



**SLOVENSKI STANDARD**  
**SIST EN 1434-4:1997/A1:2002**

**01-november-2002**

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**Toplotni števci - 4. del: Preskušanje za odobritev tipa**

Heat meters - Part 4: Pattern approval tests

Wärmezähler - Teil 4: Prüfungen für die Bauartzulassung

Compteurs d'énergie thermique - Partie 4: Essais en vue de l'approbation de modele

**Ta slovenski standard je istoveten z: EN 1434-4:1997/A1:2002**

[SIST EN 1434-4:1997/A1:2002](https://standards.iteh.ai/catalog/standards/sist/8f683860-9c74-40be-9214-36ccc90d7377/sist-en-1434-4-1997-a1-2002)

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**ICS:**

17.200.10      Toplota. Kalorimetrija      Heat. Calorimetry

**SIST EN 1434-4:1997/A1:2002**      **en**

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ICS 17.200.10

English version

## Heat meters - Part 4: Pattern approval tests

Compteurs d'énergie thermique - Partie 4: Essais en vue  
de l'approbation de modèle

Wärmezähler - Teil 4: Prüfungen für die Bauartzulassung

This amendment A1 modifies the European Standard EN 1434-4:1997; it was approved by CEN on 1 July 2002.

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

This amendment 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 Management Centre has the same status as the official versions.

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## Foreword

This document (EN 1434-4:1997/A1:2002) has been prepared by Technical Committee CEN/TC 176 "Heat meters", the secretariat of which is held by DS.

This Amendment to the 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of an identical text or by endorsement, at the latest by March 2003, and conflicting national standards shall be withdrawn at the latest by March 2003.

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

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## Introduction

This amendment to EN 1434-4 is divided into 2 main areas. The first being the new clauses – i.e. clauses which are not present in the 1997 version. The second being the amended clauses, where the entire clause – not only the changes – is presented.

It has been prepared in such a way that it can be cut and pasted into the old version.

A new descriptor has been added: cooling meters.

## 1 New clauses

### 6.19 24 hours interruption in the mains power supply voltage

The calculator shall be exposed to the following sequence:

- 1) Operate the calculator for 24 h at  $\Delta\theta_{\max}$  and  $q_p$ ;
- 2) Operate the calculator for 24 h at  $\Delta\theta_{\max}$  and zero flow;
- 3) Note the reading on the display;
- 4) Disconnect the mains power supply for 24 hours;
- 5) Re-connect the mains power supply; [SIST EN 1434-4:1997/A1:2002](https://standards.iteh.ai/catalog/standards/sist/8f683860-9c74-40be-9214-36ccc90d7377/sist-en-1434-4-1997-a1-2002)
- 6) Note the reading on the display. <https://standards.iteh.ai/catalog/standards/sist/8f683860-9c74-40be-9214-36ccc90d7377/sist-en-1434-4-1997-a1-2002>

Requirements: the energy displayed before and after the mains power supply interruption shall not differ by more than the value of the least significant digit of the display.

## 2 Amended clauses

NEW TEXT

### 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.

Pressure safety requirements are not covered by this standard.

Surface mounted sensors are not covered by this standard.

Part 1 specifies general requirements.

NEW TEXT (3 last lines added)

## 5.1 Rated operating conditions

The rated operating conditions are those given in Table 1.

**Table 1 - Rated operating conditions**

| Environmental class              | A   | B           | C           |
|----------------------------------|---|-------------|-------------|
| Ambient temperature in °C        | + 5 to + 55   | - 25 to +55 | + 5 to + 55 |
| Relative humidity in %           | < 93  |             |             |
| Mains supply voltage in V        | +10<br>230 %<br>-15   |             |             |
| Mains frequency                  | $f_{nom} \pm 2 \%$  |             |             |
| Battery voltage                  | The voltage of a battery in service under normal conditions |             |             |
| Remote AC supply voltage         | 24 V $\pm$ 50 %   |             |             |
| Remote DC supply voltage         | 12 V to 42 V  |             |             |
| Local external DC supply voltage | as specified by supplier                                    |             |             |

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NEW TEXT

### 5.3.1 Reference values for the measurand, RVM, for $q_p \leq 3,5 \text{ m}^3/\text{h}$

Range of temperature difference:  $(40 \pm 2) \text{ K}$  <https://standards.iteh.ai/catalog/standards/sist/8f683860-9c74-40be-9214-36a90e173181/sist-en-1434-4-1997-a1-2002>

or  $\Delta\theta_{max} \text{ }^{\circ} \text{K}$  if  $\Delta\theta_{max}$  is less than 40 K

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for heating applications

and  $(10 \pm 2) \text{ K}$  for cooling applications

Range of flow-rate:  $(0,7 \text{ to } 0,75) q_p$  in  $\text{m}^3/\text{h}$

Return temperature:  $(50 \pm 5) \text{ }^{\circ} \text{C}$

or the upper temperature, if it is less than  $50 \text{ }^{\circ} \text{C}$

The conditions mentioned above are reference values for a complete heat meter. Reference values for sub-assemblies are the relevant parts of the above mentioned conditions.

NEW TEXT

### 5.3.2 Reference values for the measurand, RVM, for $q_p > 3,5 \text{ m}^3/\text{h}$

Flow-rate simulation for the flow sensor electronics is allowed, but testing with water is always preferred and carried out in accordance with 5.3.1.

If flow-rate simulation is used, the following RVM values apply:

## EN 1434-4:1997/A1:2002 (E)

Range of temperature differences:

For heating applications

$$(40 \pm 2) \text{ K}$$

or  $\Delta\theta_{\max} \begin{matrix} 0 \\ -2 \end{matrix} \text{ K}$  if  $\Delta\theta_{\max}$  is less than 40 K

For cooling applications

$$(10 \pm 2) \text{ K}$$

The temperature of the liquid in the flow sensor shall be kept at  $(50 \pm 5) \text{ }^\circ\text{C}$  or at ambient temperature

Range of flow-rate:  $(0,7 \text{ to } 0,75) q_p$

The power and signal wires shall be connected.

The flow sensor including flow sensor electronics shall be operated at zero flow rate (without low flow cut off device).

NEW TEXT

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### 6.1 General

Unless otherwise stated in the test specification, the test requirements apply irrespective of the heat meter's environmental class. See clause 10 of EN 1434-1:1997.

All measurements shall be carried out under the installation conditions stipulated by the supplier for his type of meter (e.g. straight sections of piping upstream and downstream of the meter). For all tests the heat conveying liquid shall be water, unless otherwise specified.

If a temperature sensor can be installed in the flow sensor, this shall be done during the performance tests of the flow sensor. Where a filter or strainer is an integral part of the flow sensor, it shall be included in all the tests.

If the error determined lies outside the MPE, the test shall be repeated twice unless otherwise stated. The test is then declared satisfactory if both the arithmetic mean of the result of the three tests and at least two of the test results are within or at the MPE.

Depending on the flow sensor size the tests and measurements to be carried out are described below:

For each meter model the test in 6.4 6.16 and 6.17 can be carried out on a limited number of sizes according to an evaluation by the testing laboratory. This evaluation shall be included in the type testing report.

The test in 6.8 shall be carried out only for those sizes of a type for which the highest wear is expected.

For dimensions  $> \text{DN } 200$ , 6.17 shall be carried out at  $\theta_{\min}$ .

For each meter model the following tests shall be carried out on one size only: 6.5, 6.6, 6.7, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15 and 6.18.

NEW TEXT



## 6.2 Test program

Samples of a heat meter, or its sub-assemblies, submitted for pattern approval, shall be subject to tests to verify their conformity with clause 4. Unless otherwise stated, the tests shall be carried out at reference conditions and the samples shall be exposed to the influence factors or disturbances specified for the respective tests, as stated in Table 2.

The test sequence and the number of items used, shall be either as described in Table 2 or as agreed between the supplier and the testing laboratory (assuming four samples, numbered by the testing laboratory).

Only one influence quantity shall be applied at a time.

If the meter under test (complete, combined or sub-assemblies) has test outputs for quantity of water, temperature difference and/or energy, these outputs can be used to test such parameters.

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Table 2 - Test programme for heat meters and their sub-assemblies

| Test  | Sub-clause | Exposure                                 | Temperature sensor pair | Flow sensor | Calculating device | Complete meter | Sample no. |
|---|------------|--|-------------------------|-------------|--------------------|----------------|------------|
|   |            | <b>INFLUENCE FACTORS</b>                 |                         |             |                    |                |            |
| MPE   | 6.4        | Performance test                         | X                       | X           | X                  | X              | 2          |
| MPE   | 6.5        | Dry heat                                 |                         | X(a)        | X                  | X              | 2          |
| MPE   | 6.6        | Cold                                     |                         | X(a)        | X                  | X              | 2          |
| MPE   | 6.7        | Static deviations in supply voltage      |                         | X(a)        | X                  | X              | 2          |
|   |            | <b>DISTURBANCES</b>                      |                         |             |                    |                |            |
| NSFa  | 6.8        | Durability                               | X                       | X           |                    | X              | 4          |
| NSFd  | 6.9        | Damp heat, cyclic                        |                         | X(a)        | X                  | X              | 1          |
| NSFd  | 6.10       | Short time reduction in supply voltage   |                         | X(a)        | X                  | X              | 3          |
| NSFa  | 6.11       | Electrical transients                    |                         | X(a)(b)     | X(b)               | X              | 3          |
| NSFd  | 6.12       | Electromagnetic field                    |                         | X(a)(b)     | X(b)               | X              | 3          |
| NSFa  | 6.13       | Electrostatic discharge                  |                         | X(a)        | X                  | X              | 3          |
| NSFd  | 6.14       | Static magnetic field                    |                         | X           | X                  | X              | 3          |
| NSFd  | 6.15       | Electromagnetic field at mains frequency |                         | X(a)        | X                  | X              | 3          |
| NSFa  | 6.16       | Internal pressure                        |                         | X           |                    | X              | 1          |
|   | 6.17       | Pressure loss                            |                         | X           |                    | X              | 1          |
|   | 6.18       | Electromagnetic emission                 |                         | X(a)        | X(b)               | X              | 3          |
|   | 6.19       | 24 hrs interruption in supply voltage    |                         |             | X                  | X              | 3          |
| <p>MPE - Maximum permissible error according to clause 9 of EN 1434-1:1996<br/>                     NSFd - No significant fault shall occur during the test<br/>                     NSFa - No significant fault shall occur after the test<br/>                     X - Test to be performed<br/>                     a - Only for flow sensors with electronic devices<br/>                     b - This test shall be done with connected cables</p> |            |  |                         |             |                    |                |            |

NEW TEXT

**6.4.1.1 General**

Flow rates:

$$q_1 \begin{matrix} 0 \\ -10 \end{matrix} \% , q_2 \pm 5\% , q_3 \pm 5\% , q_4 \pm 5\% \text{ and } q_5 \begin{matrix} +10 \\ 0 \end{matrix} \%$$

where

$$q_1 = q_s \text{ and } q_5 = q_i, \quad q_1/q_2 = q_2/q_3 = q_3/q_4 = q_4/q_5 = K$$

where

$$K = \sqrt[4]{\frac{q_s}{q_i}}$$

The test flowrate nearest to 0,7 q<sub>p</sub> to 0,75 q<sub>p</sub> shall be changed to be within 0,7 q<sub>p</sub> to 0,75 q<sub>p</sub> in order to obtain one point within RVM conditions.

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**Table 3 - Water temperatures**

SIST EN 1434-4:1997/A1:2002

| Applications |  |
|--------------|--|
|              | Heating  |
|              | Cooling <sup>a)</sup>  |
| a            | $\vartheta_{\min}$ to $(\vartheta_{\min} + 5) \text{ }^\circ\text{C}$ (but not less than 10 $^\circ\text{C}$ ) |
| b            | $(50 \pm 5) \text{ }^\circ\text{C}$  |
| c            | $(85 \pm 5) \text{ }^\circ\text{C}$  |
| a)           | For $q_p/q_i = 25$ . For $q_p/q_i > 25$ additional testing shall be carried out at lower temperatures.         |
| b)           | Only for mechanical meters and if $q_p/q_i > 10$ .   |

The water temperature at the heat meter shall not vary by more than 2 K during a measurement.

For flow sensors larger than DN250 the test may be carried out only at the one temperature a), if the following conditions are satisfied:

- the test results for smaller flow sensors of the same model are inside MPE for all water temperatures;
- documentary evidence is given that technological similarity exists between the models tested and the larger sizes applied for.