SLOVENSKI STANDARD
SIST EN 1434-1:1997

01-junij-1997

Toplotni števci - 1. del: Splošne zahteve

Heat meters - Part 1: General requirements

Wärmezähler - Teil 1: Allgemeine Anforderungen

Compteurs d'énergie thermique - Partie 1: Prescriptions générales

Ta slovenski standard je istoveten z: **EN 1434-1:1997**

ICS:

17.200.10 Toplota. Kalorimetrija Heat. Calorimetry

SIST EN 1434-1:1997 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1434-1

February 1997

ICS 17.200.10

Descriptors: metrology, measuring instruments, thermal energy meters, equipment specifications, definitions, symbols, operating requirements, characteristics, performance evaluation, fidelity, classifications, computation

English version

Heat meters - Part 1: General requirements

Compteurs d'énergie thermique - Partie 1: Prescriptions générales

Wärmezähler - Teil 1: Allgemeine Anforderungen

This European Standard was approved by CEN on 1997-01-27. 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 Central Secretariat or to any CEN member.

The European Standards exist 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart,36 B-1050 Brussels

CONTENTS

Foreword

This draft European Standard has been prepared by Technical Committee CEN/TC 176 "Heat meters", the secretariat of which is held by DS.

The other parts are:

Part 2 - Constructional requirements

Part 3 - Data exchange and interfaces

Part 4 - Pattern approval tests

Part 5 - Initial verification tests

Part 6 - Heat meter installation, commissioning, operational monitoring and maintenance

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 August 1997, and conflicting national standards shall be withdrawn at the latest by August 1997.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard applies to heat meters, that is to instruments intended for measuring the heat which, in a heat-exchange circuit, is absorbed or given up 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 standard.

Meters with surface mounted temperature sensors are not yet included in this standard.

Part 1 specifies general requirements.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 1434-2:1997	Heat meters - Part 2: Constructional requirements
EN 60751	Industrial platinum resistance thermometer sensors (IEC 751:1983)
IEC 1010-1	Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements.
ISO 7268	Pipe components - Definition of nominal pressure

3 Types of instrument

For the purpose of this standard, heat meters are defined either as complete instruments or as combined instruments.

3.1 Complete instrument

A heat meter which does not have separable sub-assemblies as defined in 3.4.

3.2 Combined instrument

A heat meter which has separable sub-assemblies as defined in 3.4.

3.3 Hybrid instrument (often called a "compact" instrument)

A heat meter, which for the purpose of pattern approval and verification can be treated as a combined instrument as defined in 3.2. However, after verification, its sub-assemblies shall be treated as insepara-ble.

3.4 Sub-assemblies of a heat meter, which is a combined instrument

The flow sensor, the temperature sensor pair and the calculator or a combination of these.

3.4.1 Flow sensor

A sub-assembly through which the heat-conveying liquid flows, at either the flow or return of a heat-exchange circuit, and which emits a signal, which is a function of the volume or the mass or the volumetric or mass flow-rate.

3.4.2 Temperature sensor pair

A sub-assembly (for mounting with or without pockets), which senses the temperatures of the heat-conveying liquid at the flow and return of a heat-exchange circuit.

3.4.3 Calculator

A sub-assembly, which receives signals from the flow sensor, and the temperature sensors and calculates and indicates the quantity of heat exchanged.

3.5 Equipment under test (EUT)

A sub-assembly, a combined sub-assembly or a complete meter subject to a test.

4 Definitions and symbols

For the purposes of this standard, the following definitions and symbols apply.

4.1 Response time, $T_{0.5}$

The time interval between the instant when flow or temperature difference is subjected to a specified abrupt change and the instant when the response reaches 50 % of the step value.

4.2 Fast response meter

A meter suitable for heat exchanging circuits with rapid dynamic variations in the exchanged heat.

4.3 Rated voltage U_n

The voltage of the external power supply required to operate the heat meter, conventionally the voltage of the AC mains supply.

4.4 Rated operating conditions

Conditions of use, giving the range of values of influence quantities, for which the metrological characteristics of the instrument are within the specified maximum permissible errors.

4.5 Reference conditions

A set of specified values of influence factors, fixed to ensure valid intercomparison of results of measurements.

4.6 Influence quantity

A quantity which is not the subject of the measurement, but which influences the value of the measurand or the indication of the measuring instrument.

4.7 Influence factors

An influence quantity having a value within the rated operating conditions.

4.8 Disturbance

An influence quantity having a value outside the rated operating conditions.

4.9 Types of error

4.9.1 Error (of indication)

The indication of the measuring instrument minus the conventional true value of the measurand.

4.9.2 Intrinsic error

The error of a measuring instrument determined under reference conditions.

4.9.3 Initial intrinsic error

The error of a measuring instrument as determined once prior to performance tests and durability tests.

4.9.4 Durability error

The difference between the intrinsic error after a period of use and the initial intrinsic error.

4.9.5 Maximum permissible error; MPE

The extreme values of the error (positive or negative) permitted.

4.10 Types of fault

4.10.1 Fault

The difference between the error of indication and the intrinsic error of the instrument.

4.10.2 Transitory fault

Momentary variations in the indication, which cannot be interpreted, memorized or transmitted as measurements.

4.10.3 Significant fault

A fault greater than the absolute value of the MPE and not being a transitory fault.

NOTE: If the MPE is ± 2 % then the significant fault is a fault larger than 2 %.

4.11 Reference values of the measurand; RVM

A specified set of values of the flow-rate, the return temperature and the temperature difference, fixed to ensure valid intercomparison of the results of measurements.

4.12 Conventional true value

A value of a quantity, which for the purpose of this standard, is considered as the true value.

NOTE: A conventional true value is, in general, regarded as sufficiently close to the true value for the difference to be insignificant for the given purpose.

4.13 Meter model

Different sizes of heat meters or sub-assemblies having a family similarity in the principles of operation, construction, and materials.

4.14 Electronic device

A device employing electronic elements and performing a specific function.

4.15 Electronic element

The smallest physical entity in an electronic device which uses electron hole conduction in semi-conductors, or electron conduction in gases or in a vacuum.

4.16 Minimum immersion depth of a temperature sensor

The depth of immersion in a thermostatic bath with a temperature of (80 ± 5)°C at an ambient temperature of (25 ± 5)°C, beyond which deeper immersion changes the resistance value by an amount corresponding to < 0,1 K.

4.17 Self heating effect

The increase in temperature signal that is obtained by subjecting each temperature sensor of a pair to a continuous power dissipation of 5 mW when immersed to the minimum immersion depth in a water bath, having a mean water velocity of 0,1 m/s.

5 Rated operating conditions

5.1 Limits of temperature range

5.1.1 The upper limit of the temperature range, Θ_{max}, is the highest temperature of the heat conveying liquid, at which the heat meter shall function without the maximum permissible errors being exceeded.

5.1.2 The lower limit of the temperature range, Θ_{min}, is the lowest temperature of the heat-conveying liquid, at which the heat meter shall function without the maximum permissible errors being exceeded.

5.2 Limits of temperature differences

5.2.1 The temperature difference, $\Delta\Theta$, is the absolute value of the difference between the temperatures of the heat-conveying liquid at the flow and return of the heat-exchange circuit.

5.2.2 The upper limit of the temperature difference, $\Delta\Theta_{max}$, is the highest temperature difference, at which the heat meter shall function within the upper limit of thermal power, without the maximum permissible errors being exceeded.

5.2.3 The lower limit of the temperature difference, $\Delta\Theta_{min}$, is the lowest temperature difference, above which the heat meter shall function, without the maximum permissible errors being exceeded.

5.3 Limits of flow-rate

5.3.1 The upper limit of the flow-rate, q_s, is the highest flow-rate, at which the heat meter shall function for short periods (< 1h / day; < 200 h / year), without the maximum permissible errors being exceeded.

5.3.2 The permanent flow-rate, q_p, is the highest flow-rate, at which the heat meter shall function continuously without the maximum permissible errors being exceeded.

5.3.3 The lower limit of the flow-rate, q_i, is the lowest flow-rate, above which the heat meter shall function without the maximum permissible errors being exceeded.

5.4 Limit of thermal power

The upper limit of the thermal power, P_s, is the highest power at which the heat meter shall function without the maximum permissible errors being exceeded.

5.5 Maximum admissible working pressure, MAP

The maximum positive internal pressure that the heat meter can withstand permanently at the upper limit of the temperature range, expressed as a PN-series as defined in ISO 7268.

5.6 Maximum pressure loss

The loss of pressure in the heat conveying liquid passing through the flow sensor, when the flow sensor is operating at the permanent flow-rate, q_p.

6 Technical characteristics

6.1 Materials and construction

All the constituent elements of heat meters shall be solidly constructed of materials having appropriate qualities to resist the various forms of corrosion and wear which occur under rated operating conditions, especially those due to impurities in the heat conveying liquid. Correctly installed meters shall also be able to withstand normal external influences. Meters shall, in all circumstances, withstand the maximum admissible pressure and the temperatures for which they are designed, without malfunction.

6.1.1 The supplier of the heat meter shall declare any limitations with regard to installation of the heat meter and its orientation, with respect to the vertical.

6.1.2 The casing of a heat meter shall protect the interior parts against water and dust ingress. The minimum forms of enclosure protection shall be IP54 for enclosures that are to be installed into pipework and IP52 for other enclosures, all in accordance with IEC 1010-1.

6.1.3 Heat meters may be fitted with interfaces allowing the connection of supplementary devices. Such connections shall not modify the metrological qualities of the heat meter.

6.1.4 The maximum pressure loss at q_p shall not exceed 0,25 bar, except where the heat meter includes a flow controller or also acts as a pressure reducing device.