 "Nickel-chromium-silicon/nickel-silicon (nicrosil/nisil) thermocouples including composition type N" (there is no IEC equivalent).

Textual error. The following textual error has been discovered during the preparation of this British Standard and has been reported to the IEC.

In Table I for tolerance class 2, the temperature range for type K or N should read:

– 40 °C to + 333 °C

NOTE In Table I, the raised point in some of the tolerance values has been used as a multiplication sign, and it should not be confused with the decimal point.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, the EN title page, pages 2 to 4, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 60584-2

April 1993

UDC 621.362.1.015:537.32:001.4

Descriptors: Thermocouples, tolerances with regard to reference tables

English version

Thermocouples
Part 2: Tolerances

(IEC 584-2:1982 + A1:1989)

Couples thermoélectriques
Deuxième partie: Tolérances
(CEI 584-2:1982 + A1:1989)

Thermopaare
Teil 2: Grenzabweichungen der Thermospannungen
(IEC 584-2:1982 + A1:1989)

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

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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

At the request of CENELEC Reporting Secretariat SR 65B, HD 446.2 S2:1990 (IEC 584-2:1982 + A1:1989) was submitted to the CENELEC voting procedure for conversion into a European Standard.

The text of the International Standard was approved by CENELEC as EN 60584-2 on 9 March 1993.

The following dates were fixed:

– latest date of publication of an identical national standard	(dop) 1994-03-01
– latest date of withdrawal of conflicting national standards	(dow) –

1 Scope

This standard contains the manufacturing tolerances for both noble and base metal thermocouples manufactured in accordance with e.m.f.-temperature relationships of Part 1 of the standard. The tolerance values are for a thermocouple manufactured from wires, normally in the diameter range 0.25 mm to 3 mm, as delivered to the user and do not allow for calibration drift during use.

2 Definitions

2.1
thermoelectric (Seebeck) effect

the thermoelectric effect is the production of an electromotive force (e.m.f.) due to the difference of temperature between two junctions of different metals or alloys forming part of the same circuit

2.2
thermocouple

a thermocouple is a pair of conductors of dissimilar materials joined at one end and forming part of an arrangement using the thermoelectric effect for temperature measurement

2.3
measuring junction

the measuring junction is that junction referred to in Sub-clause **2.2** which is subjected to the temperature to be measured

2.4
reference junction

the reference junction is that junction of the thermocouple which is at a known (reference) temperature to which the measuring temperature is compared

2.5
tolerance

the tolerance of a thermocouple is a specified maximum deviation in degrees Celsius from the e.m.f.-temperature values in the reference tables of Part 1 of the standard, when the temperature of the reference junction is at 0 °C and the measuring junction is at the appropriate temperature (t °C)

3 Tolerances

Thermocouple tolerances shall be as specified in Table I.

NOTE 1 The temperature limits referred to in Table I are not necessarily recommended operating temperature limits.

NOTE 2 For the purpose of testing there should be no discontinuity of conductors between the measuring and the reference junction.

Table I — Tolerance classes for thermocouples (reference junction at 0 °C)

Types	Toleranceclass 1	Toleranceclass 2	Tolerance class 3[a]
Type T			
Temperature range	– 40 °C to + 125 °C	– 40 °C to + 133 °C	– 67 °C to + 40 °C
Tolerance value	± 0,5 °C	± 1 °C	± 1 °C
Temperature range	125 °C to 350 °C	133 °C to 350 °C	– 200 °C to – 67 °C
Tolerance value	± 0,004 · | t |	± 0,0075 · | t |	± 0,015 · | t |
Type E			
Temperature range	– 40 °C to + 375 °C	– 40 °C to + 333 °C	– 167 °C to + 40 °C
Tolerance value	± 1,5 °C	± 2,5 °C	± 2,5 °C
Temperature range	375 °C to 800 °C	333 °C to 900 °C	– 200 °C to – 167 °C
Tolerance value	± 0,004 · | t |	± 0,0075 · | t |	± 0,015 · | t |
Type J			
Temperature range	– 40 °C to + 375 °C	– 40 °C to + 333 °C	—
Tolerance value	± 1,5 °C	± 2,5 °C	—
Temperature range	375 °C to 750 °C	333 °C to 750 °C	—
Tolerance value	± 0,004 · | t |	± 0,0075 · | t |	—
Type K, type N			
Temperature range	– 40 °C to + 375 °C	– 40 °C to + 333 °C[b]	– 167 °C to + 40 °C
Tolerance value	± 1,5 °C	± 2,5 °C	± 2,5 °C
Temperature range	375 °C to 1 000 °C	333 °C to 1 200 °C	– 200 °C to – 167 °C
Tolerance value	± 0,004 · | t |	± 0,0075 · | t |	± 0,015 · | t |
Type R, type S			
Temperature range	0 °C to + 1 100 °C	0 °C to + 600 °C	—
Tolerance value	± 1 °C	± 1,5 °C	—
Temperature range	1 100 °C to 1 600 °C	600 °C to 1 600 °C	—
Tolerance value	± [1 + 0,003 (t – 1 100)] °C	± 0,0025 · | t |	—
Type B			
Temperature range	—	—	600 °C to 800 °C
Tolerance value	—	—	+4 °C
Temperature range	—	600 °C to 1 700 °C	800 °C to 1 700 °C
Tolerance value	—	± 0,0025 · | t |	± 0,005 · | t |

[a] Thermocouple materials are normally supplied to meet the manufacturing tolerances specified in the table for temperatures above – 40 °C. These materials, however, may not fall within the manufacturing tolerances for low temperatures given under class 3 for types T, E, K and N. If thermocouples are required to meet limits of class 3, as well as those of class 1 or 2 the purchaser shall state this, as selection of materials is usually required.

[b] See national foreword for details of a textual error.

Publication(s) referred to

See national foreword.

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