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Interested committees:

Title: Draft BS EN 806-2 BS Specification for installations inside buildings conveying water intended for human consumption.
Part 2: Design.

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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

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Submission of Comments

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	

English Version

Specification for installations inside buildings conveying
water intended for human consumption - Part 2: Design

Spécifications techniques relatives aux installations
pour l'eau destinée à la consommation humaine à
l'intérieur des bâtiments - Partie 2 : Conception

Technische Regeln für Trinkwasser-Installationen -
Teil 2: Planung

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 164.

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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European foreword

This document (prEN 806-2:2024) has been prepared by Technical Committee CEN/TC 164 “Water supply”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 806-2:2005.

prEN 806-2:2024 includes the following significant technical changes with respect to EN 806-2:2005:

- the document has been fundamentally revised across all chapters;
- the structure has been modified;
- normative references have been updated.

This is the second part of the European Standard EN 806 consisting of 5 parts as follows:

- EN 806-1, *General*
- EN 806-2, *Design*
- EN 806-3, *Pipe sizing – simplified method*¹
- EN 806-4, *Installation*
- EN 806-5, *Operation and maintenance*

This document has been prepared under a standardization request addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

¹ EN 806-3 is currently being revised and could appear under a new title with the same EN number.

Introduction

Key objectives of the design and installation process for installations inside buildings conveying water intended for human consumption (hereafter referred to as “potable water installations”) have been the functional accomplishment of the water load profiles for hot and cold water while maintaining the quality of “water intended for human consumption” (in the sense of the corresponding European legislative act Directive (EU) 2020/2184 [1]. Lately, further requirements have been added, which can be summarized by the term “sustainability”. They comprise, economic, ecologic and social issues. More precisely, they cover, for example, energy and material efficiency, conservation of resources and life cycle assessment (LCA).

In principle, there’s also the possibility of complying with the intended protection goals of this document by applying other technical measures, technologies, and procedures. In these cases, the resulting conditions shall be verified through tests and/or compliance with relevant standard(s).

NOTE Attention is drawn to national requirements and regulations that can apply.

1 Scope

This document specifies requirements for and gives recommendations on the design of potable water installations according to EN 806-1.

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 26, *Gas-fired instantaneous water heaters for the production of domestic hot water*

EN 89, *Gas-fired storage water heaters for the production of domestic hot water*

EN 200, *Sanitary tapware - Single taps and combination taps for water supply systems of type 1 and type 2 - General technical specification*

EN 805, *Water supply - Requirements for systems and components outside buildings*

prEN 806-1:2024, *Specification for installations inside buildings conveying water intended for human consumption — Part 1: General*

EN 817, *Sanitary tapware - Mechanical mixing valves (PN 10) - General technical specifications*

EN 1111, *Sanitary tapware - Thermostatic mixing valves (PN 10) - General technical specification*

EN 1287, *Sanitary tapware - Low pressure thermostatic mixing valves - General technical specification*

EN 1487, *Building valves - Hydraulic safety groups - Tests and requirements*

EN 1488, *Building valves - Expansion groups - Tests and requirements*

EN 1489, *Building valves - Pressure safety valves - Tests and requirements*

EN 1490, *Building valves - Combined temperature and pressure relief valves - Tests and requirements*

EN 1491, *Building valves - Expansion valves - Tests and requirements*

EN 1567, *Building valves - Water pressure reducing valves and combination water pressure reducing valves - Requirements and tests*

EN 1717², *Protection against pollution of water intended for human consumption in potable water installations and general requirements for devices to prevent pollution by backflow*

EN 12056 (all parts), *Gravity drainage systems inside buildings*

EN 12502 (all parts), *Protection of metallic materials against corrosion - Guidance on the assessment of corrosion likelihood in water distribution and storage systems*

EN 12976-1, *Thermal solar systems and components - Factory made systems - Part 1: General requirements*

² Currently under revision at Formal Vote stage: FprEN 1717:2024.

EN 12977-1, *Thermal solar systems and components - Custom built systems - Part 1: General requirements for solar water heaters and combisystems*

EN 13618, *Flexible hose assemblies in drinking water installations - Functional requirements and test methods*

EN 14652, *Water conditioning equipment inside buildings — Membrane separation devices — Requirements for performance, safety and testing*

EN 14743, *Water conditioning equipment inside buildings — Softeners — Requirements for performance, safety and testing*

EN 14812, *Water conditioning equipment inside buildings — Chemical dosing systems — Pre-set dosing systems — Requirements for performance, safety and testing*

EN 14897, *Water conditioning equipment inside buildings — Devices using mercury low-pressure ultraviolet radiators — Requirements for performance, safety and testing*

EN 15219, *Water conditioning equipment inside buildings — Nitrate removal devices — Requirements for performance, safety and testing*

EN 15502-1, *Gas-fired heating boilers — Part 1: General requirements and tests*

EN 60335-2-21, *Household and similar electrical appliances — Safety — Part 2-21: Particular requirements for storage water heaters (IEC 60335-2-21)*

EN 60335-2-35, *Household and similar electrical appliances - Safety - Part 2-35: Particular requirements for instantaneous water heaters (IEC 60335-2-35)*

EN IEC 60730-1, *Automatic electrical controls — Part 1: General requirements IEC 60730-1)*

EN IEC 60730-2-9, *Automatic electrical controls — Part 2-9: Particular requirements for temperature sensing control (IEC 60730-2-9)*

EN 61770, *Electric appliances connected to the water mains - Avoidance of backsiphonage and failure of hose-sets (IEC 61770)*

EN ISO 4064-5, *Water meters for cold potable water and hot water - Part 5: Installation requirements (ISO 4064-5)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 806-1 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/>

4 Basics requirements for design

4.1 Design

For design and construction of a potable water installation two types of installation are considered:

- installation type A: Unvented potable water installations;
- installation type B: Vented potable water installations (see Annex A).

Installation types A and B may be combined.

Potable water installations shall be designed such that the quality of water intended for human consumption can be ensured at any draw-off point for potable water, cold (PWC) and potable water, hot (PWH) and that normal operation of the potable water installation is possible. Therefore, the requirements of EN 806 series and EN 1717 should be fulfilled.

NOTE Attention is draw to the corresponding European legislative act Directive (EU) 2020/2184 [1] or national requirements that can apply.

4.2 Optimization of the potable water installation

Design, construction and operation of potable water installations shall be compatible with the expected occupation of the corresponding building type, and the essential parameters needed for design, installation and operation of potable water installations shall be adapted accordingly. Examples of essential parameters are:

- environmental protection and climate protection;
- potable water hygiene (see 4.4.2);
- specific water consumption (water use and equipment)/habits of usage (peak demand, usage profiles);
- specific energy consumption in buildings;
- economic considerations;
- minimizing water volume in the installation;
- sustainability.

Any potable water installation shall be designed in accordance with its relevant parameters. If foreseeable, design concepts should make allowance for possible changes of building occupation – viewed over the entire lifecycle. Methodological bases of integral design and building information modelling (BIM) are recommended as a basis for design to support compliance of later occupation in practice with the data of anticipated water consumption (specification sheet).

NOTE Attention is drawn to national or local regulations in respect to the prevention of proliferation of legionella spez.

The hot potable water installation shall not be used for space heating purposes.

For hygiene, energy efficiency and economic reasons, PWH storage devices and draw-off points should be placed at locations that minimize the total length of the distribution pipework. Such considerations need to be made at the very beginning of the design procedure, in co-operation with the architect.

Using shorter supply lines should not lead to longer circulation lines. The optimization of the pipes' length shall be performed under consideration of all distribution lines altogether.

4.3 Documentation

4.3.1 General

It is indispensable to exchange suitable design documents (e.g. usage agreement) for coordination of the construction progress and for communication between the relevant disciplines.

Designing documents should comprise at least:

- room manuals;
- implementation plans as layouts, and pipe schemes as well as sections with dimension data;
- wall and ceiling cutting and breakthrough plans;
- calculations of pipework, pump designs and designs of other components;
- the essential energy-relevant attributes shall be taken in account;
- performance data for components in the potable water installation, in particular also those components that are manufactured by other disciplines, e.g. potable water heaters.

Optionally or mandatory according to national rules, data can be added for risk analysis regarding water hygiene (see the guidelines for water safety plan concept in buildings according to CEN/TR 17801 [2]).

The graphic symbols according to EN 806-1 shall be applicable for the drawing depiction of the line diagrams.

4.3.2 Room manual

The room manual should contain a description of use and a concept for potable water installation.

A room manual comprises a list of all necessary data that describe the rooms in a building.

The following should be indicated for the potable water installation as a minimum:

- use of the room;
- use of the draw-off points;
- stop valves and automatic control devices;
- draw-off points;
- room temperatures.

Data and information for the required maintenance measures, the sampling points and the necessary measures in case of malfunctions within the potable water installation should be listed in a maintenance plan.

4.3.3 System manual

The system manual consists of documentation regarding design, implementation, operation and maintenance.

The system manual is compiled not later than the time of commissioning.

4.3.4 Maintenance plan

Proper maintenance is necessary for fault-free technical functioning in order to protect the health and safety of the consumers. Each component of the potable water installation requires individual measures in order to ensure a sustainable function. Inspections, maintenance, improvements and repairs are available as measures. The resultant tasks should be considered individually for each single component. Specifications and intervals can be found in EN 806-5 and the relevant manufacturer documents. It is necessary to include requisite maintenance measures for the selected components when designing a potable water installation. In particular, access points, intervals and space requirement for later interventions should be considered during the design. Information on the necessary measures should be gathered and summarized in a maintenance plan. This maintenance plan shall be validated regularly.

4.4 Preservation of potable water quality

4.4.1 Connection to a service pipeline

Potable water installations shall not have any negative impact on potable water supply – in particular on the public water supply – e.g. in form of impairment or pressure surges. (see EN 1717)

Where a private water supply is to be used in addition to water supplied by a statutory water supplier there shall be no cross connection of these systems, without suitable backflow protection in accordance with EN 1717.

Where pipelines are laid within the premises but outside of buildings, requirements from this document and EN 805 shall be observed where applicable (see also prEN 806-1:2024, Figure 1 and prEN 806-1:2024, Clause 6).

4.4.2 Hygiene

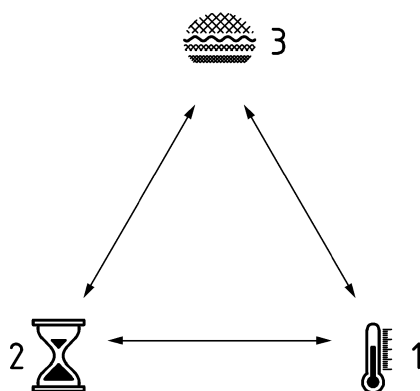
4.4.2.1 General

The requirements on the quality of water intended for human consumption shall be met at any draw-off point of the potable water installation.

NOTE The Directive (EU) 2020/2184 [1] contains information on the quality of water intended for human consumption. For nations not covered by the directive national regulations contain this information.

Adverse changes to potable water quality shall be avoided. These include excessive microbial proliferation or the proliferation of pathogens. In order to prevent unacceptable support of microbial proliferation in potable water installations, the following principles shall be observed:

- 1) prevent temperatures that promote microbial proliferation;
- 2) prevent stagnation periods;
- 3) minimize nutrient input.

**Key**

- 1 temperature
- 2 time/stagnation
- 3 nutrients

Figure 1 — Factors influencing bacterial proliferation

Hygiene rules are considered together with other design rules regarding users' comfort and energy efficiency. Optimal balance has to be found keeping hygiene with highest priority.

4.4.2.2 Operating temperature

Potable water installations shall be designed and installed such that the PWC temperature does not exceed 25 °C at any point during normal operation. Therefore, cold and hot water supply pipework shall be laid such that unacceptable external heating of PWC can be avoided (see 4.5). If necessary other appropriate measures (e.g. PWC circulation, flushing or a process combination of cooling and flushing) shall be applied.

30 s after fully opening any draw-off fitting or 3 l discharged, whichever occurs first (for PWH, see Annex B), the water temperature should not exceed 25 °C for PWC at the draw-off points and should not be less than 55 °C for the PWH system.

NOTE 1 Attention is drawn to local or national regulations that can apply.

NOTE 2 It is emphasized that national residual standards can contain stricter requirements.

PWH systems shall have the facility to enable the temperature at the extremities and all draw-off points of the installation to be raised to 70 °C for at least 5 minutes for disinfection purposes. If the heating system installed cannot reach the required temperature, an external heating source can be connected temporarily.

In normal operation the temperature of the water heater shall be set such that the PWH temperature does not fall below 55 °C at any point within the whole PWH-system. All supply pipelines of the PWH installation which are not included in a PWH-C installation shall not exceed a volume of 3 l. These should not be thermally insulated in order to cool down as quickly as possible, (see also 6.3.1)

4.4.2.3 Minimizing Stagnation

The potable water installation shall be designed such that regular water exchange occurs in all supply pipes, especially in main branch and branch pipes. To ensure that water volumes are completely exchanged during expected use, pipe dimensions and flow paths shall be selected as small as possible in relation with the calculation (see EN 806-3). . When infrequently used draw-off points (e.g. protection unit for heating system supply connections, single taps, garden taps) are installed, the pipe shall be connected as short as possible to the distributing pipe.

Safety valves and thermal discharge safety devices shall be connected as short as possible. The connection pipeline is limited to a maximum of $10 \times \text{DN}$ or 150 mm whichever is shorter.

Parallel installation shall be designed for flowing through at the same time.

4.4.2.4 Appropriate materials to minimize nutrient input

Materials that come into contact with potable water shall be suitable for use with potable water and shall comply with European and national provisions as well as with the criteria for the evaluation of suitability of materials for use with potable water. (See Clause 5.)

4.4.2.5 Sampling points

Potable water installations should be provided with at least the following sampling points for microbiological analysis according to EN ISO 19458. The number and position of sampling points shall be documented.

The sampling points shall be accessible.

Arrangement of sampling points for PWC:

- at the building entrance immediately downstream of the building/unit water meter;
- in the PWC distribution pipeline to the water heater.

Arrangement of sampling points for PWH/PWH-C:

- at the outlet of the water heater;
- at the inlet of the circulation pipe into the water heater (in the direction of flow upstream of the circulation pump);
- in the individual circulation pipes prior to re-entry into the circulation manifold.

A list of recommended peripheral sampling points of the potable water installation should be defined to obtain a representative overview of the microbiological conditions inside the single feed-pipeline of the potable water installation. They should be arranged in parts of the installation where aerosol formation is to be expected (e.g. shower units).

4.5 Pipework

4.5.1 General

The pipework shall be designed in a way that the requirements according to 4.3.2 can be fulfilled.

Where access is difficult pipework, such as in walls or solid floors, pipework should be located in a sleeve, duct or dedicated pipework shafts where it can be easily removed and replaced.

Pipework shall not compromise the building construction. Therefore it should be mounted open or as front-wall installation if necessary.

Pipework shall be protected against frost, heat gain and if needed against chemical and mechanical hazards.

When pipework is installed in installation shafts, removable connections and valves shall be accessible without damaging of structural elements.

Pipes shall not be installed in the following types of shafts still used for their original purpose, e.g.:

- in smoke shafts;

- in ventilation shafts;
- in elevator shafts;
- in domestic garbage shafts.

The pipework of the potable water installation shall not be laid through drains or sewers.

Supply and distributing pipes shall be capable of being insulated and drained. Facilities shall be provided for draining the pipework inside the building. It should be possible to empty the pipework even in the lowest point of the potable water installation.

Pipe systems shall be designed for the operating conditions according to Table 1 as a minimum. The pipe design shall be planned according to 4.4.2.

Table 1 — Requirements in respect to PWH and PWH-C pipe systems for manufacturers when designing pipe systems

Maximum design pressure	Design temperature	Time with operating temperature	Maximum temperature	Time with maximum temperature	Temperature for malfunction	Time with malfunction
$p_{\max}$ kPa	T_D °C	t_D a	$T_{\max}$ °C	$t_{\max}$ a	T_{mal} °C	T_{mal} h
1 000	70	49	80	1	95	100

All pipes and fittings which are in line with the conditions specified in Table 1 shall also be suitable for the conveyance of PWC for a period of 50 years at a temperature of 20 °C and a maximum design pressure of 1 000 kPa.

In addition, all parts of the potable water installation shall be planned so that they correspond to the requirements of the pressure test during the commissioning (see EN 806-4).

NOTE 1 Attention is drawn to local and national laws and regulations that can apply.

In every building or part of a building to which a separately chargeable supply of water is provided and in all premises occupied as a dwelling, whether or not separately charged for a supply of water, a stop valve shall be provided that controls the whole of the supply to the premises concerned without shutting off the supply to any other premises. This stop valve shall, so far as is practicable, be installed within the building or premises concerned in an accessible position above floor level and close to the point of entry of the pipeline supplying water to that premises, whether this be a service pipe or a supply pipe.

The supply pipes for each floor and those in the individual flats shall be capable of being shut off separately.

A stop valve shall be provided on the inlet connection to appliances e.g. flushing cistern (FC), storage cisterns, water heaters, washing machines.

A stop valve shall be installed in every pipeline supplying water to any structure erected within the curtilage of a building but having no access from the main building.

PWH taps shall be on the left, PWC taps on the right.

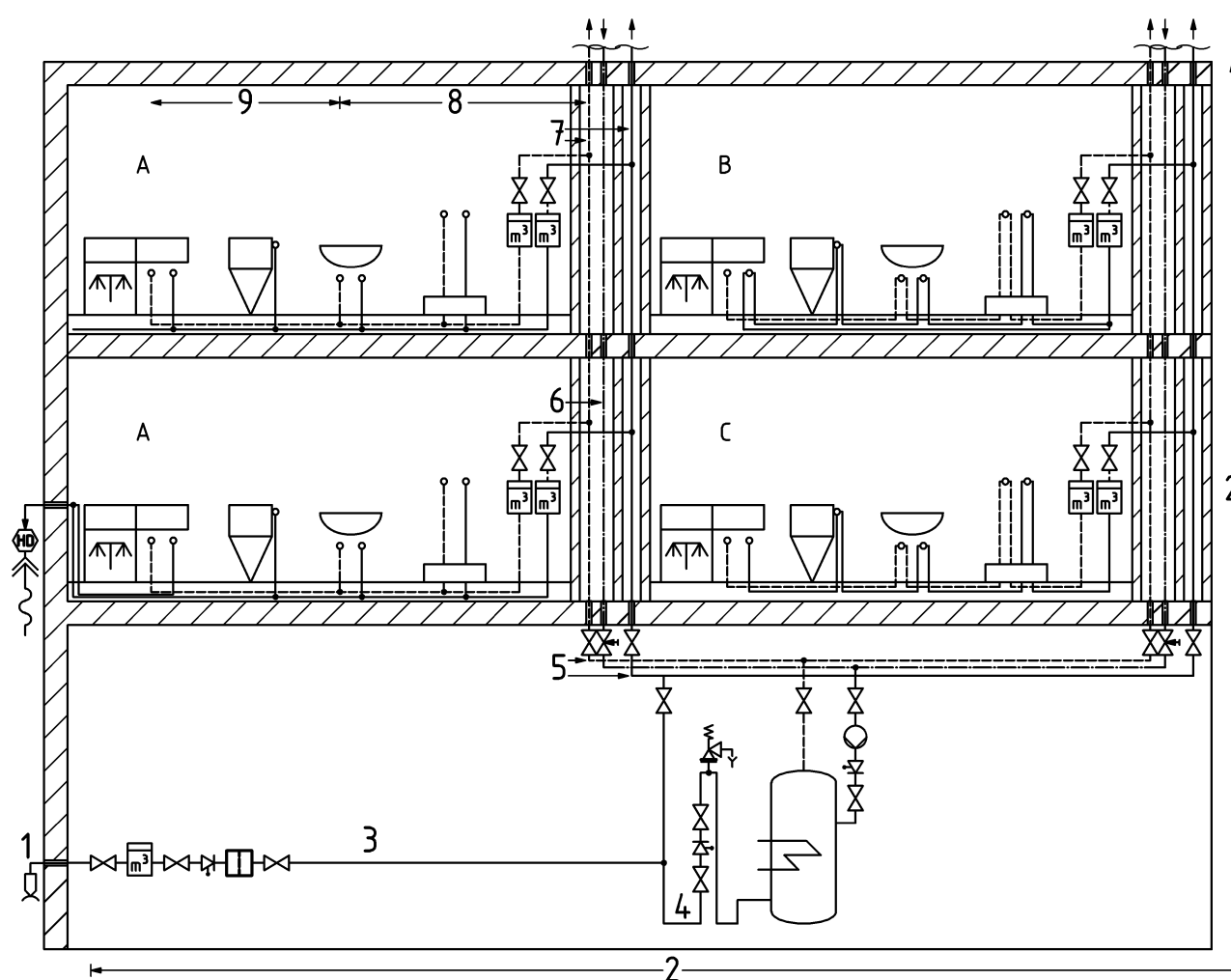
In a dwelling divided into a number of flats, where rising pipes are centrally located, stop valves shall be installed in a room near the rising pipe or space to which access is possible.

All pipelines and joints of a potable water installation shall be designed for a service life of 50 years taking into account appropriate maintenance and specific operating conditions.

In all cases of horizontal pipelines laid over one another, PWC pipelines shall be designed below PWH and PWH-C pipelines.

When designing a potable water installation as an unvented installation see as an example Figure 2 When designing a potable water installation as a vented system see as an example figure (prEN 806-1:2024, A.2, Figure A2).

Draining taps should be fixed over a drain or have provision for discharging the water to the nearest convenient point for disposal.



Key

- 1 service pipeline
- 2 supply pipelines
- 3 main distribution pipeline
- 4 distribution pipeline to water heater
- 5 horizontal distribution pipeline
- 6 return pipeline
- 7 vertical distribution pipeline
- 8 floor service pipeline
- 9 single feed pipeline

Figure 2 — Example for the use of graphic symbols and demarcation of installation parts (installation type A)

If non-potable water installations (e.g. rainwater systems) are no longer used, their pipelines and components shall not be re-used or converted for the distribution of potable water.

The pipelines shall be laid out so as to ensure a clear overview. The pipe layout should be straight-lined, parallel and in pipe sections as short as possible without crossover.

The pipelines should be routed so that air locks are avoided.

PWC pipelines shall be protected against heat gain by suitable measures (e.g. separate pipeline routes/PWC pipe shafts in contrast to hot pipe, insulation) (see 4.4.2).

If PWC pipes are routed in walls or floors parallel to pipes for transporting PWH (central heating or PWH/PWH-C installation), the PWC pipelines should be kept away from the effect of any heat transfer (e.g. floor and wall heating).

NOTE 2 The minimum distance between the PWH-Pipelines and PWC-pipelines depends on a multitude of factors e.g. insulation thickness, materials, flow through, PWC temperature etc.

Pipes that may be exposed to frost shall be protected, see 7.2 on frost effects.

4.5.2 Pipework – factors that influence the design-principles

4.5.2.1 General

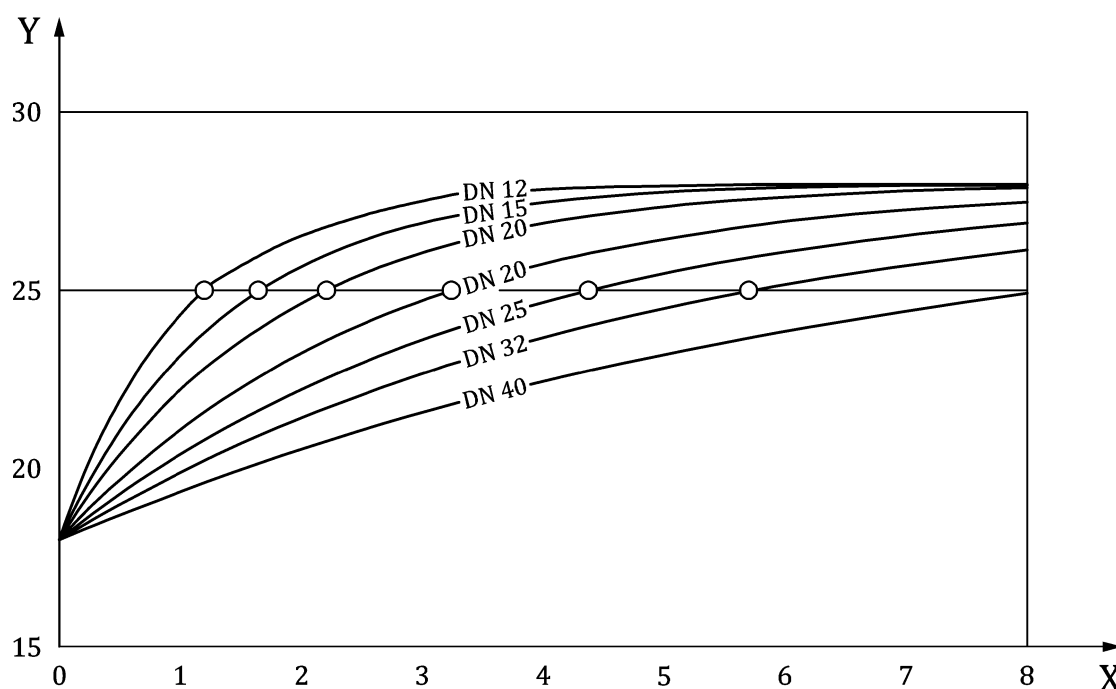
For the design of pipework for potable water installations regarding hydraulics, hygiene and energy efficiency, the following influencing factors are essential:

- architectural specifications: floor plan, location of shafts and sanitary objects (distances define required pipe lengths;
- building physics especially in regards to heating up of PWC-pipes (e.g. in concealed ceilings and shafts);
- height of floor construction, installation space required for insulation thicknesses.

In addition to the above influencing factors, project related requirements with regard to hygiene (see 4.4.2) and the technical performance (e.g. temperature at the tap and pipe-volume and pipe-length) (discharge times see informative Annex B) shall be considered in the design of the potable water installation.

4.5.2.2 Basics for hygienic PWC piping design

Due to high ambient temperatures (e.g. in common shafts or ceilings) there is a risk that the PWC will warm to temperatures greater than 25 °C through heat convection and heat radiation during stagnation periods see Figure 3.



Key

- X time of stagnation in hours
Y PWC temperature in [°C]

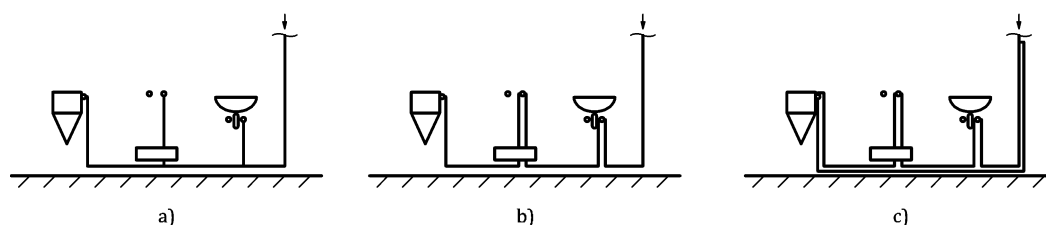
Figure 3 — Example of temperature profiles in case of stagnation in insulated metallic PWC pipelines at 28 °C ambient temperature and insulation at 100 % $\lambda = 0,035 \text{ W/(m}^*\text{K)}$

To prevent heating of PWC above 25 °C, separately located shafts for PWC-pipes and PWH/PWH-C-Pipes shall be provided. For this purpose the structure of the building has to be designed accordingly by the architect at an early stage of the building design.

If PWC-pipelines laid in areas of higher heat loads, in addition to separated shafts, a remedy can be provided by a greater insulations thickness or temperature-controlled flushing equipment, if necessary and where permitted. Otherwise, another pipe layout shall be selected.

4.5.3 Floor service pipe

Examples of distribution types for floor service pipes are shown in Figure 4.



Key

- a) individual T-piece distribution
b) chain distribution
c) ring distribution

Figure 4 — Distribution types of floor service pipelines

4.5.4 Examples for pipework in separate shafts

In residential construction, potable water is supplied via vertical distribution pipelines (rising pipelines) (Figure 5).

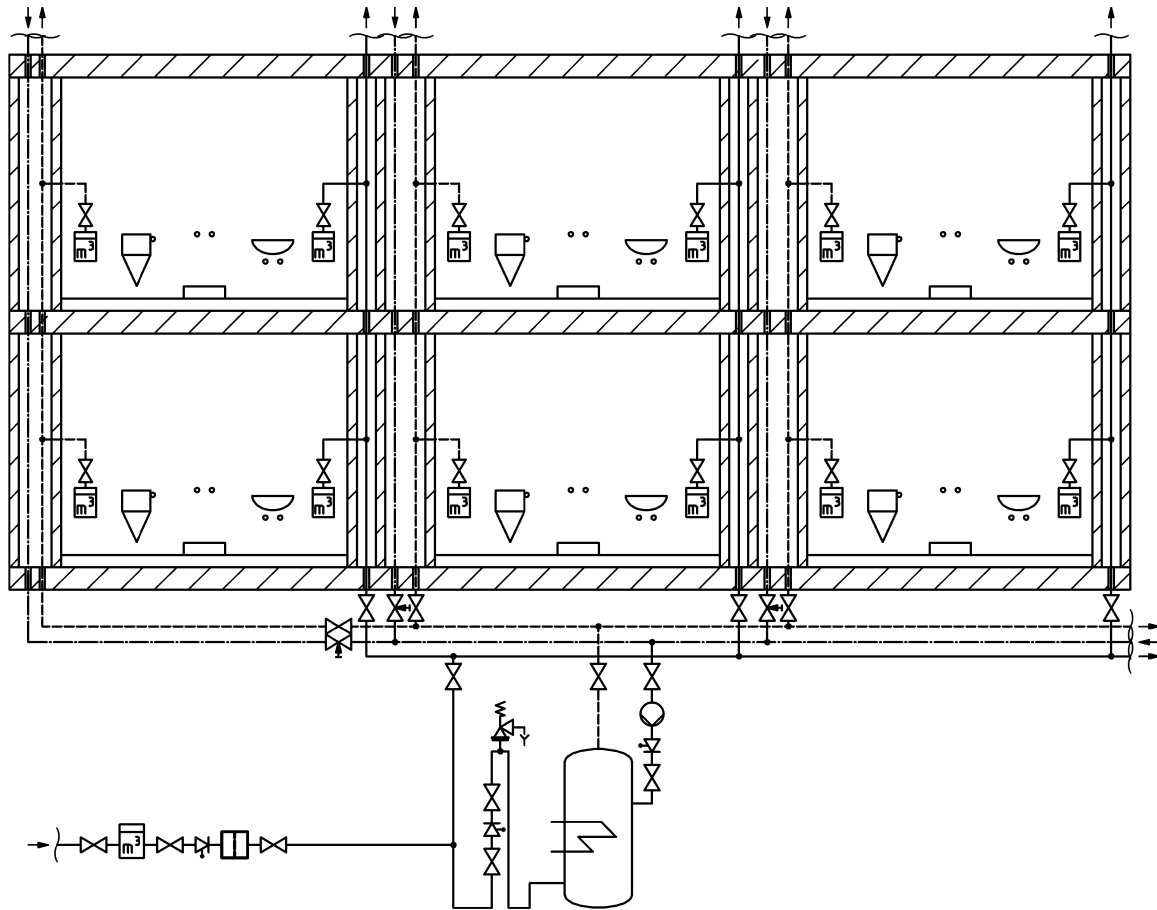


Figure 5 — Example of vertical distribution with separate shafts lines

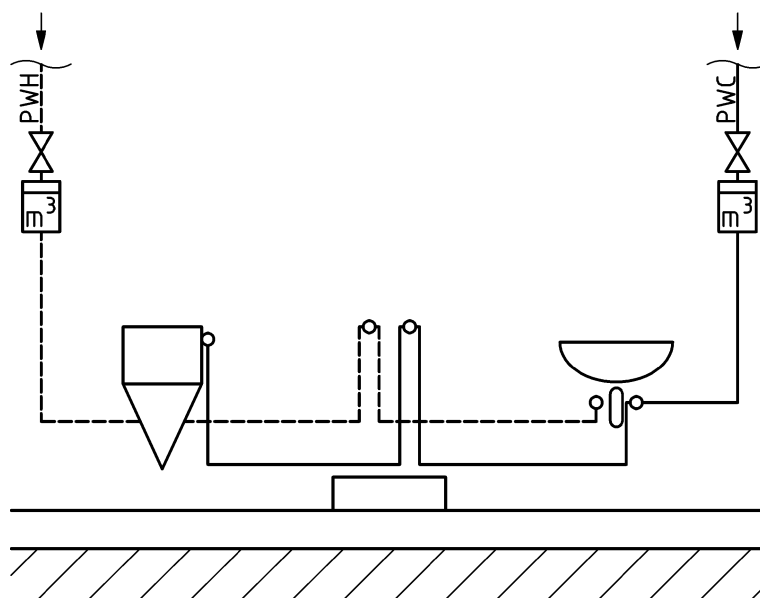


Figure 6 — Example of bathroom installation in Figure 5

The PWH-C shall never be routed of the relevant tap, as this leads to impermissible heating and to hygienic risks in the tap or at the connection of the PWC pipe. Vertical cooling sections with $l \geq 150$ mm shall be provided in order to prevent this (see Figure 7).

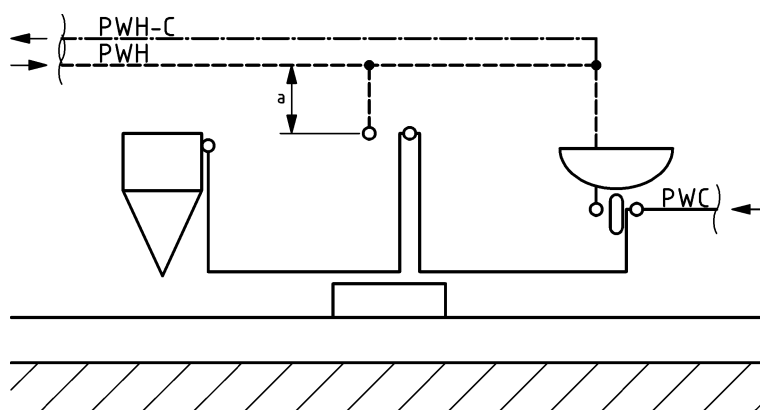


Figure 7 — Example of service pipes with wall fittings and PWH-C including connection-pipe with length of $a \geq 150$ mm

If there is a need to distribute potable water horizontally, the PWH pipelines and circulation pipelines might have to be routed with other hot water pipelines in the suspended ceiling. The PWC pipelines shall then be routed separately (e.g. see Figure 9) to this. This separate pipe layout minimizes external heating of the PWC pipe.

In order to reduce the number of vertical distribution lines (rising pipelines) and shafts, branch circuits at floor level are advised (see Figure 9 and Figure 10).

Figure 8 shows an example of a PWH single feed pipe to a washbasin with and without inclusion in a circulation system. The inclusion of a single feed pipe in a circulation system has an impact on the discharging time at the draw-off point.

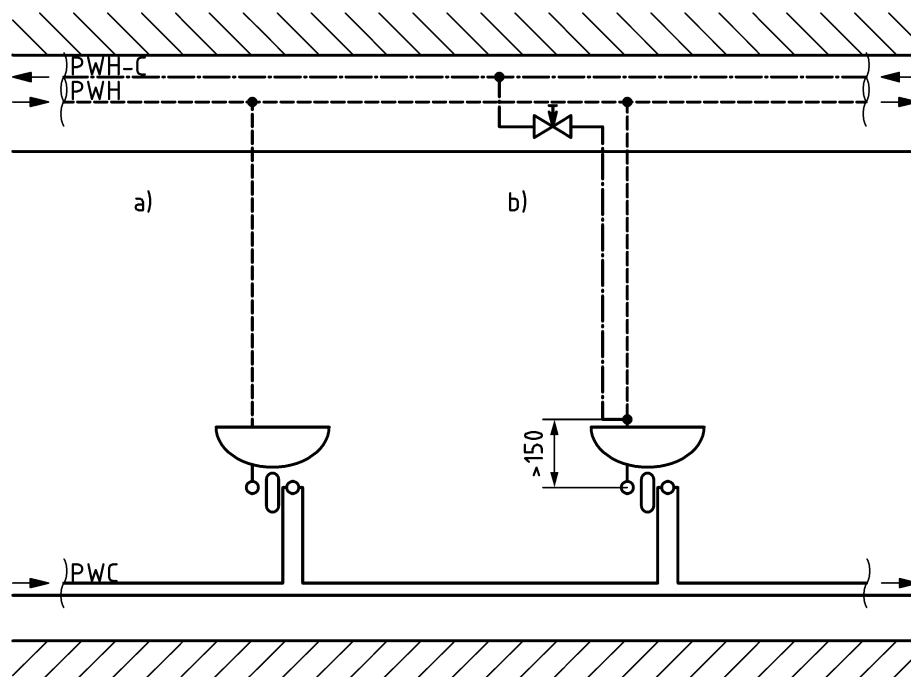


Figure 8 — Example of a PWH single feed pipe to a washbasin with and without inclusion in a circulation system

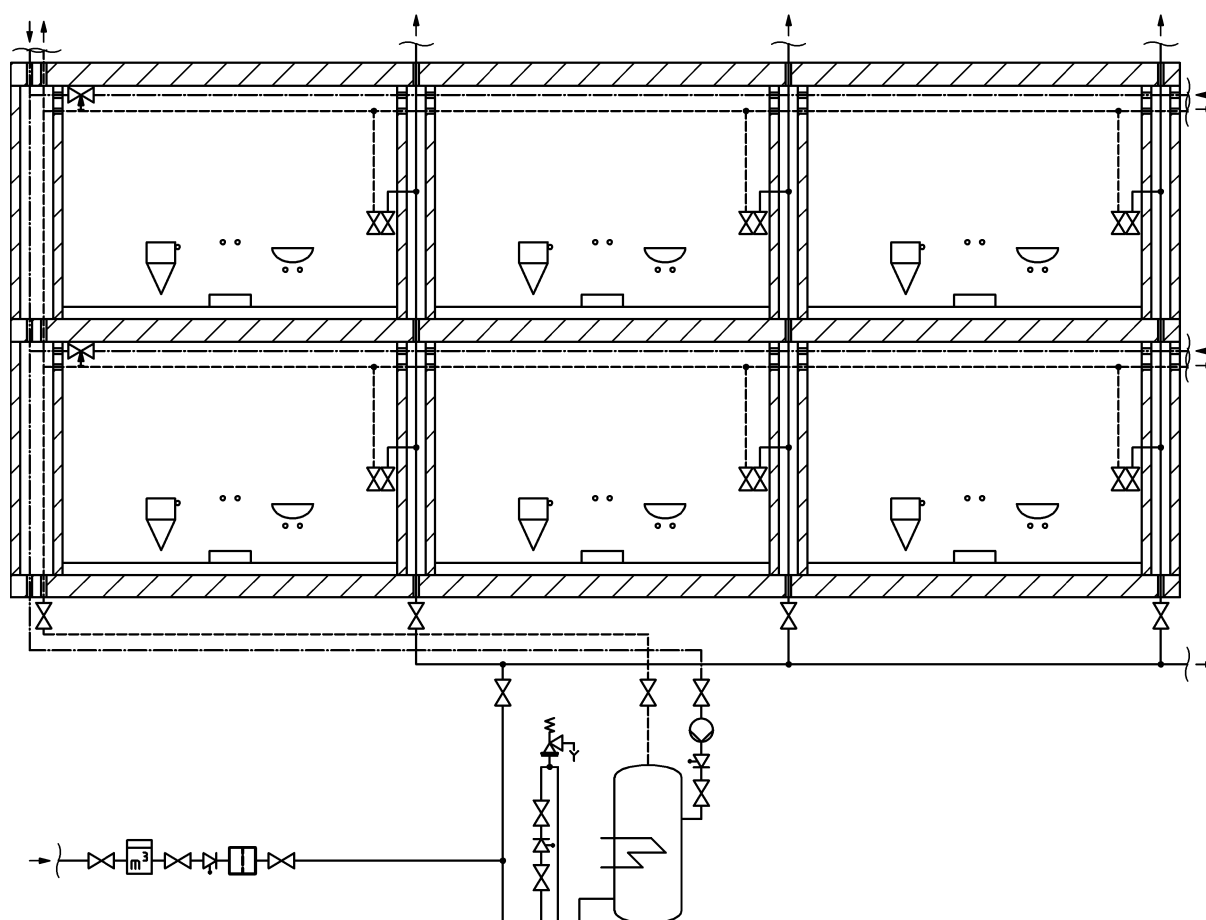


Figure 9 — Example of vertical distribution lines with separate shafts for PWC-Pipes