

# SVENSK STANDARD

## SS-EN 1434-6:2015+A1:2019



Fastställt/Approved: 2019-02-20  
Utgåva/Edition: 1  
Språk/Language: engelska/English  
ICS: 17.200.10;27.010;91.140.10

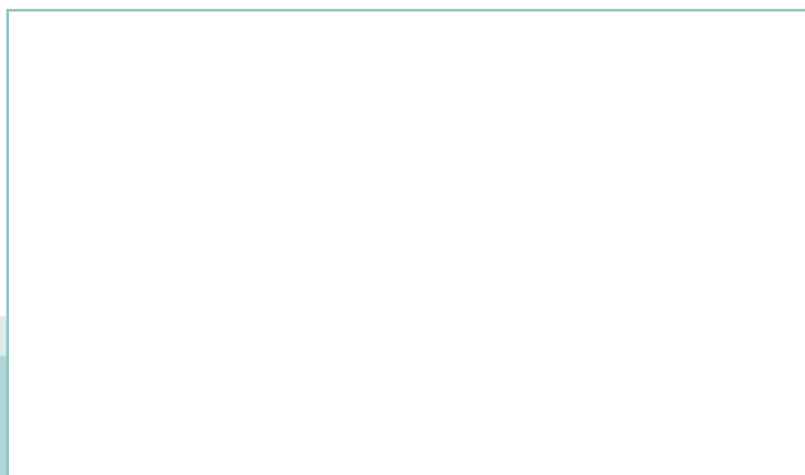
---

**Termisk energimätare —**

**Del 6: Installation, drifttagning, driftövervakning och underhåll**

**Thermal energy meters –**

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



# Standarder får världen att fungera

*SIS (Swedish Standards Institute) är en fristående ideell förening med medlemmar från både privat och offentlig sektor. Vi är en del av det europeiska och globala nätverk som utarbetar internationella standarder. Standarder är dokumenterad kunskap utvecklad av framstående aktörer inom industri, näringsliv och samhälle och befrämjar handel över gränser, bidrar till att processer och produkter blir säkrare samt effektiviserar din verksamhet.*

## Delta och påverka

Som medlem i SIS har du möjlighet att påverka framtida standarder inom ditt område på nationell, europeisk och global nivå. Du får samtidigt tillgång till tidig information om utvecklingen inom din bransch.

## Ta del av det färdiga arbetet

Vi erbjuder våra kunder allt som rör standarder och deras tillämpning. Hos oss kan du köpa alla publikationer du behöver – allt från enskilda standarder, tekniska rapporter och standardpaket till handböcker och onlinetjänster. Genom vår webbtjänst e-nav får du tillgång till ett lättnavigerat bibliotek där alla standarder som är aktuella för ditt företag finns tillgängliga. Standarder och handböcker är källor till kunskap. Vi säljer dem.

## Utveckla din kompetens och lyckas bättre i ditt arbete

Hos SIS kan du gå öppna eller företagsinterna utbildningar kring innehåll och tillämpning av standarder. Genom vår närhet till den internationella utvecklingen och ISO får du rätt kunskap i rätt tid, direkt från källan. Med vår kunskap om standarders möjligheter hjälper vi våra kunder att skapa verklig nytta och lönsamhet i sina verksamheter.

**Vill du veta mer om SIS eller hur standarder kan effektivisera din verksamhet är du välkommen in på [www.sis.se](http://www.sis.se) eller ta kontakt med oss på tel 08-555 523 00.**



# Standards make the world go round

*SIS (Swedish Standards Institute) is an independent non-profit organisation with members from both the private and public sectors. We are part of the European and global network that draws up international standards. Standards consist of documented knowledge developed by prominent actors within the industry, business world and society. They promote cross-border trade, they help to make processes and products safer and they streamline your organisation.*

## Take part and have influence

As a member of SIS you will have the possibility to participate in standardization activities on national, European and global level. The membership in SIS will give you the opportunity to influence future standards and gain access to early stage information about developments within your field.

## Get to know the finished work

We offer our customers everything in connection with standards and their application. You can purchase all the publications you need from us - everything from individual standards, technical reports and standard packages through to manuals and online services. Our web service e-nav gives you access to an easy-to-navigate library where all standards that are relevant to your company are available. Standards and manuals are sources of knowledge. We sell them.

## Increase understanding and improve perception

With SIS you can undergo either shared or in-house training in the content and application of standards. Thanks to our proximity to international development and ISO you receive the right knowledge at the right time, direct from the source. With our knowledge about the potential of standards, we assist our customers in creating tangible benefit and profitability in their organisations.

**If you want to know more about SIS, or how standards can streamline your organisation, please visit [www.sis.se](http://www.sis.se) or contact us on phone +46 (0)8-555 523 00**



Europastandarden EN 1434-6:2015+A1:2019 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN 1434-6:2015+A1:2019.

Denna standard ersätter SS-EN 1434-6:2015, utgåva 3.

The European Standard EN 1434-6:2015+A1:2019 has the status of a Swedish Standard. This document contains the official version of EN 1434-6:2015+A1:2019.

This standard supersedes the SS-EN 1434-6:2015, edition 3.

© Copyright/Upphovsrätten till denna produkt tillhör SIS, Swedish Standards Institute, Stockholm, Sverige. Användningen av denna produkt regleras av slutanvändarlicensen som återfinns i denna produkt, se standardens sista sidor.

© Copyright SIS, Swedish Standards Institute, Stockholm, Sweden. All rights reserved. The use of this product is governed by the end-user licence for this product. You will find the licence in the end of this document.

*Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS som även lämnar allmänna upplysningar om svensk och utländsk standard.*

*Information about the content of the standard is available from the Swedish Standards Institute (SIS), telephone +46 8 555 520 00. Standards may be ordered from SIS, who can also provide general information about Swedish and foreign standards.*

Denna standard är framtagen av kommittén för Termisk energimätare, SIS/TK 407.

Har du synpunkter på innehållet i den här standarden, vill du delta i ett kommande revideringsarbete eller vara med och ta fram andra standarder inom området? Gå in på [www.sis.se](http://www.sis.se) - där hittar du mer information.



EUROPEAN STANDARD

EN 1434-6:2015+A1

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2019

ICS 17.200.10

Supersedes EN 1434-6:2015

English Version

## Thermal energy meters - Part 6: Installation, commissioning, operational monitoring and maintenance

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

Thermische Energiemessgeräte - Teil 6: Einbau,  
Inbetriebnahme, Überwachung und Wartung

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

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, Serbia, 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: Rue de la Science 23, B-1040 Brussels**

<b>Contents</b>	<b>Page</b>
<b>European foreword.....</b>	<b>3</b>
<b>1 Scope.....</b>	<b>4</b>
<b>2 Normative references.....</b>	<b>4</b>
<b>3 Terms and definitions .....</b>	<b>4</b>
<b>4 Requirements .....</b>	<b>5</b>
<b>4.1 Design requirements .....</b>	<b>5</b>
<b>4.2 Installation requirements.....</b>	<b>6</b>
<b>4.3 [A1] Thermal energy meter [A1] commissioning.....</b>	<b>7</b>
<b>4.3.1 General.....</b>	<b>7</b>
<b>4.3.2 Certification check.....</b>	<b>7</b>
<b>4.3.3 Installation check.....</b>	<b>7</b>
<b>4.3.4 [A1] Thermal energy meter [A1] security .....</b>	<b>7</b>
<b>Annex A (informative) [A1] Thermal energy meter [A1] installation.....</b>	<b>8</b>
<b>Annex B (informative) [A1] Thermal energy meter [A1] operational monitoring and maintenance.....</b>	<b>18</b>
<b>Annex C (informative) Suggested gauge for checking the dimensions of installed temperature sensor pockets.....</b>	<b>21</b>
<b>Annex ZA (informative) Relationship between this European Standard and the essential requirements of Directive 2014/32/EU aimed to be covered.....</b>	<b>22</b>
<b>Bibliography.....</b>	<b>23</b>

## European foreword

This document (EN 1434-6:2015+A1:2019) 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 August 2019, and conflicting national standards shall be withdrawn at the latest by August 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 5 February 2018.

This document supersedes  $\boxed{A1}$  EN 1434-6:2015  $\langle A1 \rangle$ .

The start and finish of text introduced or altered by amendment is indicated in the text by tags  $\boxed{A1}$   $\langle A1 \rangle$ .

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

- *Part 1: General requirements*
- *Part 2: Constructional requirements*
- *Part 3: Data exchange and interfaces<sup>1)</sup>*
- *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  $\boxed{A1}$  thermal energy meters  $\langle A1 \rangle$  are added;
- additional functionalities for smart metering applications are added;
- installation requirements added for  $\boxed{A1}$  thermal energy meters  $\langle A1 \rangle$  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 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.

---

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

**SS-EN 1434-6:2015+A1:2019 (E)****1 Scope**

This European Standard specifies commissioning, operational monitoring and maintenance and applies to **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.

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

**3 Terms and definitions**

For the purposes of this document, the terms and definitions given in **A1** EN 1434-1:2015+A1:2018 **A1** and the following apply.

**A1** 3.1**thermal energy system**

heating or cooling installations of the dwelling or premises, including the exchange circuit, the thermal energy meter, the associated fittings and the electrical equipment

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

## 3.2

**thermal energy mains**

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

## 3.3

**inlet and outlet limbs**

pipes connecting the heating or cooling system to the thermal energy mains

## 3.4

**primary circuit**

circuit hydraulically connected to the thermal energy mains **A1**

## 3.5

**secondary circuit**

circuit hydraulically separated from the primary circuit



**3.6**

**competent authority**

persons or organizations charged with the responsibility for the  $\square_{A1}$  thermal energy meter  $\square_{A1}$  and/or its installation

**4 Requirements**

**4.1 Design requirements**

**4.1.1** When designing the  $\square_{A1}$  heating and cooling system  $\square_{A1}$ , the  $\square_{A1}$  thermal energy meter  $\square_{A1}$  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 1/3<sup>rd</sup> of the maximum permissible error for the heat calculator. If the resulting error is higher than 1/3<sup>rd</sup> 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.

**SS-EN 1434-6:2015+A1:2019 (E)**

**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  $\theta_{hc}$ ,
- 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  $\theta_{hc}$ ,
- 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  $\boxed{A_1}$  thermal energy meter  $\langle A_1 \rangle$  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  $\boxed{A_1}$  thermal energy meter  $\langle A_1 \rangle$  shall be protected from the risk of damage by shock and vibration induced by the surroundings at the place of installation.

The  $\boxed{A_1}$  thermal energy meter  $\langle A_1 \rangle$  shall not be subjected to undue stresses caused by pipes and fittings.

The pipe lines of the heating system up and downstream of the  $\boxed{A_1}$  thermal energy meter  $\langle A_1 \rangle$  shall be adequately anchored.

$\boxed{A_1}$  Thermal energy meters  $\langle A_1 \rangle$  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  $\boxed{A_1}$  thermal energy meter  $\langle A_1 \rangle$  shall be so installed as to deter unauthorized interference and disconnection.

Precautions shall be taken to prevent damage to the  $\boxed{A_1}$  thermal energy meter  $\langle A_1 \rangle$  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.

### 4.3 **A1** Thermal energy meter **A1** 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 **A1** thermal energy meter **A1** has been installed by comparing the **A1** thermal energy meter **A1** manufacturer's type and size designation against the system specification. Secondly, it shall be checked that the **A1** thermal energy meter **A1**, 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 **A1** thermal energy meter **A1** 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 **A1** thermal energy meter **A1** installed at a safe distance from sources of electromagnetic interference (switchgear, electric motors, fluorescent lights)?
- Where called for, has the **A1** thermal energy meter **A1** 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 **A1** thermal energy meter **A1** seen to be functioning when the heating system starts operating?

#### 4.3.4 **A1** Thermal energy meter **A1** security

At the completion of commissioning, the **A1** thermal energy meter's **A1** 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.