



BSI Standards Publication

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

National foreword

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English Version

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Systèmes de chauffage et systèmes de refroidissement à eau dans les bâtiments - Conception des systèmes de refroidissement à eau

Heizungsanlagen und wassergeführte Kühlanlagen in Gebäuden - Planung von wassergeführten Kühlanlagen

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European foreword

This document (EN 17671:2025) 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 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of an identical text or by endorsement, at the latest by February 2026, and conflicting national standards shall be withdrawn at the latest by February 2026.

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1 Scope

This document specifies design criteria for closed water-based cooling systems in buildings and the design of such systems is described. The definitions are aimed at achieving an appropriate level of technical quality and maintaining the desired thermal indoor climate with minimum energy consumption.

This document does not apply to systems for dissipating process heat from industrial processes. It also does not apply to and does not amend product standards or product installation requirements.

This document is applicable to cooling systems of the following type (see also 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.

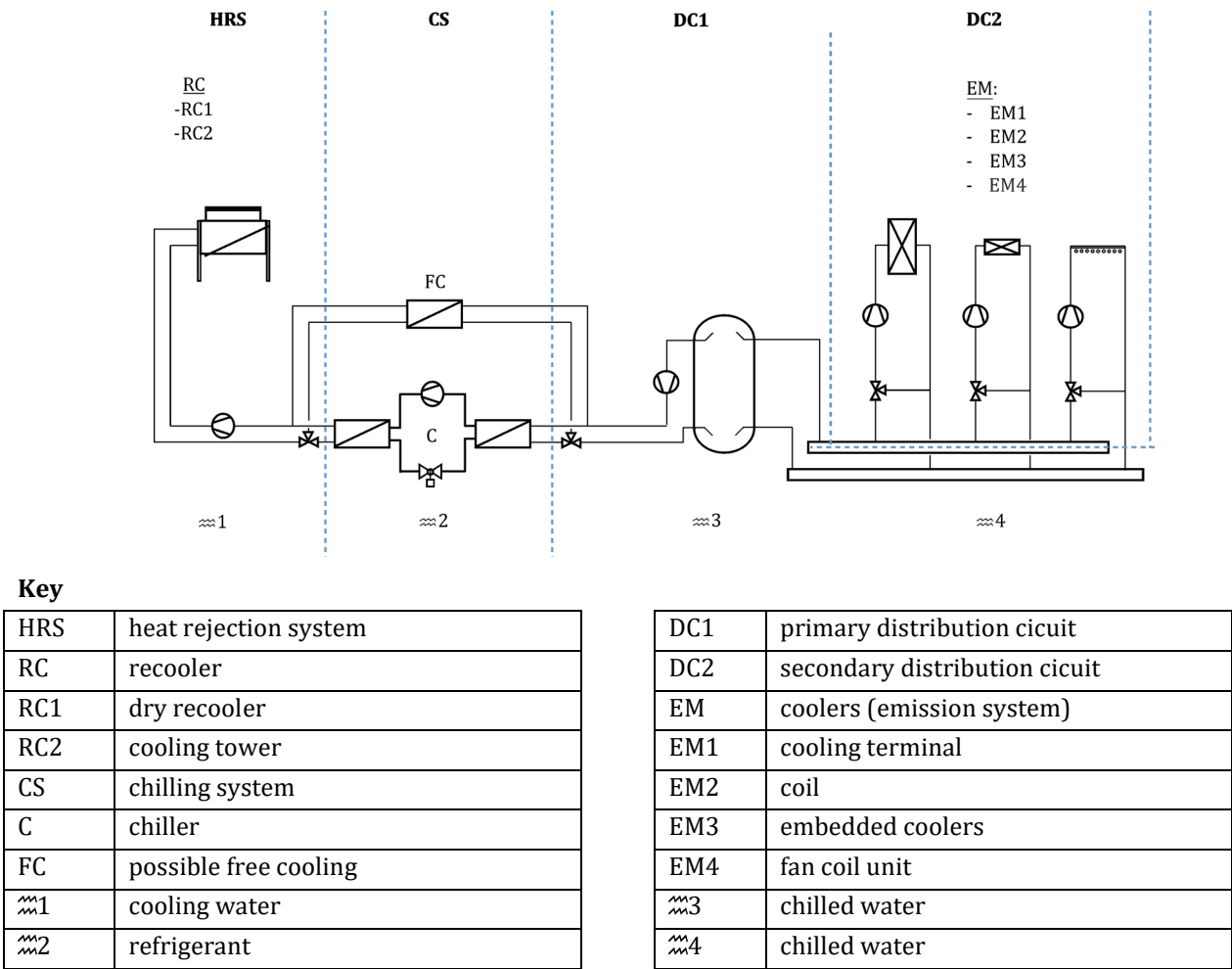


Figure 1 — Schematic example of a water-based cooling system

This document does not cover additional safety aspects for water-based cooling systems with local operating temperatures $\leq 0\text{ }^{\circ}\text{C}$. The other clauses of this document are still valid for systems with local operating temperatures $\leq 0\text{ }^{\circ}\text{C}$.

This document also does not cover the chilling system itself, but only the parts of the chilling 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. recooler, chilling system, coolers, pipes, safety devices etc.).

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 and cooling systems*

EN ISO 52000-1:2017, *Energy performance of buildings — Overarching EPB assessment — Part 1: General framework and procedures (ISO 52000-1:2017)*

3 Terms and definitions

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

ISO and IEC maintain terminology 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/>

3.1

chilling system

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

3.2

chilled water

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 heating and cooling system

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

chiller

cooler

device for extracting heat from a cooled space

EXAMPLE A fan coil unit, embedded cooler, cooling terminal and coil.

3.5

cooling water

water on the heat-rejection side of a chiller

3.6

cooled space

space which, per design, is cooled to the specified internal design temperature and separated from other spaces by building elements, walls etc

Note 1 to entry: Usually each single (cooled) room is considered a cooled space.

3.7

external air temperature

air temperature outside the building

3.8

external design temperature

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

3.9

free cooling

cooling that uses the natural low temperature of the air, water or earth instead of mechanical refrigeration

EXAMPLE By means of 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.

Note 1 to entry: Auxiliary energy can be used to attain this effect.

3.10

passive cooling

building design approach that focuses on heat gain control and heat dissipation in a building and can consist of a combination of free cooling and protection against heat gains

3.11

frost inhibitor

additive to water that lowers its freezing point

3.12

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

3.13

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.

3.14

maximum operating pressure

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

3.15

maximum operating temperature

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

3.16

minimum operating temperature

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

3.17

minimum system safety temperature

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

design cooling load

heat flow (power) required to achieve the specified internal design temperature and/or humidity conditions under external summer design conditions

3.20

partial cooling load

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

3.21

pressure limiting device

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

3.22

pressurization system

system equipment (diaphragm expansion vessels, compressor-controlled pressurization units and pump-controlled pressurization units) for maintaining the pressure 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.

3.23**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

3.24**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

3.25**sealed system**

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

3.26**temperature controller**

automatic device intended to keep the temperature at a set point

3.27**control**

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

3.28**central control**

control at a central point

3.29**zone control**

local control of a zone consisting of more than one space

3.30**local control**

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

3.31**zone**

space or group 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	–
l	heat conduction	W/m·K
d	diameter	m
e	expansion coefficient	–
U	thermal transmittance	W/m ² K or W/m·K
V	volume	m ³
h	height	m
p	pressure	Pa or bar (1 bar = 100 000 Pa)

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
st	static
sv	safety valve
v	vapor
O	operating
ini	initial
fin	final
fil	filling
e	external
w	wall
wr	water reserve
ex	expansion
N	nominal