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Thermische Energiemessgeräte - Teil 2: Anforderungen an die Konstruktion

Compteurs d'énergie thermique - Partie 2 : Prescriptions de fabrication

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ICS:

17.200.20	Instrumenti za merjenje temperature	Temperature-measuring instruments
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Thermal energy meters - Part 2: Constructional requirements

Compteurs d'énergie thermique - Partie 2 :
Prescriptions de fabrication

Thermische Energiemessgeräte - Teil 2:
Anforderungen an die Konstruktion

This European Standard was approved by CEN on 17 July 2022.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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EN 1434-2:2022 (E)**European foreword**

This document (EN 1434-2:2022) has been prepared by Technical Committee CEN/TC 176 “Thermal energy meters”, the secretariat of which is held by SIS.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2023, and conflicting national standards shall be withdrawn at the latest by March 2023.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 1434-2:2015+A1:2018.

EN 1434, *Thermal energy meters*, consists of the following parts:

- *Part 1: General requirements;*
- *Part 2: Constructional requirements;*
- *Part 3: Data exchange and interfaces¹;*
- *Part 4: Pattern approval tests;*
- *Part 5: Initial verification tests;*
- *Part 6: Installation, commissioning, operational monitoring and maintenance.*

In comparison with EN 1434-2:2015+A1:2018, the following changes have been made:

- Figure A.10 “Threaded pipe fitting G1/2B, G3/4B, G1B, G1 1/4B and G1 1/2B sizes” has been updated;
- in 4.2.2 “Materials of temperature probe sheath and pocket” another suitable material has been added.

This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) / Regulation(s).

For relationship with EU Directive(s) / Regulation(s), see informative Annex ZA, which is an integral part of this document.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of

¹ EN 1434-3 is maintained by CEN/TC 294.

North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

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EN 1434-2:2022 (E)**1 Scope**

This document is applicable to the constructional requirements for thermal energy meters. Thermal energy meters are instruments intended for measuring the energy which in a heat-exchange circuit is absorbed (cooling) or given up (heating) by a liquid called the heat-conveying liquid. The thermal energy meter indicates the quantity of thermal energy in legal units.

This document covers meters for closed systems only, where the differential pressure over the thermal load is limited.

This document is not applicable to:

- electrical safety requirements;
- pressure safety requirements; and
- surface mounted temperature sensors.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

EN 1092-1:2018, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 1: Steel flanges*

EN 1092-2:1997, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 2: Cast iron flanges*

EN 1092-3:2003, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 3: Copper alloy flanges*

EN 1434-1:2022, *Thermal energy meters — Part 1: General requirements*

EN 1434-3:2015, *Heat meters — Part 3: Data exchange and interfaces*

EN 1434-4:2022, *Thermal energy meters — Part 4: Pattern approval tests*

EN 60751:2008, *Industrial platinum resistance thermometers and platinum temperature sensors (IEC 60751:2008)*

EN 60947-5-6:2000, *Low-voltage switchgear and controlgear — Part 5-6: Control circuit devices and switching elements — DC interface for proximity sensors and switching amplifiers (NAMUR) (IEC 60947-5-6:1999)*

EN ISO 228-1:2003, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation (ISO 228-1:2000)*

ISO 4903:1989, *Information technology — Data communication — 15-pole DTE/DCE interface connector and contact number assignments*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1434-1:2022 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

4 Temperature sensors

4.1 General

The temperature sensor sub-assembly shall consist of platinum resistance temperature sensors selected as matched pairs.

Other types of temperature sensor pairs may be used, where the sub-assembly consists, inseparably, of temperature sensors and calculator.

The maximum admissible working pressure shall be declared by the manufacturer.

Where no dimensional tolerance is specified, the values shall be taken from Table 1.

Table 1 — Tolerances

Dimension mm	0,5 up to 3	over 3 up to 6	over 6 up to 30	over 30 up to 120	over 120 up to 400
Tolerance mm	±0,2	±0,3	±1	±1,5	±2,5

4.2 Mechanical design

4.2.1 General

For pipe sizes up to and including DN 250, 3 different temperature sensor types are standardized:

- direct mounted short probes - Type DS;
- direct mounted long probes - Type DL;
- pocket mounted long probes - Type PL.

Types PL and DL can be either head probes or have permanently connected signal leads. Type DS shall have permanently connected signal leads only.

4.2.2 Materials of temperature probe sheath and pocket

The temperature pocket and the protective sheath of direct mounted probes shall be of a material that is adequately strong and resistant to corrosion and has the requisite thermal conductivity.

Examples of suitable materials are:

EN 10088-3:2014-12 – X2 Cr Ni Mo 17 13 2 (also known as W.nr. 1.4404)

or

EN 10088-3:2014-12 – X6 Cr Ni Mo Ti 17 12 2 (also known as W.nr. 1.4571)

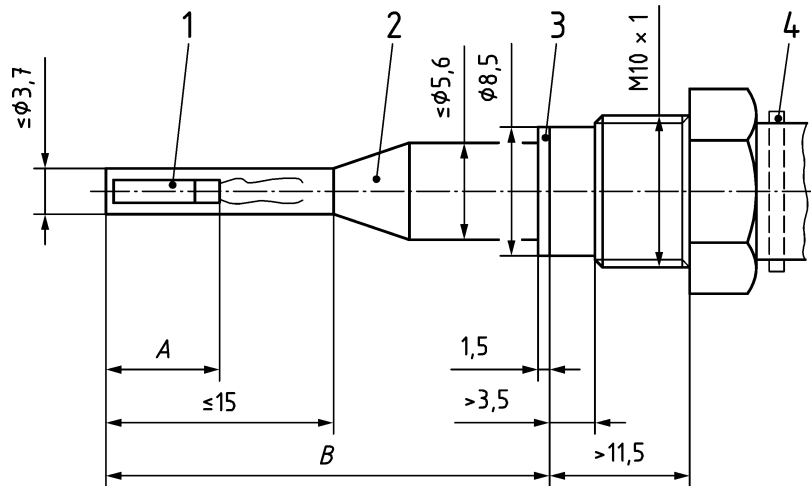
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4.2.3 Dimensions of direct mounted short probes - Type DS

The dimensions shall be as given in Figure 1.

Further non-normative information is given in Annex A, Figure A.1. The qualifying immersion depth shall be 20 mm – or less if so specified by the manufacturer.

Dimensions in millimetres



Key

- 1 temperature sensing element
- 2 protective sheath
- 3 sealing ring
- 4 ejection device
- A < 15 mm
- B 27,5 mm or 38 mm or 60 mm

Figure 1 — Temperature probes type DS

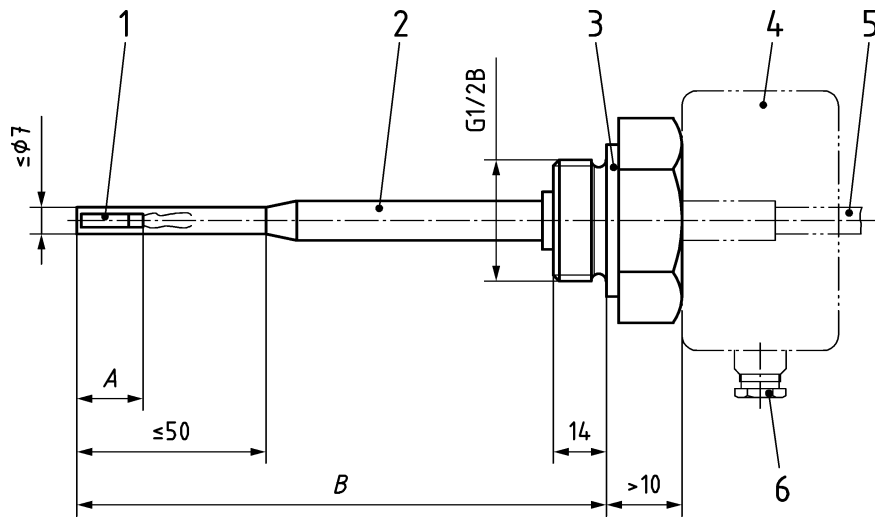
4.2.4 Dimensions of direct mounted long probes - Type DL

The dimensions shall be as given in Figure 2.

Further information is given in Annex A, Figures A.2 and A.3.

The qualifying immersion depth shall be 50 % of the length B – or less if so specified by the manufacturer.

Dimensions in millimetres

**Key**

- 1 temperature sensing element
- 2 protective sheath
- 3 sealing surface
- 4 outline of head probe
- 5 outline of permanently connected signal lead probe
- 6 inlet for signal cable – $\varnothing \leq 9$ mm
- G1/2B thread in accordance with EN ISO 228-1:2003
- A < 30 mm or ≤ 50 mm for Pt 1000
- B 85 mm or 120 mm or 210 mm

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Figure 2 — Temperature probes type DL (head or cable)

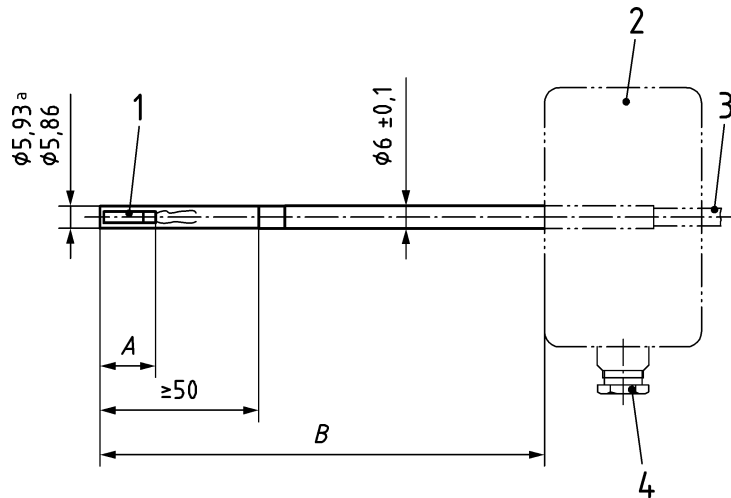
4.2.5 Dimensions of pocket mounted long probes - Type PL

The dimensions shall be as given in Figure 3.

Further information is given in Annex A, Figures A.4 and A.5.

The qualifying immersion depth shall be 50 % of the length B for the shortest pocket specified – or less if so specified by the manufacturer.

Dimensions in millimetres

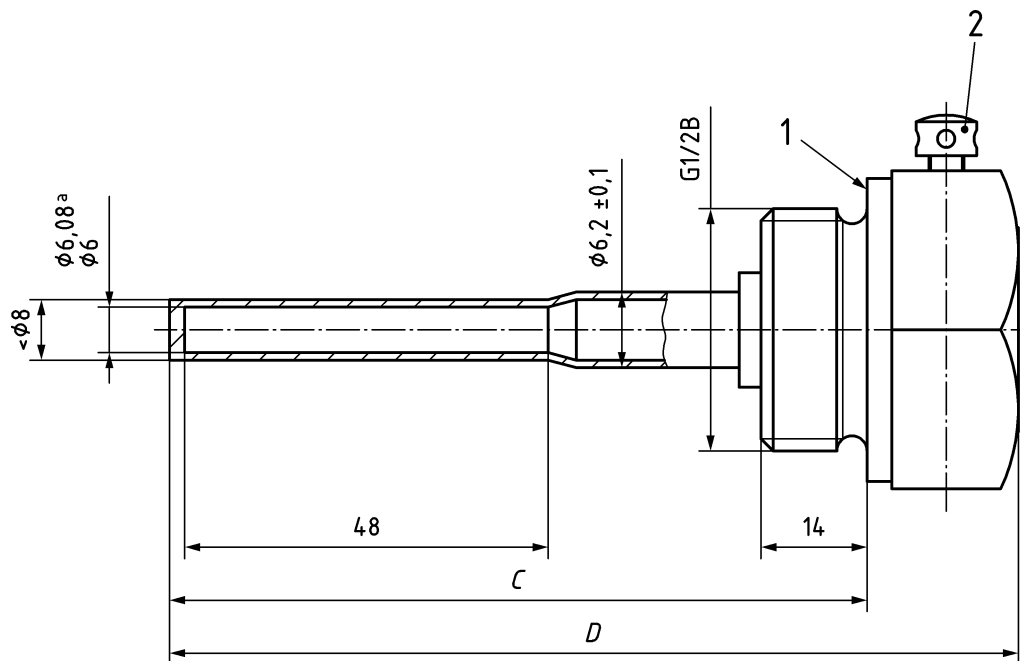
**Key**

- 1 temperature sensing element
- 2 outline of head probe
- 3 outline of permanently connected signal lead probe
- 4 inlet for signal cable – $\phi \leq 9$ mm
- ^a Corresponding to c11 in EN ISO 286-2, rounded to 2 decimals
- A < 30 mm or ≤ 50 mm for Pt 1000
- B 105 mm or 140 mm or 230 mm (head probe only)

Figure 3 — Temperature probes - Type PL (head or cable)**4.2.6 Dimensions of temperature pocket**

The temperature pocket is designed for use with type PL temperature probes only. It is designed to be capable of being inserted through a pipe wall to which has been externally brazed or welded a boss (see Annex A, Figure A.9) and in this respect only, it is interchangeable with a direct mounted long probe of corresponding insertion length. The dimensions shall be as given in Figure 4.

Dimensions in millimetres

**Key**

- 1 sealing face
 2 probe clamping screw with provision for security sealing
 a Corresponding to H11 in EN ISO 286-2:2010 rounded to 2 decimals
 G1/2B thread in accordance with EN ISO 228-1:2003

Alternative lengths	
C	D
85	≤ 100
120	≤ 135
210	≤ 225

Figure 4 — Temperature pocket**4.2.7 Design of short probes with respect to installation**

The sensor shall be mounted perpendicular to the flow and with the sensing element inserted to at least the centre of the pipe.

For internal pressures up to 16 bar, the sensor shall be designed to fit in a pipe fitting (see Annex A, Figure A.10).