SLOVENSKI STANDARD
SIST EN 1434-2:2016+A1:2019

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Merilniki toplote - 2. del: Konstrukcijske zahteve (vključno z dopolnilom A1)

Thermal energy meters - Part 2: Constructional requirements

Thermische Energiemessgeräte - Teil 2: Anforderungen an die Konstruktion

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

Ta slovenski standard je istoveten z: EN 1434-2:2015+A1:2018

ICS:

17.200.10 Toplota. Kalorimetrija Heat. Calorimetry

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EUROPEAN STANDARD

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EN 1434-2:2015+A1

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English Version

Thermal energy meters - Part 2: Constructional requirements

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

Wärmezähler - Teil 2: Anforderungen an die Konstruktion

This European Standard was approved by CEN on 5 September 2015 and includes Amendment 1 approved by CEN on 18 July 2018.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents

Page

European foreword

This document (EN 1434-2:2015+A1:2018) 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of an identical text or by endorsement, at the latest by May 2019, and conflicting national standards shall be withdrawn at the latest by May 2019.

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 includes Amendment 1, approved by CEN on 2018-07-18.

This document supersedes [A1] EN 1434-2:2015 [A1].

The start and finish of text introduced or altered by amendment is indicated in the text by tags [A1] [A1].

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

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

EN 1434-2, [A1] *Thermal energy meters* [A1] consists of the following parts:

— *Part 1: General requirements*

— *Part 2: Constructional requirements*

— *Part 3: Data exchange and interfaces*[1)]

— *Part 4: Pattern approval tests*

— *Part 5: Initial verification tests*

— *Part 6: Installation, commissioning, operational monitoring and maintenance*

In comparison to EN 1434-2:2007, the following changes have been made:

— additional functionalities for smart metering applications are added;

— minimum requirements for test signal output of calculators are added;

— minimum requirements for test data interface of complete [A1] thermal energy meters [A1] are added;

— new forms of pockets and sensors and parmeter setting and adjustment through interface are added.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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

1 Scope

This European Standard specifies the constructional requirements for [A1] thermal energy meters [A1]. [A1] Thermal energy meters [A1] 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 [A1] thermal energy meter [A1] indicates the quantity of heat in legal units.

Electrical safety requirements are not covered by this European Standard.

Pressure safety requirements are not covered by this European Standard.

Surface mounted temperature sensors are not covered by this European Standard.

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

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 1: Steel flanges*

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

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

[A1] EN 1434-1:2015+A1:2018, *Thermal energy meters — Part 1: General requirements* [A1]

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

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

EN 60947-5-6, *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)*

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

ISO 4903, *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 [A1] EN 1434-1:2015+A1:2018 [A1] apply.

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.

A suitable material has been shown to be EN 10088-3 — X6 Cr Ni Mo Ti 17 12 2.

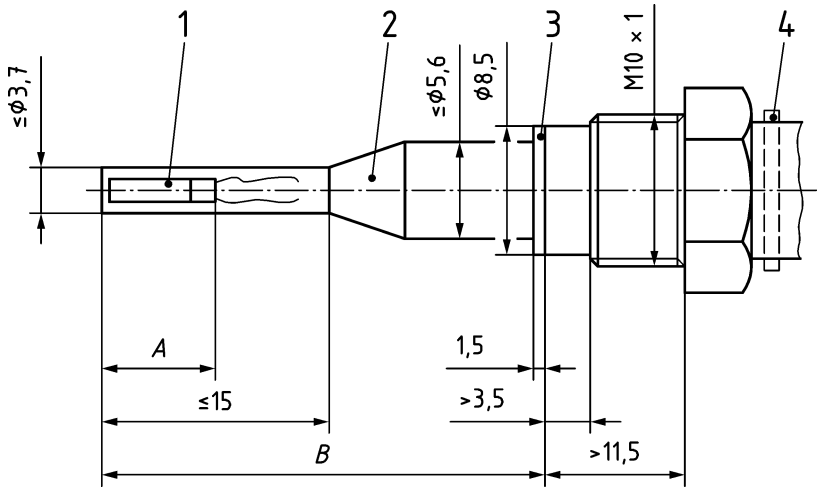
4.2.3 Dimensions of direct mounted short probes - Type DS

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

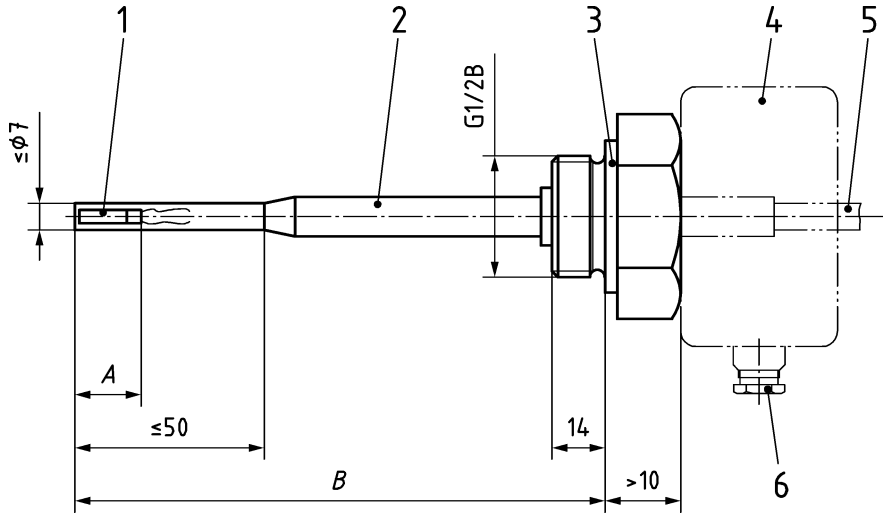
4.2.4 Dimensions of direct mounted long probes - Type DL

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 – ø ≤ 9 mm

G ½ B thread in accordance with EN ISO 228-1

A: < 30 mm or ≤ 50 mm for Pt1000

Alternative lengths	
B	C (head probe only)
85	105
120	140
210	230

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.

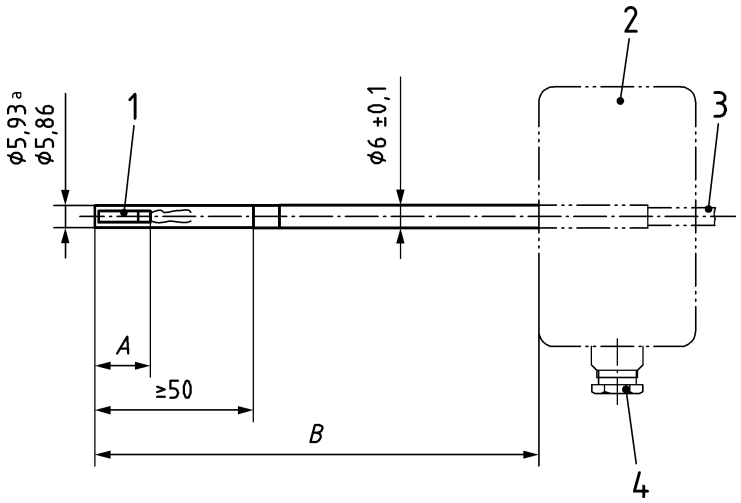
Further information is given in Annex A, Figures A.4 and A.5.

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

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

A < 30 mm or ≤ 50 mm for Pt 1000

Alternative lengths
B (head probe only)
105
140
230

1 temperature sensing element

2 outline of head probe

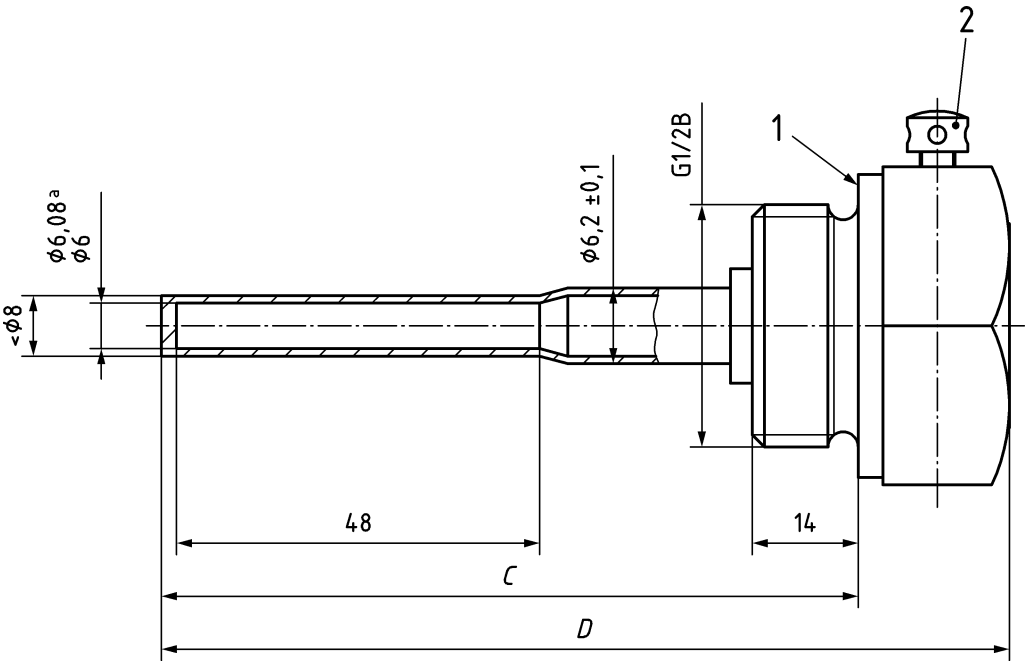
3 outline of permanently connected signal lead probe

4 inlet for signal cable – ø ≤ 9 mm

Corresponding to c11 in EN ISO 286-2, rounded to 2 decimals

Figure 3 — Temperature probes - Type PL (head or cable)

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 rounded to 2 decimals

G ½ B thread in accordance with EN ISO 228-1

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.7).

4.2.8 Design of long probes with respect to installation

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

The sensor shall be designed to fit in the following types of installation, (for internal pressures up to PN 16):

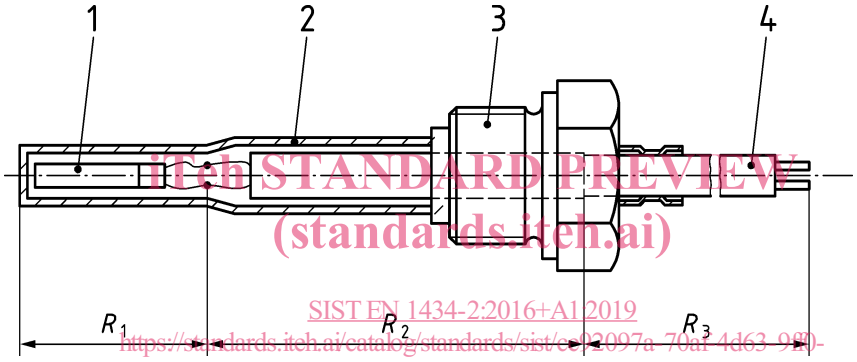
a) in a pipe DN 50 mounted with the tip pointing into the flow in a bend (see Annex A, Figure A.11 b), using welded-in boss (see Annex A, Figure A.9).

b) in a pipe DN 50 mounted at an angle 45° to the direction of the flow with the tip pointing into the flow (see Annex A, Figure A.11 c), using a welded-in boss (see Annex A, Figure A.9).

c) in a pipe DN 65 to DN 250, mounted perpendicular to the flow (see Annex A, Figure A.11 d), using a welded-in boss (see Annex A, Figure A.9).

4.3 Platinum temperature sensor

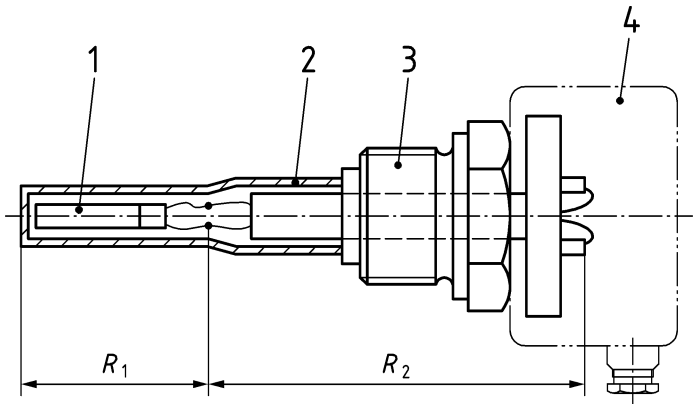
4.3.1 Specialized definitions for 2 wire temperature probes



Key

R_1	temperature sensing element resistance	1	temperature sensing element
R_2	internal wire resistance	2	protective sheath
R_3	signal lead resistance	3	mounting thread
		4	signal leads

Figure 5 — Temperature probe with permanently connected signal leads



Key

R_1	temperature sensing element resistance	1	temperature sensing element
R_2	internal wire and terminals resistance	2	protective sheath
		3	mounting thread
		4	signal leads

Figure 6 — Head sensor temperature probe

4.3.2 Resistance characteristics

The calibration of temperature sensors shall be traceable to national temperature standards. The intermediate values of the [A1] thermal energy meter [A1] temperature sensor shall be interpolated using Formula (1) as follows:

$$R_t = R_0\left(1 + At + Bt^2\right) \quad (1)$$

where

R_t is the resistance value at temperature t in Ω (excluding cable resistance - see Figures 5 and 6);

R_0 is the resistance value at temperature 0 °C in Ω (base value) (excluding cable resistance);

A is $3{,}908\,3 \times 10^{-3}$ °C^{-1};

B is $-5{,}775 \times 10^{-7}$ °C^{-2}.

NOTE It is assumed that the national temperature standards are established with reference to ITS-90 - The International Temperature Scale of 1990.

4.3.3 Signal leads

For signal leads, leads with strands can be used, or in the case of head probes, solid wires. The lead ends shall be precisely trimmed, if strands are used (e. g. by lead end sleeves). Solder-coating of the lead ends to prevent splicing is not permissible.

A soldered joint to connect the temperature probe signal lead to the calculator is only permitted in the case of non-interchangeable temperature probes.

For screened cables for temperature sensors there shall be no connection between the screen and the protecting sheet.