

SVENSK STANDARD

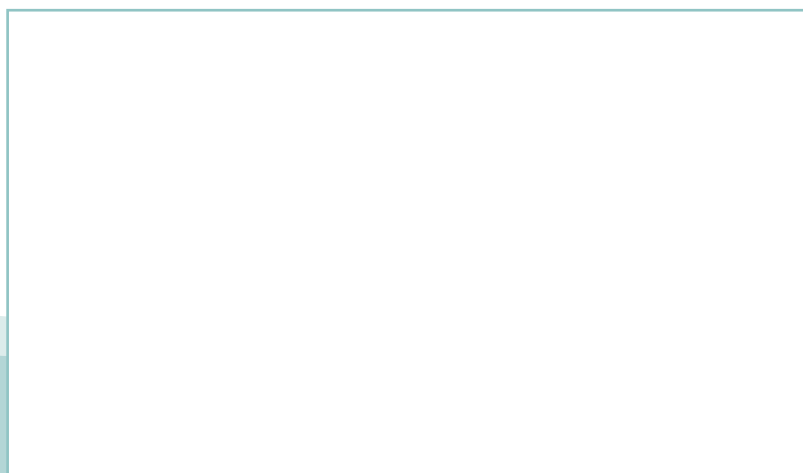
SS-EN ISO 11855-5:2015



Fastställt/Approved: 2015-08-09
Publicerad/Published: 2015-10-28
Utgåva/Edition: 1
Språk/Language: engelska/English
ICS: 91.040.01; 91.140.10; 91.140.30

**Byggnadsprojektering med miljöhänsyn – Projektering, dimensionering, installation och reglering av inbyggda strålningsverkande värme- och kylsystem –
Del 5: Installation (ISO 11855-5:2012)**

**Building environment design – Design, dimensioning, installation and control of embedded radiant heating and cooling systems –
Part 5: Installation (ISO 11855-5:2012)**



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Europastandarden EN ISO 11855-5:2015 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN ISO 11855-5:2015.

The European Standard EN ISO 11855-5:2015 has the status of a Swedish Standard. This document contains the official English version of EN ISO 11855-5:2015.

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Denna standard är framtagen av kommittén för Installationer, SIS/TK 189/AG 3.

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EUROPEAN STANDARD

EN ISO 11855-5

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 2015

ICS 91.140.10; 91.140.30

English Version

**Building environment design - Design , dimensioning, installation
and control of embedded radiant heating and cooling systems -
Part 5: Installation (ISO 11855-5:2012)**

Conception de l'environnement des bâtiments - Conception,
construction et fonctionnement des systèmes de chauffage
et de refroidissement par rayonnement - Partie 5:
Installation (ISO 11855-5:2012)

Umweltgerechte Gebäudeplanung - Planung, Auslegung,
Installation und Steuerung flächenintegrierter
Strahlheizungs- und -kühlsysteme - Teil 5: Installation (ISO
11855-5:2012)

This European Standard was approved by CEN on 30 July 2015.

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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: Avenue Marnix 17, B-1000 Brussels

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European foreword

The text of ISO 11855-5:2012 has been prepared by Technical Committee ISO/TC 205 “Building environment design” of the International Organization for Standardization (ISO) and has been taken over as EN ISO 11855-5:2015 by Technical Committee CEN/TC 228 “Heating systems and water based cooling systems in buildings” the secretariat of which is held by DIN

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 February 2016, and conflicting national standards shall be withdrawn at the latest by February 2016.

This standard is applicable for design, construction and operation of radiant heating and cooling systems. The methods defined in part 2 are intended to determine the design heating or cooling capacity used for the design and evaluation of the performance of the system.

For identifying product characteristics by testing and proving the thermal output of heating and cooling surfaces embedded in floors, ceilings and walls the standard series EN 1264 can be used.

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.

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Endorsement notice

The text of ISO 11855-5:2012 has been approved by CEN as EN ISO 11855-5:2015 without any modification.

Building environment design — Design, dimensioning, installation and control of embedded radiant heating and cooling systems —

Part 5: Installation

1 Scope

This part of ISO 11855 establishes guidelines on the installation of embedded radiant heating and cooling systems. It specifies uniform requirements for the design and construction of heating and cooling floors, ceiling and wall structures to ensure that the heating/cooling systems are suited to the particular application. The requirements specified by this part of ISO 11855 are applicable only to the components of the heating/cooling systems and the elements which are part of the heating/cooling surface and which are installed due to the heating/cooling systems.

This part of ISO 11855 is applicable to water-based embedded surface heating and cooling systems in residential, commercial and industrial buildings. The methods apply to systems integrated into the wall, floor or ceiling construction without any open-air gaps, but are not applicable to panel systems with open-air gaps which are not integrated into the building structure.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 10508:2006, *Plastics piping systems for hot and cold water installations — Guidance for classification and design*

ISO 11855-1, *Building environment design — Design, dimensioning, installation and control of embedded radiant heating and cooling systems — Part 1: Definition, symbols, and comfort criteria*

ISO 15874 (all parts), *Plastics piping systems for hot and cold water installations — Polypropylene (PP)*

ISO 15875 (all parts), *Plastics piping systems for hot and cold water installations — Crosslinked polyethylene (PEX)*

ISO 15876 (all parts), *Plastics piping systems for hot and cold water installations — Polybutylene (PB)*

ISO 15877 (all parts), *Plastics piping systems for hot and cold water installations — Chlorinated poly(vinyl chloride) (PVC-C)*

ISO 21003-1 (all parts), *Multilayer piping systems for hot and cold water installations inside buildings*

ISO 22391 (all parts), *Plastics piping systems for hot and cold water installations — Polyethylene of raised temperature resistance (PE-RT)*

EN 1057, *Copper and copper alloys — Seamless, round copper tubes for water and gas in sanitary and heating applications*

EN 1254 (all parts), *Copper and copper alloys — Plumbing fittings*

DIN 4724, *Kunststoff-Rohrleitungssysteme für Warmwasserheizung und Heizkörperanbindung — Vernetztes Polyethylen mittlerer Dichte (PE-MDX)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 11855-1 apply.

NOTE All terms and definitions in this part of ISO 11855 are consistent with ISO 7345, ISO 9229, ISO 9288, ISO 9346 and ISO 16818.

4 Symbols and abbreviations

For the purposes of this document, the symbols and abbreviations in Table 1 apply.

Table 1 — Symbols and abbreviations

Symbol	Unit	Quantity
$R_{\lambda,ins}$	m ² K/W	thermal resistance of the insulating layer of the heating/cooling system
ϑ_d	°C	external design temperature
$\vartheta_{V,des,max}$	°C	maximum heating water flow temperatures
PB	—	polybutylene
PE-X	—	cross-linked polyethylene
PE-MDX	—	cross-linked polyethylene, medium density
PE-RT Systems	—	polyethylene of raised temperature resistance
PP	—	polypropylene
PVC-C	—	chlorinated polyvinyl chloride

5 Installation

5.1 Floor heating and cooling systems

5.1.1 General structural preconditions

The installation of a hot water floor heating and/or cooling system must follow the previous installation of any electrical, sanitary and other pipe facilities. The structure as specified in 5.1.2.1, along with the draught-free closure of all building openings, e.g. windows and outer doors, must be completed.

5.1.2 Building layers, building components

5.1.2.1 Supporting base

The supporting base shall be prepared in accordance with relevant standards. Any pipe work or conduits shall be fixed and encased to provide a level base upon which thermal insulation and/or acoustic insulation is added before laying the heating pipes. In this respect, the necessary structural height shall be taken into account. Where service pipes are installed within the insulating layer, they must be protected against temperature change in accordance with national regulations.

5.1.2.2 Insulating layers, perimeter insulating strip

5.1.2.2.1 Insulating layers

The resistance $R_{\lambda,ins}$ of the insulating layer of the heating/cooling system is specified in Table 2. These requirements are for heating and cooling systems. For cooling systems only, these values are recommended.

Table 2 — Minimum thermal resistance of insulating layers below the pipes of heating/cooling systems (m² K)/W

	Heated room below	Unheated or intermittent heated room below or directly on the ground ^a	External design temperature below		
			$\theta_d \geq 0\text{ °C}$	$0\text{ °C} > \theta_d \geq -5\text{ °C}$	$-5\text{ °C} > \theta_d \geq -15\text{ °C}$
thermal resistance $R_{\lambda,ins}$	0,75	1,25	1,25	1,50	2,00
^a With ground water level \leq 5m below the supporting base, the value should be increased.					

When installing the insulating layer, the insulating panels shall be butted tightly together. Multiple insulating layers shall be staggered or placed in such a way that the joints between panels of one layer are out of line with the next layer.

NOTE National building codes may require higher insulation levels.

5.1.2.2.2 Peripheral insulating strip

Before laying the screed, a peripheral insulating strip (edge joint) shall be placed along the walls and other building components penetrating the screed and firmly secured to the supporting base (e.g. door frames, pillars and risers).

The peripheral insulating strip shall rise from the supporting base up to the surface of the finished floor and permit a movement of the screed of at least 5 mm.

In the case of multiple insulating layers, the peripheral insulating strip shall be placed before application of the upper insulating layer. When laying the screed, the peripheral insulating strip shall be secured against any change in position. The top part of the peripheral insulating strip which rises over the finished floor shall not be cut off until completion of the floor covering and, in the case of textile and plastic coverings, hardening of the filler.

5.1.2.3 Protection layer

Before laying the screed, the insulating layer shall be covered with a protective layer consisting of a polyethylene film of at least 0,15 mm thickness, with a minimum of 80 mm overlap, or with another product of equivalent function.

In accordance with 5.1.2.2.2, the protective layer shall be turned pulled up above the upper edge of the peripheral insulating strip unless the strip itself fulfils the function of protection. The peripheral insulating strip shall be firmly secured to the insulating layer to avoid the infiltration of the liquid screed. When using synthetic resin screeds or calcium sulfate screeds, the protective layer of the insulating layer must be liquid-tight by, for instance, being stuck or welded together.

NOTE Protective layers are not humidity barriers.

5.1.2.4 Equipment

5.1.2.4.1 Safety

For heating systems, a safety device, independent of the control unit, and which operates even in the absence of electric power, shall cut off the heat supply in the floor heating circuit in such a way that the temperature around the heating elements does not exceed the data given in 5.1.2.8.2. For cooling systems, a dew point sensor device is required to interrupt cooling water flow just before condensation forming or coalescing.

5.1.2.4.2 Manifolds

The central manifold of the piping system shall be placed in such a manner as to get the shortest flow pipes. Otherwise, the flow pipes can have an unwanted impact on the control of the room temperature.