



SLOVENSKI STANDARD

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Merilniki toplote - 6. del: Vgradnja, zagon, nadzor in vzdrževanje

Heat meters - Part 6: Installation, commissioning, operational monitoring and maintenance

Wärmezähler - Teil 6: Einbau, Inbetriebnahme, Überwachung und Wartung

Compteurs d'énergie thermique - Partie 6: Installation, mise en service, surveillance et maintenance

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Ta slovenski standard je istoveten z: EN 1434-6:2015

ICS:

17.200.10 Toplota. Kalorimetrija Heat. Calorimetry

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EUROPEAN STANDARD

EN 1434-6

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2015

ICS 17.200.10

Supersedes EN 1434-6:2007

English Version

Heat meters - Part 6: Installation, commissioning, operational monitoring and maintenance

Compteurs d'énergie thermique - Partie 6: Installation,
mise en service, surveillance de fonctionnement et
maintenance

Wärmezähler - Teil 6: Einbau, Inbetriebnahme,
Überwachung und Wartung

This European Standard was approved by CEN on 5 September 2015.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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.

CEN members are the national standards bodies of 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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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European foreword

This document (EN 1434-6:2015) has been prepared by Technical Committee CEN/TC 176 “Heat 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 2016, and conflicting national standards shall be withdrawn at the latest by May 2016.

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

This document supersedes EN 1434-6:2007.

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.

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

EN 1434, *Heat meters* consists of the following parts:

- *Part 1: General requirements* (standards.iteh.ai)
- *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 1434-6:2007, the following changes have been made:

- special cases for combined cooling and heating meters are added;
- additional functionalities for smart metering applications are added;
- installation requirements added for heat meters which are located next to cables like data communication cables and mains supply cables;
- installation requirement changed for 4-wire connections;
- cooling meters are added.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria,

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

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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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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1 Scope

This European Standard specifies commissioning, operational monitoring and maintenance and applies to heat meters. Heat 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 heat meter 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 1434-1:2015, *Heat meters — Part 1: General requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1434-1:2015 and the following apply.

3.1

heating system

heating installation of the dwelling or premises, including the exchange circuit, the heat meter, the associated fittings and the electrical equipment

Note 1 to entry: The heating system typically commences and finishes at the two connections to the heat mains.

3.2

heat mains

heat suppliers distribution pipes to which the consumer's installation is connected

3.3

inlet and outlet limbs

pipes connecting the heating system to the heat mains

3.4

primary circuit

circuit hydraulically connected to the heat mains

3.5

secondary circuit

circuit hydraulically separated from the primary circuit

3.6

competent authority

persons or organizations charged with the responsibility for the heat meter and/or its installation

4 Requirements

4.1 Design requirements

4.1.1 When designing the heating system, the heat meter manufacturer meter specification and installation instructions shall be followed.

For DN 40 and smaller, it is possible to use short direct sensors. To achieve good temperature sensitivity, direct sensors should be installed without temperature pockets. Temperature pockets should only be used when required for safety reasons.

4.1.2 To avoid unnecessary systematic error the temperature sensors shall be placed directly before and after the thermal load. If the differential pressure between the sensors is too high this systematic error might be too large.

For typical systematic negative error as a function of differential pressure and temperature difference, see Table 1.

Table 1 — Typical systematic negative error as a function of differential pressure and temperature difference

Diff in bar	Temperature difference in K							
	3	5	10	20	30	40	50	60
0,5	0,2	0,2	0,1	0,1	0,1	0	0	0
1	0,5	0,4	0,3	0,2	0,1	0,1	0,1	0,1
2	0,9	0,7	0,5	0,3	0,2	0,2	0,1	0,1
3	1,4	1,1	0,8	0,5	0,3	0,2	0,2	0,2
4	1,8	1,5	1,0	0,6	0,4	0,3	0,3	0,2
5	2,3	1,9	1,3	0,8	0,5	0,4	0,3	0,3
6	2,7	2,2	1,5	0,9	0,6	0,5	0,4	0,3
7	3,2	2,6	1,9	1,1	0,7	0,6	0,5	0,4
8	3,6	3,0	2,0	1,2	0,9	0,7	0,5	0,4
9	4,1	3,3	2,3	1,4	1,0	0,7	0,6	0,5
10	4,5	4,0	2,5	1,5	1,1	0,8	0,7	0,5

The values are shown as fraction of the maximum permissible error for the calculator. The values below the marked line are higher than 1/3rd of the maximum permissible error for the heat calculator. If the resulting error is higher than 1/3rd of the maximum permissible error, it is recommended to change the installation to have smaller differential pressure.

NOTE In cases where flows from two different loads with different temperatures (e.g. for space heating and domestic warm water) are merged together just before the temperature sensor, the optimum position for the sensor is after the flow sensor.

4.1.3 For bifunctional meters for change-over systems between heating and cooling additional requirements are necessary to ensure the correct switching over function between the heating and cooling register. These requirements are:

- the lowest operating temperature in the inlet pipe at heating conditions shall be at least 3 °C higher than any specified optional switching over temperature θ_{hc} ,

- the highest operating temperature in the inlet pipe at cooling conditions shall be at least 3 °C lower than any specified optional switching over temperature θ_{hc} ,
- the minimum temperature difference in heating and cooling application shall be more than 3 K.

NOTE The above mentioned temperature range of at least 3 °C covers the maximum accepted uncertainty in absolute temperature and the cable resistance.

A temperature sensor with smaller tolerances than 2 °C for measuring absolute temperature is recommended.

4.2 Installation requirements

The heat meter shall be installed in accordance with the manufacturer's instructions.

Before installation, the circuit into which the flow sensor is to be installed shall be thoroughly flushed to remove debris. The strainer, where fitted, shall be cleaned.

The heat meter shall be protected from the risk of damage by shock and vibration induced by the surroundings at the place of installation.

The heat meter shall not be subjected to undue stresses caused by pipes and fittings.

The pipe lines of the heating system up and downstream of the heat meter shall be adequately anchored.

Heat meters designed to operate from an AC mains supply shall be wired in accordance with wiring regulations applicable.

The AC mains power supply shall be secured against accidental interruption. However, circuit protection shall be incorporated according to the state of the art, to safely disconnect the device when electrical problems occur.

Measurement signal leads shall not be laid directly alongside other leads such as mains supply cables, low voltage supply cables and data communication cables and shall be independently supported. The separation between those groups shall not be less than 50 mm. Unless the calculator under installation was type tested according to the latest version of EN 1434-4, it is recommended to install cables and calculators with a distance of at least 60 cm to strong electromagnetic fields, e.g. frequency controlled pumps and similar high energy mains cables.

Mains and external signal cables longer than 10 m shall in areas where lightning is frequent be protected with an external lightning surge protection at the cable entrance to the building.

Each signal lead between temperature sensors and calculator shall be one continuous length without joints except 4-wire connection solutions which are approved.

Signal circuits between parts of a heat meter shall be so installed as to deter unauthorized interference and disconnection.

Precautions shall be taken to prevent damage to the heat meter by unfavourable hydraulic conditions (cavitation, surging, water hammer).

When the installation of the heat and cooling meters is complete, it shall be inspected and approved by representatives of the competent authority in accordance with established procedures and the inspection shall be documented.

Installation shall be done according to national legislation on legal metrology.

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4.3 Heat meter commissioning**4.3.1 General**

The responsibility for the carrying out of each of the inspection phases is not necessarily restricted to one person or one authority depending on the national legislation on legal metrology, but however arranged, the following points shall be addressed and responsibilities defined.

4.3.2 Certification check

Before commissioning commences it shall be ascertained firstly, that the correct heat meter has been installed by comparing the heat meter manufacturer's type and size designation against the system specification. Secondly, it shall be checked that the heat meter, if a complete instrument, bears the correct pattern approval mark and, if a combined instrument, that each of the meters sub-assemblies bear the pattern approval marks stipulated in the pattern approval document for the heat meter installed.

4.3.3 Installation check

At least the following points shall be checked:

- Is the flow sensor mounted in the correct position and with the correct flow direction?
- Does the temperature sensor fit correctly into the pocket (pockets shorter than 140 mm shall be marked "EN 1434" or dimensions checked)?
- Are the temperature sensors correctly installed?
- Is the heat meter installed at a safe distance from sources of electromagnetic interference (switchgear, electric motors, fluorescent lights)?
- Where called for, has the heat meter been correctly earthed?
- The specified protection class (IP) has to be ensured: Is every cable diameter within the minimum and maximum diameter as specified by the manufacturer?
- Are the gaskets dedicated to the application (e.g. temperature range, pressure, durability, medium)?
- Are the accessories correctly installed according to the installation instructions of the manufacturer and operator?
- Is the heat meter seen to be functioning when the heating system starts operating?

4.3.4 Heat meter security

At the completion of commissioning, the heat meter's protective devices shall be sealed by representatives of the competent authority. For any further adjustment of the meter or for replacement of sub-assemblies, batteries, etc., it will thus be necessary to break one or more seals.

If a seal has to be broken then the renewal shall be conducted in conformity with the national legislation of legal metrology

Annex A (informative)

Heat meter installation

A.1 General

This annex gives recommendations for the installation of heat meters into the heating system of which they form a component.

It includes reference to the quality of the heat conveying liquid and contains recommendations of direct concern to the distributor of heat, the building owner and the final consumer.

A.2 Criteria for the selection of a heat meter

The type, size, accuracy and environmental class of a heat meter is determined according to the operating and environmental conditions of the installation, taking into account in particular the following:

- a) pressure of the heat conveying liquid;
- b) physical and chemical characteristics of the heat conveying liquid;
- c) acceptable pressure loss across the heat meter;
- d) accuracy requirements;
- e) temperature ranges in inlet and outlet limbs to the heating system and the system temperature difference;
- f) expected maximum and minimum flow rate of the heat conveying liquid;
- g) required thermal power of the heating system;
- h) nature of the flow rate through the heat meter, whether constant, variable or intermittent;
- i) requirements concerning the electrical supply to the heat meter;
- j) special requirements of the space around the heat meter for ease of reading, security installation and servicing of the meter;
- k) requirements for connections, i.e. flanges, fittings and meter dimensions.

A.3 Quality of the heat conveying liquid

A.3.1 General

Heat meters in general are constructed to withstand variations in the chemical constituents and the acidity or alkalinity of the heat conveying liquid. However, the presence of solids in suspension and their deposition onto the surfaces of the passages of the heat meter or their effect on the moving parts of a mechanical flow sensor causes degradation of the performance with time.