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Water based surface embedded heating and cooling systems - Part 4: Installation

Raumflächenintegrierte Heiz- und Kühlsysteme mit Wasserdurchströmung - Teil 4: Installation

Systèmes de surfaces chauffantes et rafraîchissantes hydrauliques intégrées - Partie 4: Installation

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91.140.10	Sistemi centralnega ogrevanja	Central heating systems

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English Version

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This European Standard was approved by CEN on 1 August 2009.

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Foreword

This document (EN 1264-4:2009) has been prepared by Technical Committee CEN/TC 130 “Space heating appliances without heat sources”, the secretariat of which is held by UNI.

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of an identical text or by endorsement, at the latest by March 2010, and conflicting national standards shall be withdrawn at the latest by March 2010.

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 1264-4:2001. Together with EN 1264-3:2009, this document also supersedes EN 15377-2:2008.

The series of European Standards EN 1264 "*Water based surface embedded heating and cooling systems*" consists of the following parts:

Part 1: Definitions and symbols;

Part 2: Floor heating: Prove methods for the determination of the thermal output of floor heating systems using calculation and test methods;

Part 3: Dimensioning;

Part 4: Installation;

Part 5: Heating and cooling surfaces embedded in floors, ceilings and walls — Determination of the thermal output.

The two main changes with respect to EN 1264-4:2001 are listed below:

a) The scope is expanded over floor heating, now additionally includes ceiling and wall heating as well as cooling surfaces in floors, ceilings and walls;

b) The content generally is attuned to the state of the technology.

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard applies to heating and cooling systems embedded into the enclosure surfaces of the room to be heated or to be cooled.

This document specifies uniform requirements for the design and the construction of heating and cooling floor, ceiling and wall structures to ensure that the heating/cooling systems are suited to the particular application.

The requirements specified by this Standard apply only to the components of the heating/cooling systems which are part of the heating/cooling system. This document excludes all other elements which are not part of the heating/cooling system.

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.

EN 1057:2006, *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*

EN 1264-1:1997, *Water based surface embedded heating and cooling systems - Part 1: Definitions and symbols*

EN 1264-2, *Water based surface embedded heating and cooling systems - Part 2: Floor heating: Prove methods for the determination of the thermal output using calculation and test methods*

EN ISO 15874-1, *Plastics piping systems for hot and cold water installations - Polypropylene (PP) - Part 1: General (ISO 15874-1:2003)*

EN ISO 15874-2, *Plastics piping systems for hot and cold water installations - Polypropylene (PP) - Part 2: Pipes (ISO 15874-2:2003)*

EN ISO 15874-3, *Plastics piping systems for hot and cold water installations - Polypropylene (PP) - Part 3: Fittings (ISO 15874-3:2003)*

EN ISO 15874-5, *Plastics piping systems for hot and cold water installations - Polypropylene (PP) - Part 5: Fitness for purpose of the system (ISO 15874-5:2003)*

EN ISO 15875-1, *Plastics piping systems for hot and cold water installations - Crosslinked polyethylene (PE-X) - Part 1: General (ISO 15875-1:2003)*

EN ISO 15875-2, Plastics piping systems for hot and cold water installations - Crosslinked polyethylene (PE-X) - Part 2: Pipes (ISO 15875-2:2003)

EN ISO 15875-3*, Plastics piping systems for hot and cold water installations - Crosslinked polyethylene (PE-X) - Part 3: Fittings (ISO 15875-3:2003)*

EN ISO 15875-5, *Plastics piping systems for hot and cold water installations - Crosslinked polyethylene (PE-X) - Part 5: Fitness for purpose of the system (ISO 15875-5:2003)*

EN ISO 15876-1, *Plastics piping systems for hot and cold water installations - Polybutylene (PB) - Part 1: General (ISO 15876-1:2003)*

EN ISO 15876-2, *Plastics piping systems for hot and cold water installations - Polybutylene (PB) - Part 2: Pipes (ISO 15876-2:2003)*

EN ISO 15876-3, *Plastics piping systems for hot and cold water installations - Polybutylene (PB) - Part 3: Fittings (ISO 15876-3:2003)*

EN ISO 15876-5, *Plastics piping systems for hot and cold water installations - Polybutylene (PB) - Part 5: Fitness for purpose of the system (ISO 15876-5:2003)*

EN ISO 15877-1, *Plastics piping systems for hot and cold water installations - Chlorinated poly(vinyl chloride) (PVC-C) - Part 1: General (ISO 15877-1:2003)*

EN ISO 15877-2, *Plastics piping systems for hot and cold water installations - Chlorinated poly(vinyl chloride) (PVC-C) - Part 2: Pipes (ISO 15877-2:2003)*

EN ISO 15877-3, *Plastics piping systems for hot and cold water installations - Chlorinated poly(vinyl chloride) (PVC-C) - Part 3: Fittings (ISO 15877-3:2003)*

EN ISO 15877-5, *Plastics piping systems for hot and cold water installations - Chlorinated poly(vinyl chloride) (PVC-C) - Part 5: Fitness for purpose of the system (ISO 15877-5:2003)*

EN ISO 21003-1, *Multilayer piping systems for hot and cold water installations inside buildings - Part 1: General (ISO 21003-1:2008)*

EN ISO 21003-2, *Multilayer piping systems for hot and cold water installations inside buildings - Part 2: Pipes (ISO 21003-2:2008)*

EN ISO 21003-3, *Multilayer piping systems for hot and cold water installations inside buildings - Part 3: Fittings (ISO 21003-3:2008)*

EN ISO 21003-5, *Multilayer piping systems for hot and cold water installations inside buildings - Part 5: Fitness for purpose of the system (ISO 21003-5:2008)*

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

ISO 22391-1, *Plastics piping systems for hot and cold water installations — Polyethylene of raised temperature resistance (PE-RT) — Part 1: General*

ISO 22391-2, *Plastics piping systems for hot and cold water installations — Polyethylene of raised temperature resistance (PE-RT) — Part 2: Pipes*

ISO 22391-3, *Plastics piping systems for hot and cold water installations — Polyethylene of raised temperature resistance (PE-RT) — Part 3: Fittings*

ISO 22391-5, *Plastics piping systems for hot and cold water installations — Polyethylene of raised temperature resistance (PE-RT) — Part 5: Fitness for purpose of the system*

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

3 Terms, definitions and symbols

For the purposes of this document, the terms, definitions, and symbols given in EN 1264-1:1997 apply.

4 Requirements

4.1 Floor heating and cooling systems

4.1.1 General structural preconditions

The installation of a hot water floor heating and/or cooling system must follow the prior installation of any electrical, sanitary and other pipe facilities. The structure as specified in 4.1.2.1 with the draught-free closure of all building openings, e.g. windows and outer doors, must be completed.

4.1.2 Building layers, building components

4.1.2.1 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.

In the case of service pipes installed within the insulation layer, these pipes must be protected against temperature change in accordance with National Regulations.

4.1.2.2 Insulating layers, perimeter insulating strip

4.1.2.2.1 Insulating layers

The resistance $R_{\lambda,ins}$ of the insulating layer of the heating/cooling system is specified in Table 1. These requirements are for heating and cooling systems, but for cooling only systems, these values are recommended.

Table 1 — System Insulation

Minimum heat conduction resistance of system-insulating layers below the pipes of heating/cooling systems ($m^2 \cdot K)/W$

	heated room below or adjacent	Unheated or intermittent heated room below, adjacent or directly on the ground *)	external air temperature below or adjacent		
			external design temperature $\vartheta_d \geq 0$ °C	external design temperature 0 °C > $\vartheta_d \geq$ -5 °C	external design temperature -5 °C > $\vartheta_d \geq$ -15 °C
heat conduction resistance $R_{\lambda,ins}$	0,75	1,25	1,25	1,50	2,00
*) with ground water level ≤ 5m below the supporting base, the value should be increased.					

When installing the system-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.

4.1.2.2.2 Peripheral insulating strip

Prior to the laying of 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 prior to 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.

4.1.2.3 Protective layer

Prior to laying the screed, the insulation 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 overlaps, or with another product of equivalent function.

In accordance with 4.1.2.2.2, 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 or to the protective layer to avoid the infiltration of the liquid screed.

When using synthetic resin screeds or calcium sulphate screeds, the protective layer of the insulating layer must be liquid-tight by for instance being stuck or welded together.

When using gush asphalt screeds, also a therefore suitable protective layer shall be applied, but in this case, liquid tightness is not necessary.

Protective layers are not humidity barriers.

4.1.2.4 Equipment

4.1.2.4.1 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 4.1.2.8.2. For cooling systems, a dew point sensor device is required to interrupt cooling water flow just prior to condensation forming or coalescing.

4.1.2.4.2 Manifolds

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

4.1.2.4.3 Stop valves and balancing devices

Each circuit shall have two stop valves and a balancing device. The shut-off and balancing functions shall be independent. At least one circuit per heated/cooled room shall be installed in order to permit temperature control either manual or automatic.