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EN 806-Technical rules for domestic drinking water installations

EN 806-Spécifications techniques relatives aux installations pour l'eau destinée à la consommation humaine à l'intérieur des bâtiments

EN 806 – Technische Regeln für Trinkwasser-Installationen in Gebäuden

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1 Introduction

EN 806 provides requirements for installations inside buildings conveying water for human consumption and gives recommendations for design, installation and commissioning. It applies to new installations, alterations, extensions and repairs.

EN 806 consists of five parts, Part 1: General; Part 2: Design; Part 3: Pipe sizing; Part 4: Installation; Part 5: Operation and maintenance.

EN 806 is the product of Working Group WG 2 of TC 164. WG 2 was set up in 1989, when TC 164 was founded.

2 Structure of the TC 164 "Water supply"

WG 2 „Drinking water installations in buildings“
WG 3 „Effects of materials in the contact with drinking water“
WG 4 „Protection against drinking water contamination“ (dormant)
WG 7 "Building Valves" formerly TC 36“ (dormant)
WG 8 "Sanitary Taps" (formerly TC 34)
WG 10 "Drinking water heaters"
WG 12 „Flexible Hoses for sanitary taps“
WG 13 „Drinking water conditioning inside buildings“
WG 14"Building valves and protection devices against backflow"
Remark: WG 7 and parts of WG 4 were summarised to WG 14.

3 Development of the EN 806 series

The development of technical rules for drinking water installations as a European standard the EN 806 dates back to 1989. The work was complicated at the beginning because various systems of standardisation where already established in the member states with their own particular technical specifications and requirements.

Part 5 of EN 806 has been published in April 2012. With upon publication of Part 5 a first working period of nearly 23 years has come to an end.

4 Objectives (EN 806-1)

The main objectives are to ensure that:
— the deterioration in water quality within the installation is avoided;
— the required flow of water and pressure is available at the draw-off points and at the connection points of appliances (e. g. water heaters, washing machines);
— the potable water meets the standards for physical, chemical and microbiological quality at the draw-off points;
— all parts of the installation do not cause danger to health and do not damage property within calculated lifetimes;
— the maintenance of the installation meets the functional requirements at all times during its lifetime;
— sound levels are kept to a practicable minimum;

— contamination of the public water supply, undue consumption, leakage and misuse is avoided.

5 Competence and duties for design, construction and operation (EN 806-1)

The design shall be carried out by competent persons, e. g. persons with relevant experience, qualifications, knowledge of regulations and safety requirements.

The work for construction, alteration and maintenance shall be carried out by competent installers in accordance with qualification required by national or local regulations.

The data necessary for design and construction (e. g. supply pressure, the supply flow rates and the water quality analysis at the point of delivery) shall be determined before commencement of work: the information should be made available by the water supplier (or the operator of a private or separate water supply).

The owner/occupier is responsible for ensuring the safe operation and maintenance of the potable water installation and should be provided with the necessary information.

6 Requirements for pressure, temperature and lifetime (EN 806-2)

As a basic standard EN 806-2 provides basic required values for total lifetime, pressure and temperature tolerance which have to be fulfilled by the products.

To ensure adequate strength, all components of the system shall be designed to meet the test pressure requirements of the local and national laws and regulations. The test pressure shall be at least 1,5 times the allowable maximum operating pressure (PMA). All pipes 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. Unless otherwise specified in European Standards, the materials, components and appliances for hot drinking water installations shall be capable of resisting water temperatures up to 95° under fault conditions.

Table 1 — Allowable maximum operating pressure classes (EN 806-2)

Allowable maximum operating pressure (PMA) class	**Pressure** kPa
PMA 1,0	1000
PMA 0,6	600
PMA 0,25	250

Table 2 — Classification of service conditions for plastic pipe systems (EN 806-2)

Application class	Design temperature, T_D ℃	Time at T_D years	T_{max} ℃	Time at T_{max} years	T_{mal} for fault condition ℃	Time at T_{mal} for fault condition h	Typical field of application
1	60	49	80	1	95	100	Hot water supply (60 ℃)
2	70	49	80	1	95	100	Hot water supply (70 ℃)

All systems which satisfy the conditions specified in Table 2 shall also be suitable for the conveyance of cold water for a period of 50 years at a temperature of 20 ℃ and a design pressure of 10 bar.

7 Design aspects for prevention of corrosion damage

Guidance in order to prevent or to minimize the risk of corrosion damage in potable water installations is given by information in EN 806-2 with regard to:

— the corrosion characteristics of the metallic material to be used;
— the water characteristics;
— the design, installation and operating conditions of the potable water installation.

Corrosion effects occur in potable water installations as a result of the interaction between the metallic material and the water, influenced by the above mentioned parameters. Corrosion often causes the formation of protective layers and does not necessarily lead to corrosion damage. Prevention of corrosion damage requires carefulness regarding selection of materials, design, possible water conditioning and storage of the materials on site and its assembly.

The designer shall consider any practical experience gained with regard to the particular water supplied. If no experience is available, the designer shall contact the water supplier in order to obtain water analysis data permitting assessment. The necessary water analysis data and the methods of assessment are described in EN 12502. The water supplier should be additionally consulted with regard to his experiences with the use of certain materials and whether changes in the supply conditions or water composition are to be expected.

The designer shall choose components and appliances which comply with the relevant product standards. Where no such standards or codes of practice exist only those products for which proof of suitability including adequate corrosion protection has been provided shall be used. The system shall be designed so as to assure regular renewal of the water under normal service conditions in order to avoid stagnation.

If an apparent risk of corrosion damage remains the designer shall check whether this risk can be reduced by water conditioning in accordance with EN 12502. Water conditioning shall be restricted to the requirements of the particular application and is only permitted within the limits of the EU-Directive 98/83/EC, national or local regulations. The processes considered in this standard are intended, where necessary to modify the water quality.

All components shall be stored by the installer to prevent contamination of their inside surface. Where necessary all piping components and fittings shall be cleaned and any loose particles removed (e.g. sand, soil metal filings). Care shall be taken to prevent the ingress of contaminants during assembly.

The method of jointing chosen by the designer shall be in accordance with the recommendation of the pipe manufacturer.

8 Corrosion protection of outside surfaces

Measures shall be taken on site to prevent the outside surfaces of pipework from coming into contact with moisture over prolonged periods. Pipework installed in damp locations shall be protected against moisture. Such protective materials shall not be aggressive to metallic pipework.

Thermal insulation of copper pipes shall be free from nitrites and its content of ammonia shall not exceed 0,2 % by mass. The content of water soluble chloride ions in insulating material used for stainless steel shall not exceed 0,05 % by mass. Where hot dip galvanized steel pipes are laid on concrete floors, sheeting with plastic, approximately 1 m wide, shall be placed between pipe and floor in addition to providing the pipe with a suitable protective coating.

Hot dip galvanized steel pipes are not allowed to be fixed using gypsum plaster. Nor shall they be installed in contact with mortar with containing chloride additives. Where metallic pipes are laid in floor channels, measures shall be taken on site to ensure that such channels are protected against the ingress of water and flooding or can be vented and safely drained.

In general, where pipes are installed on or in walls corrosion protection may not necessary if there is a space between the pipe and the wall.

9 Installation aspects of corrosion protection (EN 806-4)

EN 806-4 "Installation" covers all definitions and information which necessary for the installation of pipework within buildings: the storage and use of the materials, for the installing of the pipe materials, for metal pipe systems and about those out of plastics. Detailed tables illustrate the individual materials and their pipe joints and jointing procedures. The connection of drinking water heaters and the correct installation of the necessary security valves and control valves as for example pressure reducers are also illustrated.

On the topic of corrosion aspects, the EN 806-4 contains requirements and recommendation for the plumber in cases of using various materials together with copper. A special section deals with the installation of combination of pipes and fittings made of different metals (Table 3)

Table 3 — Combination of pipes and fittings (EN 806-4)

Fitting (or valve)	Pipe		
	Stainless steel	**Hot dipped galvanized steel**	**Copper**
Stainless steel	+	See producer's recommendations.	+
Hot dipped galvanized steel	-	+	-
Copper	+	See producer's recommendations.	+
Copper alloy	+	+	+
+ possible - not possible			

In circumstances where galvanized steel is used in the same installation with copper, the galvanized steel products shall be installed up-stream of copper, i.e. water flows from galvanized steel products to copper and direct contact between galvanized steel products and copper shall be avoided, e.g. by using a brass or gun metal fitting. Similarly, copper and galvanized steel products shall not be used in the same drinking water circulation system (see also EN 12502-3).
The normal use of valves made of copper alloys in a water distribution system is not critical in this context because of their relatively low surface area.

10 Flushing the installation

Before commissioning a pressure test has to be carried out and the pipe system has to be flushed. Two flushing procedures are described either one with flushing by water only or the other with a water / air mixture. Flushing procedure during commissioning provides clean installations and prevents initial corrosion related damage from the outset.

The drinking water installation shall be flushed with drinking water as soon as possible after installation and pressure testing and immediately before commissioning. Cold and hot water pipes shall be flushed separately. The water used for the flushing procedure shall be drinking water. It shall be taken into account that particles in the water can damage the installation (corrosion, disfunctioning). To prevent this, a mechanical filter in accordance with EN 13443-1 (no particles $\geq$ 150 µm) shall be used.

Where a system is not brought into use immediately after commissioning, it shall be flushed at regular intervals (up to 7 days).

Precautions shall be taken to protect sensitive valves and equipment (e.g. WC flushing valves, thermostatic mixers, etc.) against foreign particles arising from the installation of the system. Filters installed upstream of valves or installation, which cannot be replaced, shall be backwashed or renewed after flushing.

Aerators, flow strainers, flow controllers, shower heads or hand showers, already installed with valves should be removed to increase flow. In case of concealed thermostatic valves and other sensitive valves, the manufacturer's instructions shall be followed. All servicing valves in the section to be flushed shall be fully opened. Depending on the size of the installation and on the layout of the pipework, the system may be flushed in sections. Flushing shall commence at the lower storey of any building and proceed upward storey by storey. The minimum velocity for flushing the installation shall be at least 2 m/s. The water in the system shall be changed at least 20 times during flushing. At any particular floor level, the draw-off-points shall be fully opened starting with the point most remote from the riser. After flushing the furthest, downstream draw-off-point, the draw-off points shall be closed, in order, commencing with the draw-off point at the upstream end of any circuit. A complete record of the flushing procedure shall be made and retained and handed over to the building owner.

11 Disinfection

Another section treats although no disinfection procedures are described here, it is containing a listing of factors which must be taken into account if disinfection need be carried out. Disinfection measures require special knowledge about the procedure and about possible effects on the material in view of the potential for corrosion later on. Commissioning by using the flushing procedures is usually sufficient, if installation was performed cleanly.

For single dwellings, and minor extensions or alterations in any premises, disinfection is not usually necessary, flushing is sufficient. Any disinfection shall be done in accordance with national or local regulations. After flushing, drinking water installations may be disinfected where it is specified by the responsible person or authority. Depending on the size of the installation, it may be necessary to divide the system into sections. During the whole disinfection procedure it must be ensured that there is no draw-off of any water. A sufficient alternative water supply shall be provided in buildings which are in use. Where any supply pipe within the installation is to be disinfected and there is a possibility that the disinfection substance can come into contact with the point of delivery, the water supplier shall be informed. Complete isolation from the incoming service pipe may be required. Where water that has been used to disinfect an installation is to be discharged into a drain or a sewer, the responsible authority shall be informed and their approval given before the discharge takes place. Where necessary, a neutralising agent may be required. The sequence of disinfection shall be: service pipes; supply pipes; cisterns; distributing pipes, as applicable. Contractors and building users, especially working outside office hours, such as cleaners and security guards, shall be informed by notices displayed at all draw-off points. It shall also be ensured that no other chemicals, such as sanitary appliance cleaning materials, are added to the water containing disinfection substances until the disinfectant solution is flushed out of the system.

12 Documentation

During the installation of a water supply system, records of all pipe runs, cisterns, valves, outlets, etc. shall be kept. On completion of the works, records shall be prepared in a durable format of the 'as fixed' installation. These records shall be handed over to the building owner.

13 Operation and Maintenance (EN 806-5)

Installations shall be operated and maintained in such a manner to avoid adversely affecting the quality of the drinking water, the supply to consumers and the equipment of the water supplier.

Installations shall be checked at regular intervals for safety and quality. Appropriate procedures shall be adopted to maintain the performance of the system at the level specified in EN 806-2 and the individual product standards referenced in EN 1717. The operating conditions of the installation shall be compared with the conditions for design and installation to ensure proper functioning. Responsibility for operation, inspection and maintenance are subject to local and national requirements

In order to ensure the correct operation and maintenance, all information relevant to the installation shall be available. Manufacturer's documentation (e. g. Technical Product Information (TPI)) related to the operation and maintenance of connected appliances shall be available, retained and followed for the purposes of operation and maintenance. The commissioning report shall be part of the documentation. The maintenance shall be recorded in such a way that the data is traceable.

Installations which will not be operated within seven days of their completion or are out of service for more than seven days shall be shut-off at the service stop valve and drained or the water shall be flushed regularly. Service pipes, that are not commissioned immediately after completion or are to be disconnected temporarily, shall be shut off at the water main and those not used for a period of one year or more, disconnected from the water main. Water installations, located in areas where frost damage is likely and frost protection measures are not in place and operational, shall be drained in time to prevent such damage.

14 Recommended frequencies for inspection and maintenance of components for drinking water installations

The following Table A.1 contains information on recommended frequencies for inspection and maintenance of various components for drinking water installations. This list is not exhaustive. Other components will require inspection and maintenance as well. Different requirements on inspection and maintenance may exist in the Member States.

Table 4: Recommended frequencies for inspection and maintenance of components for drinking water installations (EN 806-5)

No.	System component and unit	Reference document	Inspection	Routine maintenance
1	Unrestricted air gap (AA)	EN 13076	Every 6 months	
2	Air gap with overflow non-circular (unrestricted) (AB)	EN 13077	Every 6 months	

3	Air gap with submerged feed incorporating air inlet plus overflow (AC)	EN 13078	Once a year	
4	Air gap with injector (AD)	EN 13079	Every 6 months	
5	Air gap with overflow circular	EN 14622	Once a year	
6	Air gap with overflow tested by vacuum measurement (AG)	EN 14623	Once a year	
7	Backflow preventer with controllable reduced pressure zone (BA)	EN 12729	Every 6 months	Once a year
8	Backflow preventer with different non controllable pressure zones (CA)	EN 14367	Every 6 months	Once a year
9	In line anti-vacuum valve (DA)	EN 14451	Once a year	Once a year
10	Pipe interrupter with atmospheric vent and moving element (DB)	EN 14452	Once a year	
11	Pipe interrupter with permanent atmospheric vent (DC)	EN 14453	Every 6 months	
12	Controllable antipollution check-valve (EA)	EN 13959	Once a year	Once a year
13	Non controllable antipollution check-valve (EB)		Once a year	Replacement every 10 years
14	Controllable antipollution double check-valve (EC)		Once a year	Once a year
15	Non controllable antipollution double check-valve (ED)		Once a year	Replacement every 10 years
16	Mechanical disconnector direct actuated (GA)	EN 13433	Every 6 months	Once a year
17	Mechanical disconnector hydraulic actuated (GB)	EN 13434	Every 6 months	Once a year
18	Hose union backflow preventer (HA)	EN 14454	Once a year	Once a year
19	Shower hose union anti-vacuum valve (HB)	EN 15096	Once a year	Once a year
20	Automatic diverter (HC)	EN 14506	Once a year	
21	Hose union anti-vacuum valve combined with a check-valve (HD)	EN 15096	Once a year	Once a year
22	Pressurised air inlet valve (LA)	EN 14455	Once a year	Once a year

No.	System component and unit	Reference document	Inspection	Routine maintenance
23	Pressurised air inlet valve combined with a check valve located downstream (LB)		Once a year	Once a year
24	Hydraulic safety group	EN 1487	Once a month	Once a year
25	Expansion group	EN 1488	Once a month	Once a year
26	Pressure safety valve	EN 1489	Once a month	
27	Combined temperature and pressure relief valve	EN 1490	Once a month	
28	Expansion valve	EN 1491	Once a month	
29	Pressure reducing valve	EN 1567	Once a year	Once a year
30	Inline hot water supply tempering valve	EN 15092	Every 6 months	Once a year
31	Pressure booster pump	EN 806-2 prEN 806-4	Once a year	
32	Filter, back washable (80 µm to 150 µm)	EN 13443-1	Minimum every 6 months	
33	Filter, not back washable (80 µm to 150 µm)	EN 13443-1	Minimum every 6 months	
34	Filter (< 80 µm)	EN 13443-2	Minimum every 6 months	
35	Chemical dosing system	EN 14812 prEN 15848	Every 2 months	Minimum every 6 months
36	Water softener	EN 14743	Every 2 months	Minimum every 6 months
37	Electrolytic treatment system with aluminium anodes	EN 14095	Every 2 months	Minimum every 6 months
38	Active media filter	EN 14898	Every 2 months	Minimum every 6 months
39	Membrane separation device	EN 14652	Every 2 months	Minimum every 6 months
40	UV device	EN 14897	Every 2 months	Minimum every 6 months
41	Nitrate removal device	EN 15219	Every 2 months	Minimum every 6 months
42	Water heater	EN 12897	Every 2	Once a year

			months	
43	Pipework	EN 806-2 prEN 806-4	Once a year	
44	Water meter, cold	MID [1]	Once a year	Every 6 years
45	Water meter, hot	MID [2]	Once a year	Every 5 years
46	Fire fighting devices	EN 806-2 prEN 806-4	National regulations	

Bibliography

1 EN 806-1, Specifications for installations inside buildings conveying water for human consumption — Part 1: General

2 EN 806-2, Specifications for installations inside buildings conveying water for human consumption — Part 2: Design

3 EN 806-4, Specifications for installations inside buildings conveying water for human consumption — Part 4: Installation

4 EN 806-2, Specifications for installations inside buildings conveying water for human consumption — Part 5: Operation and maintenance

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

6 EN 12502-1, Protection of metallic materials against corrosion – Guidance on the assessment of corrosion likelihood in water distribution and storage systems – Part 1: General

7 EN 12502-2, Protection of metallic materials against corrosion – Guidance on the assessment of corrosion likelihood in water distribution and storage systems – Part 2: Influencing factors for copper and copper alloys
EN 12502-3, Protection of metallic materials against corrosion – Guidance on the assessment of corrosion likelihood in water distribution and storage systems – Part 3: Influencing factors for hot dip galvanised ferrous materials

8 EN 12502-4, Protection of metallic materials against corrosion – Guidance on the assessment of corrosion likelihood in water distribution and storage systems – Part 4: Influencing factors for stainless steels

9 EN 12502-5, Protection of metallic materials against corrosion – Guidance on the assessment of corrosion likelihood in water distribution and storage systems – Part 5: Influencing factors for cast iron, unalloyed and low alloyed steels

10 EN 13443-1, Water conditioning equipment inside buildings - Mechanical filters — Part 1: Particle rating 80 µm to 150 µm — Requirements for performances, safety and testing