



SLOVENSKI STANDARD

oSIST prEN 14336:2022

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Ogrevalni sistemi v stavbah - Vgradnja in zagon toplovodnih ogrevalnih sistemov

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

Heizungsanlagen und wassergeführte Kühlanlagen in Gebäuden - Installation und Abnahme der Warmwasser-Heizungsanlagen

Systèmes de chauffage dans les bâtiments - Installation et commissionnement des systèmes de chauffage à eau

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ICS:

91.140.10	Sistemi centralnega ogrevanja	Central heating systems
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EUROPEAN STANDARD
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Heating systems in buildings - Installation and commissioning of water based heating systems

Systèmes de chauffage dans les bâtiments - Installation et commissionnement des systèmes de chauffage à eau

Heizungsanlagen und wassergeführte Kühlanlagen in Gebäuden - Installation und Abnahme der Warmwasser-Heizungsanlagen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 228.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 14336:2021) has been prepared by Technical Committee CEN/TC 228 “Heating systems and water-based cooling systems in buildings”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 14336:2004.

In comparison with the previous edition, the following technical modifications have been made:

- new technologies are covered;
- inclusion of new test procedures;
- editorial organization to facilitate the use of this document within a comprehensive commissioning process.

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Introduction

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

- design of water-based heating and cooling systems;
- 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.

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.

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

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.

Figure 1 illustrates the basic sequence of the installation and commissioning process.

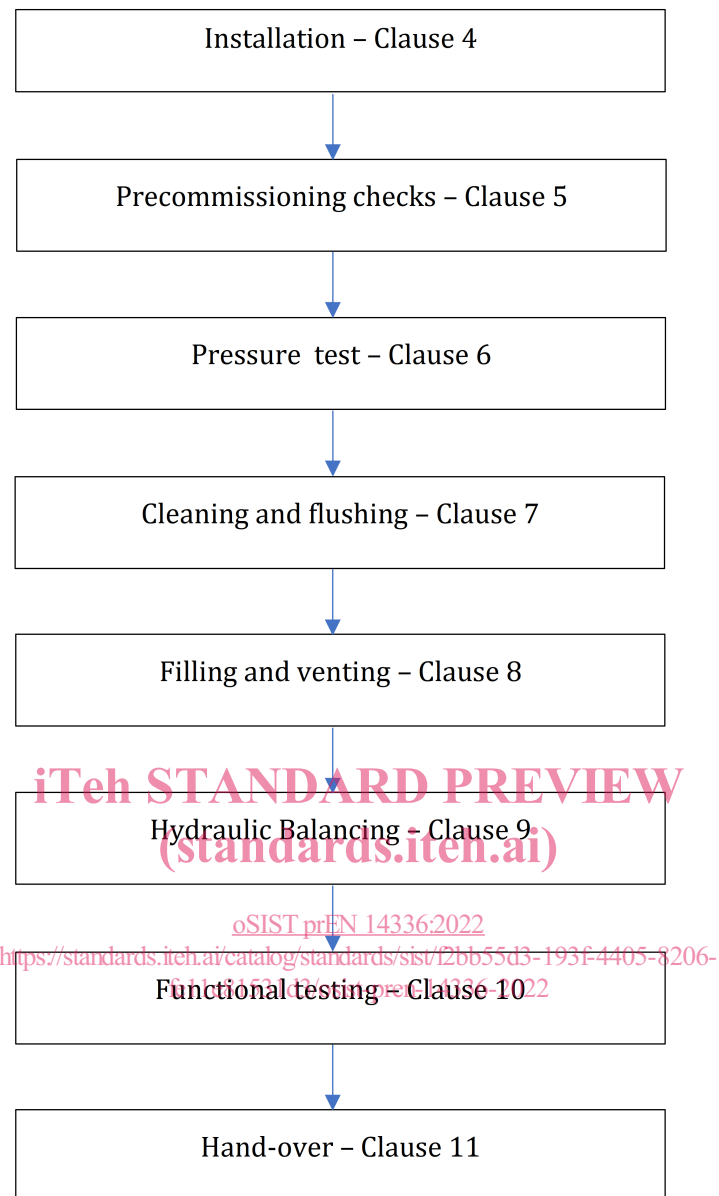


Figure 1 — Installation and commissioning process

1 Scope

This document specifies the requirements for the installation and commissioning of water-based heating, cooling and domestic hot water preparation (DHW) systems in buildings with a maximum operating temperature of 110°C.

This document does not cover superheated water systems and steam systems.

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 (e.g. how to set fuel/air ratio on a boiler).

This document does not cover the installation or commissioning of attached systems (e.g. air conditioning, domestic hot water distribution, 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 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 12170, *Heating systems in buildings - Procedure for the preparation of documents for operation, maintenance and use - Heating systems requiring a trained operator*

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 61082-1, *Preparation of documents used in electrotechnology - Part 1: Rules*

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

3 Terms and definitions

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

3.1

installer

party performing the installation process

3.2

client

party for whom the installation process is performed

Note 1 to entry: In some contexts, the client may be represented by a professional during the installation and commissioning process.

prEN 14336:2021 (E)**3.3****commissioning**

advancement of an installation from the stage when the mechanical and electrical installation work is complete to a confirmed operation-ready state according to specified requirements

Note 1 to entry: The word “commissioning” is used here to identify the activities of checking, testing and setting to work the installed systems prior to hand-over. This is only a part of the comprehensive “commissioning process” as defined in Ashrae 202 standard.

3.4**hydraulic balancing**

process of adjusting flow rates throughout the system to obtain the required flow rates under design conditions

3.5**contaminant**

undesired substance or particle which is present inside a water-based system

Note 1 to entry: Examples of contaminants are welding scale, slag, cuttings, metal oxide particles, cutting oil residues, dirt.

3.6**flushing**

washing out of a piping system to remove contaminants

3.7**mechanical cleaning**

process of pipe cleaning and removal of dirt and debris by forcing a device called a pig or scraper through the pipeline

3.8**heat distribution system**

configuration of interconnected components for the transport of heat from the heat generation system to the heat emission system or any attached system

3.9**heat emission system**

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

3.10**heat generation system**

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

3.11**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

3.12**maximum operating pressure**

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

3.13**maximum operating temperature**

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

3.14**OM&U**

operation, maintenance and use

3.15**operation**

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

3.16**setting to work**

process of setting a static system into operation

3.17**use**

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

3.18**shop drawings**

drawings and diagrams prepared to be used during on-site installation activities

3.20**pressure test**

combination of tightness and load test

3.21**tightness test**

test performed to ensure that there are no leaks in a hydraulic system

Note 1 to entry: Tightness test is normally performed at lower pressure than load test.

3.22**load test**

test performed to ensure that the system can withstand the designed fluid pressure and that it has the required strength reliability under operating conditions

4 Installation**4.1 Preparation for the installation****4.1.1 Documentation**

The installation activities can begin only after the design has been approved for execution and the following documentation and/or information has been prepared and handled to the installer(s):

- a) equipment and component specifications;
- b) design specification, including:
 - functional diagrams;
 - installation layout;

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- installation details;
- shop drawings, where appropriate;
- design flow rates and all other information needed for testing and balancing.

Some documents may be available later in the installation process.

- c) a coordinated **time schedule** of the work, specifying priorities and relationship between installation items, where appropriate (e.g. any timing to be respected between installation works)
- d) a list of critical materials / equipment to be checked and / or approved upon delivery (see 4.2 – incoming goods);
- e) an agreed procedure or instructions to handle changes;
- f) a list of test and control activities to be performed during the installation and commissioning process, which include:
 - anticipated tests to be performed during the installation process (e.g. any pressure testing of concealed pipes before covering them);
 - required pre-commissioning checks;
 - required documented actions, inspections, verifications and testing, such as pressure test, cleaning, filling, balancing, etc.

Concerning item f), the client and the installer(s) shall agree the required reports to be provided during the installation process.

Additional information and an example of a list according to item f) are given in informative Annex A.

The completed test reports and forms for the listed test and control activities shall be annexed to the OM&U instructions.

4.1.2 Site preparation

It shall be ensured that:

- the site is available and accessible for installation;
- handling facilities are provided;
- storage facilities are provided;
- appropriate services/utilities (e.g. water, electricity, gas) are available;
- contractual obligations about site organization are met.

4.2 Inventory and inspection of incoming goods

Delivered materials shall be checked to ensure, that:

- quantities and descriptions correspond to the design specification;
- equipment and components are undamaged.

All accompanying documentation shall be archived and kept available for the installation activities and for inclusion in the OM&U instructions.

The inspection of incoming materials that have been identified as critical to achieve the design objectives shall be documented.

4.3 Handling of materials

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

Suitable handling equipment shall be used where necessary.

Penetration/accumulation of dirt and damage of exposed parts shall be avoided.

Attention shall be given to safety requirements.

4.4 Storage of materials

Storage of components shall be carried out according to the manufacturers' specifications with particular attention to safety requirements and climatic conditions.

Protection of stored materials shall consider at least:

- sunlight (high temperatures and UV light);
- high temperatures;
- humidity, rain and other atmospheric agents;
- low temperatures (icing);
- animals;
- penetration/accumulation of dirt and damage of exposed parts.

Special provisions shall be given if the installation process shall be residue free.

EXAMPLE Keeping caps on pipes and any other mean of avoiding component contamination.

4.5 Installation of components

4.5.1 General

Manufacturers' instructions for the installation of components shall be available and followed.

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

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

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

The components shall be installed in a way that allows further (subsequent) work and operations such as insulation, maintenance and replacement.

Any component needing maintenance shall be installed in such a way that it can be serviced, repaired or replaced.

EXAMPLE 1 Manoeuvring space and access to replace fan-coil filters.

Components shall be placed, fixed and supported in such a way that they are steady and no harmful deformations occur and so that thermal expansion is possible. Where applicable, supports and bracings shall consider seismic actions.

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EXAMPLE 2 Suspended equipment may require additional bracing to withstand seismic horizontal forces.

Electrical components shall be installed in accordance with CENELEC requirements.

Clean working procedures (such as avoiding producing and/or leaving swarf and debris in the components and pipes) shall be adopted if it is planned to avoid cleaning at the end of the mechanical installation. The installation of filters is recommended in this case (residual risk, check regularly).

The installer shall notify the client of any evidence of possible design mistakes or installation difficulties and agree a solution.

4.5.2 Heat generation**4.5.2.1 General**

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 safety, cleaning and maintenance, shall be at least in accordance with the heat generator manufacturer's instructions.

Points of attention shall be:

- a) timber framed buildings with protection of combustible material and fire protection;
- b) the boiler room and the mechanical rooms are expected to be built and equipped according to the applicable legal and safety regulations;
- c) heat generator mounting, positioning and connection, in order to limit noise transmission from the appliance;
- d) avoiding stress transmission (connection of piping).

4.5.2.2 Combustion generator

Point of attention shall be:

- a) combustion air supply and flue gas evacuation;
- b) airing and ventilation openings;
- c) fuel supply.

4.5.2.3 Heat pumps

Point of attention shall be:

- a) noise and distance to the property limit for heat pumps with outdoor unit;
- b) air ducts for indoor mounted, air source heat pumps.

4.5.2.4 Solar collectors

Point of attention shall be:

- a) access to the roof;
- b) shadings;
- c) hangers and supports on the roof shall not compromise the roof waterproofing;

- d) insulation material for collector pipes shall withstand high temperatures;
- e) using suitable materials for glycol mixture;
- f) weight of the system (for natural circulation with store on the roof).

4.5.2.5 Heat exchangers

Point of attention shall be:

- a) right connection and flow direction;
- b) room for disassembling and cleaning (shell and tube);
- c) avoiding mechanical stresses from connections.

4.5.3 Heat distribution – piping and pumps

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

NOTE When crossing fire rated structures, applicable regulations and technical standards are expected to be followed.

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 maintenance free and have an appropriate life expectancy.

Point of attention shall be:

- a) provisions to allow thermal expansion of pipes (supports with fixed points and moving points);
- b) provisions to avoid transmission of stresses to equipment (flexible joints);
- c) provisions to fill, flush and drain the systems, vents and drains along pipes, including slope;
- d) orientation of devices according to manufacturer instructions (e.g. control valves, pumps, meters);
- e) positioning of sensors;
- f) straight pipe runs before and after sensitive devices;
- g) provisions to measure pressure and/or temperature and/or flow rates during commissioning;
- h) positioning of cold water pipes with respect to potentially hot lines (heat sources may bring legionella on cold water distribution if 25 °C is exceeded).

The pressure test (and any other relevant test concerning them) shall be carried out prior to the covering of permanent joints and components.

4.5.4 Heat emission

Heat emitters shall be installed so as to allow venting.

Positioning shall consider maintenance (e.g. filter replacement for fan-coils).