BS EN 1264-4:2021

BSI Standards Publication

Water based surface embedded heating and cooling systems

Part 4: Installation

bsi.

National foreword

This British Standard is the UK implementation of EN 1264-4:2021. It supersedes BS EN 1264-4:2009, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee RHE/6, Air or space heaters or coolers without combustion.

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English Version

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

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

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

This European Standard was approved by CEN on 12 April 2021.

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European foreword

This document (EN 1264-4:2021) has been prepared by Technical Committee CEN/TC 130 “Space heating appliances without integral 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of an identical text or by endorsement, at the latest by November 2021, and conflicting national standards shall be withdrawn at the latest by November 2021.

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 supersedes EN 1264-4:2009.

The main changes compared to the previous edition are listed below:

a) Clarification of the Scope;

b) Improved wording, especially the term “prove method”;

c) Addition of a new subclause 4.1, Hydronic balancing;

d) Addition of a paragraph in 4.2.2.1, Supporting base;

e) Modification of 4.2.2.2, Insulating layers;

f) Addition of a new subclause 4.2.2.4, Other layers;

g) Modification of 4.2.2.9, Weight bearing layer;

h) Addition of a new subclause 4.2.2.9.5.4, Tubes damage;

i) Modification of 4.2.3, Leak test;

j) Modification of 4.2.4, Initial heat up of the emission system;

k) Addition of a new subclause 4.2.5, Heating up for readiness for covering;

l) Modification of 4.3.3 Insulation;

m) Addition of a new Annex B, Initial heating up protocol.

EN 1264, *Water based surface embedded heating and cooling systems*, consists of the following parts:

— *Part 1: Definitions and symbols;*

— *Part 2: Floor heating: Methods for the determination of the thermal output using calculations and experimental tests;*

— *Part 3: Dimensioning;*

— *Part 4: Installation;*

— *Part 5: Determination of the thermal output for wall and ceiling heating and for floor, wall and ceiling cooling.*

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

The EN 1264 series gives guidelines for surface embedded heating and cooling systems installed in buildings, residential and non-residential (e.g. office, public, commercial and industrial buildings) and focuses on systems installed for the purpose of thermal comfort.

The EN 1264 series gives guidelines for water based heating and cooling systems embedded into the enclosure surfaces of the room to be heated or to be cooled. It also specifies the use of other heating media instead of water, as appropriate.

The EN 1264 series specifies standardized product characteristics by calculation and testing the thermal output of heating for technical specifications and certification. For the design, construction and operation of these systems, see EN 1264-3 and EN 1264-4 for the types A, B, C, D, H, I and J. For the types E, F and G, see the EN ISO 11855 series.

The systems specified in The EN 1264 series are adjoined to the structural base of the enclosure surfaces of the building, mounted directly or with fixing supports. The EN 1264 series does not specify ceiling systems mounted in a suspended ceiling with a designed open air gap between the system and the building structure which allows the thermally induced circulation of the air. The thermal output of these systems can be determined according to the EN 14037 series and EN 14240.

EN 1264-4 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 the EN 1264 series apply only to the components of the heating/cooling systems which are part of the heating/cooling system. EN 1264-4 does not cover other elements which are not part of the heating/cooling system.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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+A1:2010, *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, *Water based surface embedded heating and cooling systems - Part 1: Definitions and symbols*

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

EN ISO 15875 (all parts), *Plastics piping systems for hot and cold water installations - Crosslinked polyethylene (PE-X)*

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

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

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

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

ISO 11855-6:2018, *Building environment design - Design, dimensioning, installation and control of embedded radiant heating and cooling systems - Part 6: Control*

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

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Requirements

4.1 Hydronic balancing

According to ISO 11855-6:2018, 4.8, water based heating and cooling systems shall have a hydronic balancing. The components shall be adjusted in order to ensure the required flow rates. Under dynamic conditions, e.g. during the heating up period, it shall be ensured that the hydraulic interaction between the different heating circuits is small. The flow rates in the different circuits should not be greater than the design flow rates.

Each circuit shall have a balancing device or balancing system.

The balance of the system shall be done according to the realized project, e.g. “as build”, because the length of circuits realized can differ from the project, therefore once the system has been installed, the flow rates shall be updated and then set on the manifold.

Depending on the situation of the heating and cooling system the distribution system shall be equipped with facilities for degassing and sludge separation.

4.2 Floor heating and cooling systems

4.2.1 General structural preconditions

The installation of a water floor heating and/or cooling system shall follow the prior installation of any electrical, sanitary and other pipe facilities. The structure as specified in 4.2.2.1 with the draught-free closure of all building openings, e.g. windows and outer doors, shall be completed.

4.2.2 Building layers, building components

4.2.2.1 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 shall be protected against temperature change. Any existing National Regulations on this topic should be taken into consideration.

If the external doors and windows are not present before the installation of the system, it is recommended to close all windows holes, even with provisional systems (in order to avoid too high/low temperatures and to limit the effect of the speed of the air). Walls plaster shall be completed.

4.2.2.2 Insulating layer

In the case of floor heating and cooling systems, as a rule the thermal resistance $R_{\lambda,ins}$ is provided by the insulation layers which are integral parts of the system; on this topic, national rules should be consulted.

The thermal resistance $R_{\lambda,ins}$ of the insulating layer of the heating/cooling system is specified in Table 1. For renovation systems, $R_{\lambda,ins}$ may be determined taking into account the effective thermal resistance of the building structure including insulation layers.

These requirements are for heating and cooling systems.

Table 1 — System Insulation — Minimum heat conduction resistance of system-insulating layers below the pipes of heating/cooling systems

	Heated room below or adjacent	Unheated or intermittent heated room below, adjacent or directly on the ground[a]	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 $R_{\lambda,ins}$ $(m^2 \cdot K)/W$	0,75	1,25	1,25	1,50	2,00
[a] with ground water level ≤ 5 m below the supporting base, the value should be increased.					

NOTE Insulation are not vapour barrier.

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.

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.

4.2.2.3 Protective layer

Prior to laying the screed, the insulation layer shall be covered with a protective layer consisting of a plastic film of at least 0,15 mm thickness, with a minimum of 80 mm overlaps, or with another product of equivalent function. 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 sulfate screeds, the protective layer of the insulating layer shall be liquid-tight by for instance being stuck or welded together.

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

Protective layers are not moisture barriers.

4.2.2.4 Other layers

If other layers (such as acoustic insulation layers) are included and they have an influence on the thermal output, they have to be taken into account in the thermal performance calculation.

4.2.2.5 Equipment

4.2.2.5.1 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. For cooling systems, the control system shall prevent condensation with interruption of flow rate or increase in flow temperature.

4.2.2.5.2 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. At least one circuit per heated/cooled room shall be installed in order to permit temperature control either manual or automatic.

4.2.2.5.3 Stop valves and balancing devices

Each circuit shall have two stop valves and one balancing device or balancing system.

4.2.2.6 Piping (pipes and couplings)

4.2.2.6.1 Plastic piping

Requirements for plastic pipes shall comply with the following standards:

PE-X	EN ISO 15875 (all parts)
PB	EN ISO 15876 (all parts)
PP	EN ISO 15874 (all parts)
PVC-C	EN ISO 15877 (all parts)
Multilayer Piping Systems	EN ISO 21003 (all parts)
PE-RT Systems	ISO 22391 (all parts)

Calculate the minimum wall thickness in accordance with the following conditions:

a) Service conditions: Class 4 in accordance with ISO 10508;

b) Operating pressure: = 4 bar;

c) Lifetime = 50 years.

It is recommended to use pipes with an oxygen-barrier layer in conformity with Annex A. Precautions shall be taken to protect the system against corrosion.

In the case of junction of the circuit, or repair of tubes the technical information of the manufacturer should be followed.

4.2.2.6.2 Copper piping

Copper piping shall comply with the requirements of EN 1057 (pipes) and EN 1254 (all parts) (fittings).The preferred temper is annealed R220 (see EN 1057:2006+A1:2010, Clause 4).

4.2.2.7 Installation of piping

4.2.2.7.1 Storage and transport

The pipes shall be transported, stored and handled in such a way as to be:

a) protected from anything which could damage them; and

b) for plastic pipes stored out of direct sunlight.

4.2.2.7.2 Clearance area

The pipes are placed more than:

a) 50 mm distance from vertical structures; and

b) 200 mm distance from smoke ducts and open fireplaces, open or walled shafts, lift wells.

4.2.2.7.3 Bending radius

Use only a bending radius equal to the radius of bending for the pipes as recommended by the system supplier.

4.2.2.7.4 Couplings

All couplings within the floor construction shall be exactly located and designated on the record drawing.

4.2.2.8 Attachment of pipes

The pipes and their attachment systems shall be secured such that their horizontal and vertical positions are maintained as planned. The vertical deviation upwards of the pipes before and after application of the screed shall not exceed 5 mm at any point. The horizontal deviation of the specified pipe spacing in the heating circuit shall not exceed ± 10 mm at the attachment points. These requirements are not applicable in the area of bends and deflections. The attachment spacing necessary to comply with these requirements is dependent on the tube materials, dimensions and systems.

The manufacturer shall specify the maximum permissible distance between attachments.

NOTE Attachments that are more frequent provide greater security concerning pipe positioning. Spacing of the attachments depends on the system applied. Experience has shown that systems with individual attachments necessitate spacing of approximately 50 cm in order to comply with the above-mentioned requirements.

4.2.2.9 Weight bearing layer

4.2.2.9.1 General

European and National Standards, where available, should be used. If no relevant European or National Standards can be used, the manufacturer should provide the information.

4.2.2.9.2 Screed layer

The thickness of the screed is calculated according to relevant standards taking into account loading capacity and flexural strength class. European and National Standards, where available, should be used.

The minimum thickness above the heating pipes is at least 30 mm (cementitious screeds (CT), calcium sulfate screeds (CA), self-levelling calcium sulfate screeds (CAF), synthetic resin screeds (SR) and magnesite screeds (MA)). Special system screeds may allow lower thickness according to the recommendations of the supplier.

The specifications of the manufacturer should be followed.

4.2.2.9.3 Reinforcement

Reinforcement shall be in accordance with relevant standard. National Standards should be used until a European Standard is available.

4.2.2.9.4 Joints

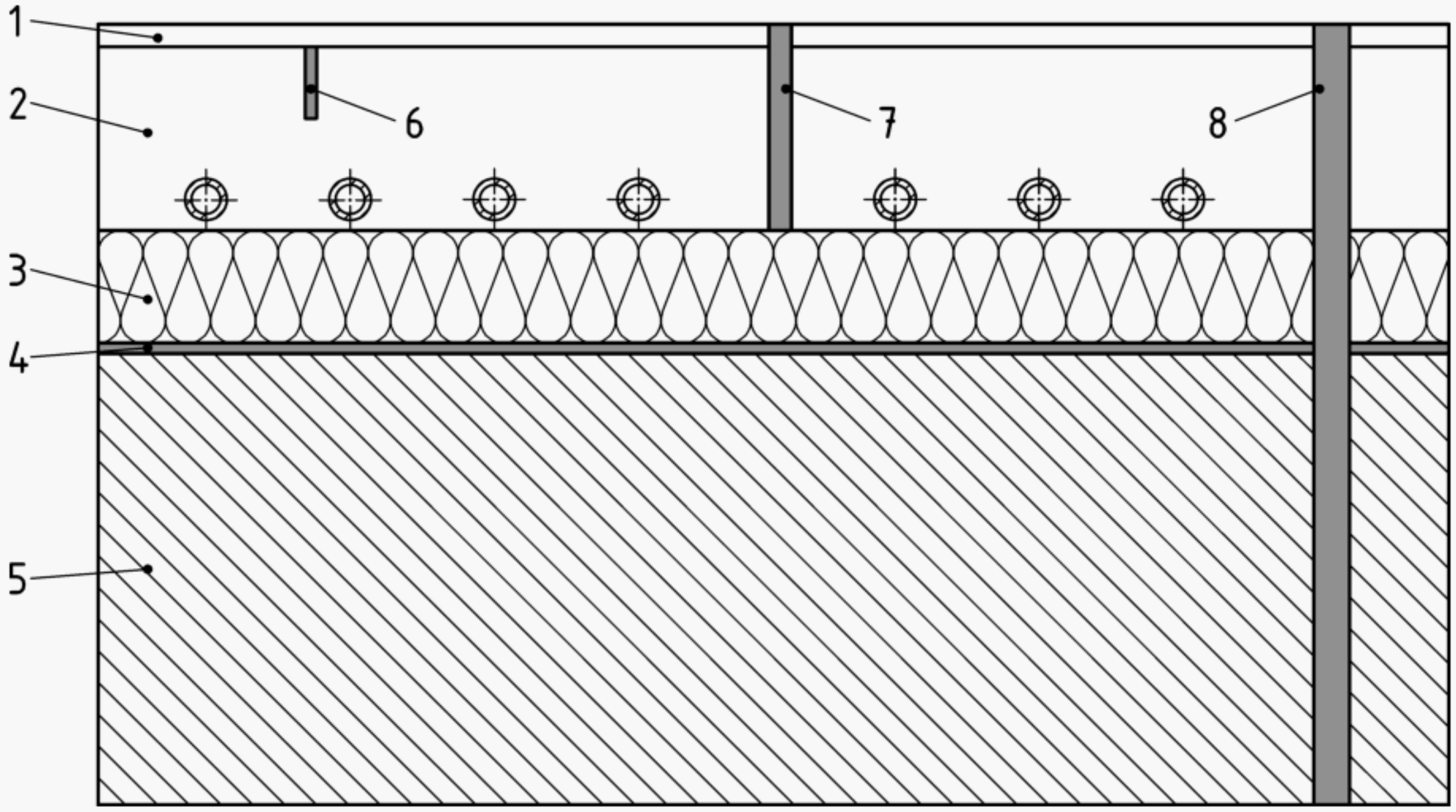
A joint plan (including type and place of joint) shall be drawn up by the building planner.

A joint shall be applied above a building joint. The floor screed shall be separate from rising elements (boarder joint).

The joint shall not cross a heating circuit.

The determination of joint width, joint distance and joint areas depends on type of binder, floor covering geometry of area, use of area and temperature change.

Figure 1 shows different types of joints.



Key

1 floor covering
2 weight bearing and thermal diffusion layer
3 thermal insulation
4 acoustic insulation (if present)
5 structural bearing
6 contraction joints
7 expansion joints (movement joints)
8 construction joints

Figure 1 — Joints

A construction joint is a structural joint that involves the whole thickness of the element (e.g. wall, floor or ceiling), including the reinforcement. An expansion joint is used to compensate dimensional variations of the screed (mainly due to temperature change). An expansion joint crosses the entire thickness of the screed. A contraction joint interrupts only a part of the thickness of the screed. It constitutes a guided break line. The thickness of the screed that is cut shall not exceed 1/3 of the thickness of the uniform screed layer.

In the case of heating screeds of type A and C, movement joints and perimeter joints shall only be crossed by connecting pipes (flow pipes and return pipes of the circuit) and solely in one level. In this case, the connecting pipes shall be covered with a flexible insulation tube of some 0,3 m in length.

4.2.2.9.5 Laying of the screed

4.2.2.9.5.1 Protective measures

No components shall be affected in their functions when applying the screed and, when installing the heating elements, e.g. by using unsuitable knee-boards. When carting the screed mortar over the installed pipe system, boards or the like should be laid. Equally, short-term greater loads on the insulating layer shall be avoided so as not to reduce the insulating effect.

During the screed laying process, the screed material should contain only those additives approved by the manufacturer/supplier. Do not use admixtures which entrain more than 5 % air into the screed to avoid loss of strength.

4.2.2.9.5.2 Laying

When laying the screed, the temperature of the screed and the temperature of the room shall not fall below 5 °C. Subsequently, it shall be maintained at a temperature of at least 5 °C for the curing period. In addition, the screed shall be protected against drying-out and following this, against harmful effects, e.g. warmth and draught, in order to keep shrinkage low. Generally, this is ensured for smaller buildings when the building is closed.

NOTE Typically, the curing period is maintained for at least 3 days.

Asphalt screed can be laid with temperature till 0 °C.

4.2.2.9.5.3 Holes in floor

Each hole in floor shall have been performed before the floor heating is installed in order to avoid any drilling thereafter.

4.2.2.9.5.4 Tubes damage

If pipes of the radiant system are damaged, it is possible to restore the installation by connecting or joining the pipes, eliminating the damaged part. The fitting, which may be of metal or plastic, shall be adequately protected from mechanical forces or chemical corrosion by the elements that are in contact. A new pressure test of the system shall be carried out, in order to prevent and avoid hydraulic losses. The note of the intervention carried out with the precise location of the repair point of the pipes shall be reported on the plan of the project.

4.2.3 Leak test

The leak test may be performed using water or compressed air.

Before installing the screed, the heating and cooling circuits shall be checked for leaks by means of a pressure test. For standard systems, the test pressure shall be 4 bar to 6 bar. When testing with air, the test pressure shall be 2 bar to 3 bar.

NOTE National standards and regulations can require lower test pressures.

A maximum pressure loss of 0,2 bar/h shall be respected.

In the case of asphalt screed, during the laying process, the pipes have to be depressurized.

For all type of screed during screed installation the pressure of tubes shall be returned to the operating one.

The absence of leaks and the test pressure shall be specified in a test record.

When there is a danger of freezing, suitable measures such as the use of frost protective or the conditioning of the building shall be taken.

When normal system operation begins, any frost protection fluids may be drained and disposed of in compliance with National Health and Safety Regulations, then flushed 3 times with clean water.

4.2.4 Initial heating up of the emission system

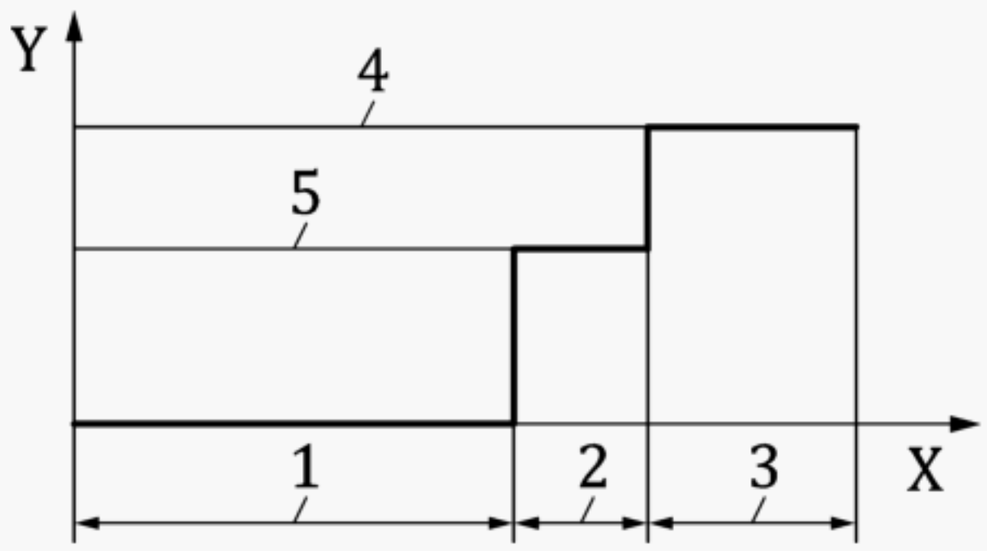
The purpose of the initial heating up is to check the function of the emission system and to bring it to operation. The stability of the screed (e.g. cracks) can be seen after cooling down.

As reported in Figure 2, this operation should be carried out on completed cement screeds after 21 days have elapsed, or for completed calcium sulfate screeds a period of 7 days shall elapse, or for asphalt screed 1 day shall elapse. For all screed materials, the specifications of the manufacturer shall be followed.

Cement and anhydrite screeds shall be heated before the floor coverings are laid. Work shall not begin until the above mentioned time frames have elapsed, depending on the screed types and the manufacturer's instructions. The initial heat-up phase starts with an inlet temperature of 25 °C, which shall be maintained for 3 days. Subsequently, the maximum design temperature shall be set and maintained for at least another 4 days.

Before the normal operation of the system begins, discharge and rinse of the system should be done according to national regulations. In case there are no national regulations the manufacturer's instructions should be followed.

NOTE Initial heating up is not aimed to make a thermal shock of the screed. Initial heating up is not a drying cycle of the screed.



Key

X time
Y temperature
1 21 days
2 3 days
3 4 days
4 maximum water design temperature
5 20 °C to 25 °C

Figure 2 — Heating up process (example for cement screeds)

The process of heating up shall be documented. An example of initial heating up protocol is reported in Annex B. If using screeds for which special procedures are specified by the manufacturer, these shall be observed and reported.

4.2.5 Heating up for readiness for covering

For covering, the screed shall be sufficiently dry. The drying process can be accelerated by operating the floor heating system (heating for readiness of covering), by increased air exchange rates or by other means such as mechanical drying. The time for the drying process cannot be estimated as it depends on several influencing factors. For example the drying process can even stop completely in case of a high humidity of the room air.

Heating up for the readiness for covering should provide the flooring technician a screed ready for covering in terms of sufficient dryness. This heating up is not a basic service and shall be ordered separately.

The dryness of the screed shall be verified by measurement. The location of measurements shall be indicated in the plans of the heating system. At least one measurement location per room shall be selected. In larger rooms (>50 m^2) more measurement locations are recommended. Within a radius of 10 cm around the selected measurement location shall be no heating pipe.

For larger heated areas for each 200 m^2, 3 measurement locations shall be selected.

European and National Standards, where available, should be used. If no relevant European or National Standards can be used, the values of Table 2 are recommended.

Table 2 — Maximum percentage of screed moisture measurement using Carbide-Method (CM)

Type of screed	**Cementitious screeds (CT, CTF)**	**Calcium sulfate screeds (CA, CAF)**
maximum percentage of screed moisture	1,8 CM-%	0,5 CM-%
For other mineral floor screeds the necessary moisture content may differ. This value has to be indicated by the manufacturer.		

4.2.6 Floor coverings

Thermal Resistance of Floor Coverings is to be taken into consideration regarding heat transfer calculations and should be verified on installation.

Prior to lying of the floor covering, the floor covering installer shall verify the suitability for lying the floor covering on the screed.

The floor coverings are stored and installed according to the relevant standards and the manufacturer's instructions.

4.3 Heating and cooling systems embedded in ceilings and walls

4.3.1 Preface

Generally, the requirements given above for floor heating/cooling systems also apply where applicable. Therefore, the following clauses only represent additional requirements or modifications of requirements where needed.

4.3.2 General structural preconditions

Heating/Cooling systems can be installed upon or within walls or ceilings constructed from masonry, concrete or prefabricated lightweight materials.

The following requirements shall be fulfilled:

a) Walls or ceilings shall be structurally capable of supporting the system;

b) Tolerances, levels and technical data shall comply with European and National Standards where these exist;

c) All electric cables, ducts, or service pipes shall be installed and tested before heating/cooling work commences;

d) Where settlement joints exist in walls or ceilings, appropriate measures shall be identified and carried out before the heating/cooling work commences;

e) If the external doors and windows are not present before the installation of the radiant system, it is recommended to close all windows holes, even with provisional systems (in order to avoid extreme temperatures and to limit the effect of the air velocity). Walls plaster shall be completed.

4.3.3 Insulation

The insulation for ceiling and wall heating/cooling systems depending on the adjacent room or outside environment (see Table 3) may be divided into sections of layers, e.g. in the case of outside walls into a layer directly behind the system and another one outside.

In the case of wall and ceiling heating and cooling systems, the thermal resistance $R_{\lambda,\mathrm{ins}}$ may be determined taking into account the effective thermal resistance of the building structure.

Table 3 — System Insulation — Minimum heat conduction resistance of system-insulating layers $(\mathrm{m}^2\cdot\mathrm{K})/\mathrm{W}$

	heated room above or adjacent	Unheated or intermittent heated room above, adjacent or directly on the ground[a]	external air temperature above 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 $R_{\lambda,\mathrm{ins}}$	0,75	1,25	1,25	1,50	2,00

[a] with ground water level ≤ 5 m below the supporting base, the value should be increased.

4.3.4 Maximum flow temperatures

Depending on material, the following maximum flow temperatures are recommended:

Plaster based on gypsum or lime $\vartheta_{V,des,max} = 50\ °C$;

loam mortar plaster $\vartheta_{V,des,max} = 50\ °C$;

plaster based on lime-cement $\vartheta_{V,des,max} = 70\ °C$;

prefabricated building slab of hard plaster $\vartheta_{V,des,max} = 50\ °C$.

Annex A
(informative)

Corrosion Prevention

A.1 Oxygen Barrier Layer

To reduce corrosion problems when combining plastic pipes with corrodible materials in heating installations, one way could be using plastic pipes carrying an oxygen barrier layer. When tested in accordance to ISO 17455 method I or method II, as applicable, pipes shall meet the requirement, oxygen permeability ≤ 0,32 mg/(m^2 · d) at a test (water) temperature of 40 °C.

Specimen preparation:

An accumulation of water shall be carried out on a pipe section from at least 20 meter length. Ten % of the length shall be wound around a core. The coil shows a bending radius, equal to the bending radius recommended by the system supplier. The wound up pipe section shall be fixed on the core. After assembling, a relaxation time over 24 hours without any load takes place (outside of the water bath). Afterwards, the coil shall be stored in a water bath (tap water) with a water temperature of 20 °C. During storage, the pipe has to be filled with water. Both ends of the pipe shall be outside of the water bath (without any contact to the water). After the storage time, the coil will be taken out of the water bath for drying the outside surface of the pipe. Both pipe ends shall be closed, the water remains inside the pipe. The drying of the outside surface of the pipe takes place over a period of 28 days under standard atmosphere conditions according to EN ISO 291.

NOTE The unit mg/(m^2·d) enables results, independent from the tested dimension of the pipe.

A.2 Adoption of specific inhibitory products

Inhibitors can be used according to manufactures specifications and instructions.

Annex B
(informative)

Initial heating up protocol

Construction project:	
Building owner/Occupant:	
Client:	
Heating installation technician:	
Architect:	
Other:	
In the above-mentioned building project, a floor heating system of type ___ was installed.	

Screed

Outside temperature [°C]:	
Screed thickness (including tube diameter):	
Type of screed:	
Bonding agent:	
Manufactured by:	
The screed work was completed on:	
The heating with constant 25 °C inlet temperature started on:	
The heating with maximum design temperature of ___°C started on:	
The heating ended on: (7 days after start of heating at the earliest)	
Was the heating was interrupted?	___ Yes, from _____ to _____. ___ No.
Was the heated flooring area free of building materials and other coverings?	___ Yes. ___ No.
Were the rooms ventilated without draughts and was the screed protected for draughts and drying out too quickly after switching off the floor heating system (windows and external doors closed).	___ Yes. ___ No.
The installation was approved for further building work at an outside temperature of ___ ° C.	___ The installation was not in use at the time. ___ The screed was heated to ___ ° C at the time.

Notes

_____

_____

_____

Confirmation

Developer/Client (Stamp/Signature)	
Construction Manager/Architect (Stamp/Signature)	
Heating engineering company/Installer (Stamp/Signature)	

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