SLOVENSKI STANDARD
SIST EN 14336:2005

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Ogrevalni sistemi v stavbah - Vgradnja in zagon toplovodnih sistemov

Heating systems in buildings - Installation and commissioning of water based heating systems

Heizungsanlagen in Gebäuden - Installation und Abnahme der Warmwasser-Heizungsanlagen

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Systemes de chauffage dans les bâtiments - Installation et commissionnement des systemes de chauffage a eau

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 14336

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English version

Heating systems in buildings - Installation and commissioning of water based heating systems

Systèmes de chauffage dans les bâtiments - Installation et mise en systèmes de chauffage à eau

Heizungsanlagen in Gebäuden - Installation und Abnahme der Warmwasser-Heizungsanlagen

This European Standard was approved by CEN on 29 July 2004.

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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 Central Secretariat has the same status as the official versions.

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Foreword

This document (EN 14336:2004) has been prepared by Technical Committee CEN/TC 228 "Heating systems in buildings", the secretariat of which is held by DS.

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of an identical text or by endorsement, at the latest by April 2005, and conflicting national standards shall be withdrawn at the latest by April 2005.

The subjects covered by CEN/TC 228 are the following:

- Design of heating systems (water based, electrical etc.);
- Installation of heating systems;
- Commissioning of heating systems;
- Instructions for operation, maintenance and use of heating systems;
- Methods for calculation of the design heat loss and heat loads;
- Methods for calculation of the energy performance of heating systems.

Heating systems also include the effect of attached systems such as hot water production systems.

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All these standards are systems standards, i.e. they are based on requirements addressed to the system as a whole and not dealing with requirements to the products within the system.

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Where possible, reference is made to other European or International Standards, a.o. product standards. However, use of products complying with relevant product standards is no guarantee of compliance with the system requirements.

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The requirements are mainly expressed as functional requirements, i.e. requirements dealing with the function of the system and not specifying shape, material, dimensions or the like.

The guidelines describe ways to meet the requirements, but other ways to fulfil the functional requirements might be used if fulfilment can be proved.

Heating systems differ among the member countries due to climate, traditions and national regulations. In some cases requirements are given as classes so national or individual needs may be accommodated.

In cases where the standards contradict with national regulations, the latter should be followed.

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

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1 Scope

This document specifies the requirements for the installation and commissioning of water-based heating systems in buildings with a maximum operating temperature of 110 °C and a maximum operating pressure of 6 bar.

This document covers the system's requirements for the installation and commissioning of individual components of the system (e.g. heat generators, pumps, controls). It does not cover the specific commissioning requirements for these components.

This document does not cover the installation or commissioning of attached systems (e.g. air conditioning, domestic hot water or ventilation systems).

This document covers only the technical requirements, and does not cover any commercial or contractual arrangements between parties.

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 1717, *Protection against pollution of potable water in water installations and general requirements of devices to prevent pollution by backflow.*

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EN 12170, *Heating systems in buildings – Procedure for the preparation of documents for operation, maintenance and use – Heating systems requiring a trained operator.*

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EN 12171, *Heating systems in buildings – Procedure for the preparation of documents for operation, maintenance and use – Heating systems not requiring a trained operator.*

EN 12828, *Heating systems in buildings – Design for water-based heating systems.*

EN 61082-1, *Preparation of documents used in electrotechnology – Part 1: General requirements (IEC 61082-1:1991).*

EN 61082-3, *Preparation of documents used in electrotechnology – Part 3: Connection diagrams, tables and lists (IEC 61082-3:1993).*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

balancing
process of adjusting flow rates in a system

3.2

commissioning
advancement of an installation from the stage of static completion to working according to specified requirements

3.3

flushing
washing out of a piping system to a formal procedure to remove detritus

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3.4

heat distribution system
configuration of interconnected components for the dispersal of heat between the heat supply system and the heat emission system or any attached system

3.5

heat emission system
configuration of interconnected components for the dispersal of heat to a heated space

3.6

heat supply system
configuration of interconnected components/appliances for the supply of heat to the heat distribution system

3.7

maintenance
combination of all technical, administrative and managing actions necessary to retain an item in, or restore it to, a state in which it can perform an intended function

3.8

maximum operating pressure
maximum pressure at which the system, or parts of the system, is designed to operate

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3.9

maximum operating temperature
maximum temperature at which the system, or parts of the system, is designed to operate

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3.10

OM&U
operation, maintenance and use

3.11

operation
actions necessary to make available the services, which the system has been designed to provide

3.12

setting to work
process of setting a static system into operation

3.13

use
action of receiving the services, which the system has been designed to provide

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4 Installation

4.1 Coordination of the work

Specifications, including drawings and schedules, where appropriate, shall be available.

A co-ordinated time schedule of the work shall be available.

It shall be ensured that:

— the site is available and accessible for installation;

— handling facilities are provided;

— storage facilities are provided;

— services (e.g. water, electricity, gas) are available;

— contractual obligations about site organisation are met.

4.2 Inventory and inspection

Delivered material shall be checked to ensure, that:

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— quantities and descriptions correspond to the consignment;

— components are undamaged.

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4.3 Handling

Any manufacturer's instructions on how to handle material shall be followed.

Suitable handling equipment shall be used where necessary.

Attention shall be given to safety requirements.

4.4 Storage

Storage of components shall be carried out according to the manufacturers' specifications with particular attention to safety requirements and climatic conditions (e.g. temperature, humidity).

4.5 Installation of components

4.5.1 General

Manufacturers' instructions for installation shall be available and followed.

The components shall be installed in accordance with the design specifications.

Proper accessories and tools for assembling and installation shall be available.

Before installation every component shall be internally clean and suitable for use.

The components shall be installed in a way that allows insulation, maintenance and replacement.

Any components needing maintenance shall be installed in such a way that they can be replaced or repaired.

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Components shall be placed, fixed and supported in such a way that no harmful deformations occur and so that thermal expansion is possible.

Electrical components shall be installed in accordance with CENELEC requirements.

4.5.2 Heat supply

The structure upon which the heat supply (generator) is supported and its immediate surroundings shall be in accordance with the design specifications.

Clearances between the heat generator and adjacent materials, e.g. for cleaning and maintenance, shall at least be in accordance with the heat supply manufacturer's instructions.

Note:

a) special considerations may apply in the case of installations in timber framed buildings with protection of combustible material and fire protection;

b) the plant room shall be built and equipped according to appropriate legal and safety regulations;

c) any flue gas system arrangements shall be appropriate for the heat generator;

d) attention shall be paid to heat supply mounting, positioning and connection, in order to limit noise transmission from the appliance;

e) vibration and sound transmission into the building can be minimised by the following measures:

   1. vibration insulation between heat supply and support;

   2. insulation of the flue gas pipe on its way to the chimney (possibly by the installation of a compensator);

   3. insulation of all pipings rigidly connected with the boiler, which lead through walls, ceilings/floors or concrete.

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4.5.3 Heat distribution

Measures shall be taken to prevent moisture, fire smoke, noise and infestants where pipes pass through a structure.

The components shall be installed in a way that allows insulation according to the design.

In cases where joints and components are inaccessible, they shall be permanent. Permanent joints and components shall be maintenance free and have a durability that corresponds to the lifetime of the components in which they are installed.

Prior to the covering of permanent joints and components, the tightness test shall be carried out.

4.5.4 Heat emission

Heat emitters shall be installed so as to allow venting.

4.5.5 Control and monitoring

Controls shall be accessible for setting and servicing.

Thermometers, manometers, flow meters and energy meters shall be accessible for reading and servicing.

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The following factors shall be considered when installing water temperature sensors, which may be either of type surface sensor or of type insertion sensor:

— stratification effects when mixing hot and cold water;

— time lag problems with automatic control;

— location on the upper side of pipes and surface contact of the surface sensor;

— location in elbows or on the upper side of pipes and positioning in the waterstream of the sensitive part of the insertion sensor;

— insulation from the environment.

4.5.6 Thermal insulation

Supports, suspensions, girders and fixpoints passing through the thermal insulation shall be installed so as to limit heat losses.

5 Precommissioning checks

5.1 Objective

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The purpose of the procedure given in this clause is to check that the system is in a satisfactory and safe condition and to achieve static completion before setting to work.

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5.2 State of the system

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It shall be verified that the installation has been installed in accordance with EN 12828 and 4.5. Inspections shall be carried out in the course of installation and at completion in order to ensure:

— that all plant items are in accordance with the design, drawings, specifications and, where applicable, the manufacturers' instructions;

— that correct installation procedures are being followed;

— that the standards of installation are being met;

— availability of a fuel supply and the correct installation of the flue gas removal system.

5.3 Water tightness test

The heating system shall be water tight and tested for leakage. A suggested method is given in Annex A. This test may be an independent test or a combined test for water tightness and pressure verification.

5.4 Pressure test

The heating system shall be pressure tested to a pressure at least 30 % greater than the working pressure for an adequate period, as a minimum of 2 hours duration. A suggested method is given in Annex B.

5.5 System flushing and cleaning

Systems shall, if necessary, be cleaned and/or flushed. A suggested method is given in Annex C.

NOTE Cleaning may include chemical cleaning. Suggested methods are given in Annex C.

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If the system is not to be used immediately, consideration shall be given to whether the system is to be left full or empty.

5.6 System filling and venting

The system shall be filled with suitable water and vented. Water treatment apparatus, where specified by the designer, shall be filled and set in operation in accordance with specialist instructions.

When the whole system is filled, disconnection of the filling source connections to the water supply shall be according to EN 1717.

The working pressure of the system shall not be exceeded when filling from a high-pressure source.

NOTE To ensure effective venting, the system shall be filled slowly from the bottom upwards, thus forcing the air to high points for venting to atmosphere. Careful consideration shall be given to the setting of valves and air vents before and during filling to avoid airlocks and excessive spillage, particularly where the fill is treated.

5.7 Frost precautions

Where the work is being carried out in cold weather, it is essential that any equipment susceptible to frost damage be protected.

NOTE If the system is not to be used for a prolonged period, consideration shall be given to whether the system is to be drained.

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5.8 Operational checks

All components of the system shall be checked for correct operation. Suggested methods are given in Annex D.

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5.9 Static completion records

Static completion records shall be completed. Sample record sheets are given in Annex E.

6 Setting to work

It shall be confirmed that:

— the heating appliance can provide heat;

— the pump(s) is(are) operational;

— all parts of the system are able to receive heat.

NOTE The latter bullet may involve some adjustment of valves.

Suggested methods on setting to work are given in Annex F.

7 Balancing water flow rates

The water flow rates shall be balanced to meet the requirements of the design.

Guidelines on a number of balancing methods and tolerances are given in Annex G.

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8 Adjusting of controls

All controls shall be adjusted in accordance with the manufacturers' instructions and the design specification. A typical checklist for setting and adjusting of controls is given in Annex H.

9 Handover

9.1 Objective

The objective is to hand over written instructions about the operation, maintenance and use of the heating system and any attached systems, to give instructions to the user and to confirm that the commissioning requirements of the specification have been met.

9.2 Documents for operation, maintenance and use

Instructions for operation, maintenance and use (OM&U instructions) shall be prepared in accordance with the specific requirements of the heating system. These instructions shall comply with the requirements of EN 12170 or EN 12171, as applicable.

9.3 Instructions on operation and use

The operator/user shall be instructed on the operation/use of the heating system.

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9.4 Hand over documentation

Hand over documentation shall contain all information necessary to enable the installation and equipment to be operated and maintained. Hand over documentation shall include the following as required by the contract:

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— OM&U instructions;

— controls and electrical schematics and wiring diagrams. These documents shall comply with EN 61082-1 and EN 61082-3;

— records about pressure and functional testing;

— records about environmental testing, e.g. flue gas testing;

— balancing report.

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Annex A
(informative)

Guide to good practice for water tightness test

A.1 General

The Contractor shall test the heating system for water tightness after installation but before insulating pipework, covering of shafts or openings in the walls and ceilings as well as before covering a floor heating system with screed or other coverings.

A.2 Procedure

For doing the water tightness test, the system shall be filled with filtered water starting from the lowest point (filling valve) up to the highest point and shall be vented. Having filled the system, the vents shall be shut and the system shall be checked for water tightness.

In case of doing the water tightness test with inert gas, the safety requirements for each test shall be met and all connections to appliances and joints shall be checked for water tightness with soap water.

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The heating system is tight if no water is escaping or, in case of testing by inert gas, no bubbles can be seen or heard.

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A.3 Documentation

After the water tightness test, a record shall be prepared containing the following information:

— date of test;

— data on the heating system, including position in the building and maximum operational pressure;

— test pressure;

— time period of water tightness test;

— confirmation that the system is watertight and that no permanent deformation was found.

See Typical Water Tightness Test Report, Form A1.

These reports should be passed to the technical author of the OM&U instructions in accordance with the system designer's requirements.