



SLOVENSKI STANDARD
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Sistemi za ogrevanje in hlajenje z vodo v stavbah - Projektiranje sistemov za hlajenje z vodo

Heating systems and water based cooling systems in buildings - Design for water based cooling systems

Heizungsanlagen und wassergeführte Kühlanlagen in Gebäuden - Planung von wassergeführten Kühlanlagen

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ICS:

91.140.30	Prezračevalni in klimatski sistemi	Ventilation and air-conditioning systems
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Heating systems and water based cooling systems in buildings - Design for water based cooling systems

Heizungsanlagen und wassergeführte Kühlanlagen in
Gebäuden - Planung von wassergeführten Kühlanlagen

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COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (prEN 17671:2021) 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.

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1 Scope

This document specifies design criteria for closed water-based cooling systems in buildings. The requirements aim at achieving a proper technical quality level and maintaining the desired thermal indoor climate with minimum energy consumption.

Systems for dissipating process heat from industrial processes, for example, are not covered by this document.

This document does not amend product standards or product installation requirements. The standard covers cooling systems of the following type (see Figure 1):

- 1) devices for the water-based heat rejection of the chilling system;
- 2) devices for chilling and storage of chilled water;
- 3) devices for the distribution of chilled water;
- 4) devices for the absorption of heat (“cooling emission”);
- 5) control devices;
- 6) safety devices.

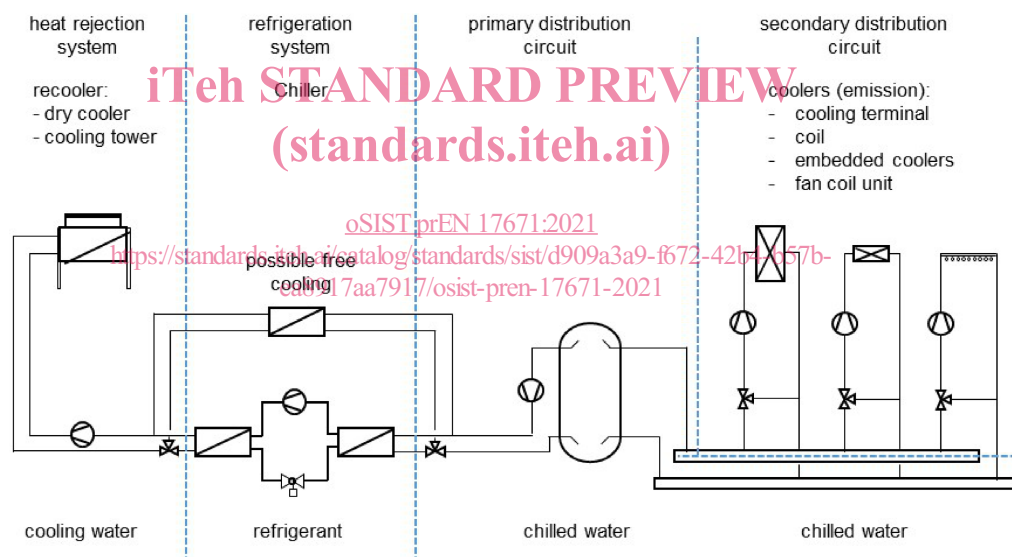


Figure 1

The design of such systems is described in this document. In the case of water-based cooling systems with local operating temperatures $\leq 0\text{ }^{\circ}\text{C}$ separate safety aspects may apply. The other Clauses of this document are still valid for those systems.

This document does not cover the chilling system itself, but only the parts of the cooling system which are an integral part of the cooling system, including determination of the design performance. Furthermore this document does not cover:

- the requirements for installation or instructions for operation, maintenance and use;
- the design of the system components (e.g. recooling, chilling system, coolers, pipes, safety devices etc.).

The relevant technical rules with regard to the prevention of corrosion are to be observed in the material selection for the system components and the nature of the heat transfer medium.

prEN 17671:2021 (E)**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 1717, *Protection against pollution of potable water in water installations and general requirements of devices to prevent pollution by backflow*

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 16798-1:2019, *Energy performance of buildings – Ventilation for buildings - Part 1: Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics - Module M1-6*

EN 14336, *Heating systems in buildings - Installation and commissioning of water based heating systems*

EN ISO 52000-1:2017, *Heating systems in buildings - Installation and commissioning of water based heating systems*

3 Terms and definitions

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For the purposes of this document, the following terms and definitions 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 <http://www.electropedia.org/>

3.1 chilling system

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

3.2 chilled water

circulation water on the heat-absorbing side of a chiller (primary and secondary circuit)

Note 1 to entry: Usually with a temperature ≤ 25 °C.

3.3 combined system (combined heating and cooling systems)

system used both for covering a heat load and the cooling load of a building, and for which there is a temporary or permanent hydraulic connection between the two respective circuits

3.4 cooler

component for extracting heat from a cooled space, such as a fan coil unit, embedded cooler, cooling terminal and coil

3.5**cooling period**

time period during which cooling is required to maintain the internal design temperature

3.6**cooling water**

circulation water on the heat-rejection side of a chiller

Note 1 to entry: Usually with a temperature $> 25\text{ °C}$ and $\leq 40\text{ °C}$.

3.7**cooled space**

room or enclosure which is to be cooled to the specified internal design temperature under defined boundary conditions

3.8**design cooling load**

maximum cooling capacity required from the cooling system of a building in order maintain the required internal temperature and/or humidity under defined boundary conditions

3.9**external air temperature**

air temperature outside the building

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3.10**external design temperature (standards.iteh.ai)**

external air temperature which is used for the calculation of the design cooling load

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3.11**free cooling**

cooling without the use of a chilling system, e.g. through ventilation during the day or night or through the direct use of cooling towers, dry coolers, seawater, groundwater or embedded coils with energy consumption for any pumps and fans

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3.12**frost inhibitor**

supplement to a cooling medium lowering its freezing point

3.13**heat rejection system**

part of the cooling system which emits the rejected heat produced by the chiller to the external environment including pipes, valves, pumps and mixing systems

3.14**lockout**

default condition resulting in a shutdown of the system and requiring a manual reset

Note 1 to entry: The intention of a lockout is to require the operator to investigate and eliminate the cause of the lockout.

3.15**maximum operating pressure**

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

prEN 17671:2021 (E)**3.16****maximum/minimum operating temperature**

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

3.17**maximum/minimum system safety temperature**

highest/lowest temperature any component of the cooling system can accommodate

3.18**operative temperature**

arithmetic average of the internal air temperature and the mean radiant temperature

3.19**partial cooling load**

fraction of design cooling load occurring under typical dynamically varying cooling system operating conditions

3.20**pressure limiting device**

automatic operating device which prevents the maximum operating pressure from being exceeded

3.21**pressurization system**

system equipment (diaphragm expansion vessels, compressor-controlled pressurization units and pump-controlled pressurization units) for pressure maintenance in closed cooling systems

Note 1 to entry: The equipment provides to maintain the system pressure between defined limits and ensures the required minimal working pressure of the cooling system. The equipment holds the accruing expansion water when the system water is heated and restores the volume when the cooling system is cooling down and contracting. Due to the design of construction the expansion system simultaneously protects the expansion water from corrosion producing ingress of oxygen.

3.22**primary distribution circuit**

part of the cooling system which distributes chilled water from the chilling system to the individual cooling circuits including pipes, valves, pumps and mixing systems

3.23**response overpressure**

pressure at which a safety valve opens at operating conditions

3.24**room set point temperature**

operative temperature of a cooled space which is used for the calculation of the design cooling load

3.25**secondary distribution circuit**

part of the cooling system which distributes chilled water from the primary distribution circuit to the individual coolers at the appropriate temperatures and/or flowrates including pipes, valves, pumps and mixing systems

3.26**sealed system**

cooling system in which the cooling medium is closed to the atmosphere

3.27**temperature controller**

automatic device intended to keep the temperature at a set point

3.28**timing control**

method of controlling the generation, extraction or transfer of heat by using a timed program for starting and shutting down the system

3.29**water level limiter**

automatic operating device that causes shutdown and lockout of the heat absorption when the set minimum operating pressure of the cooling system is reached

3.30**control**

method of controlling the chilled water flow to a cooling emission system by changing the flow rate and/or the flow temperature

3.31**central control**

control at a central point

3.32**local control**

control locally on the basis of the temperature of the cooled space

3.33**zone control**

local control of a zone consisting of more than one space

3.34**zone**

space or groups of spaces with similar thermal characteristics

4 Symbols and subscripts

4.1 Symbols

For the purposes of this document, the symbols given in EN ISO 52000-1:2017 and the specific symbols listed in Table 1 apply. Symbols and subscripts may have more than one denotation.

Table 1 — Symbols and units

Symbol	Name	Unit
ϑ	Temperature on the Celsius scale	°C
ρ	Density	kg/m ³ or kg/l
η	utilization efficiency	–
e	expansion coefficient	–
V	Volume	m ³
h	Height	m
P	Pressure	bar

4.2 Subscripts

For the purposes of this document, the subscripts given in EN ISO 52000-1:2017, and the specific subscripts listed in Table 2 apply. Subscripts may have several denotations.

Table 2 — Subscripts

Index	Meaning/Use
<i>st</i>	static
<i>v</i>	vapor
<i>O</i>	operating
<i>ini</i>	initial
<i>fin</i>	final
<i>wr</i>	water reserve
<i>ex</i>	expansion
<i>N</i>	nominal
<i>min</i>	minimal

5 System design requirements

5.1 General requirements

Cooling systems shall be designed and selected to provide satisfactory thermal comfort and to enable an economically optimized operation with a minimum energy consumption within the framework of the specified operating parameters. This includes operation at design cooling load and partial cooling loads.

The following general aspects shall be taken into account:

- external cooling loads shall be minimized e.g. by using external sunlight protection and sunshade equipment.

NOTE In new constructions, this is combined with an appropriate design of the building and windows as well as the use of materials with a high heat capacity.

- internal cooling loads shall be reduced as far as possible e.g. by using energy efficient lighting and technical appliances.