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**Specifikacije za napeljave za pitno vodo v stavbah - 4. del: Inštalacije**

Specifications for installations inside buildings conveying water for human consumption - Part 4: Installation

Technische Regeln für Installationen innerhalb von Gebäuden für Trinkwasser für den menschlichen Gebrauch - Teil 4: Installation

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Spécifications techniques relatives aux installations d'eau destinée à la consommation humaine à l'intérieur des bâtiments - Partie 4 : Installation

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## Specifications for installations inside buildings conveying water for human consumption - Part 4: Installation

Spécifications techniques relatives aux installations d'eau  
destinée à la consommation humaine à l'intérieur des  
bâtiments - Partie 4 : Installation

Technische Regeln für Trinkwasser-Installationen - Teil 4:  
Installation

This European Standard was approved by CEN on 23 January 2010.

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**EN 806-4:2010 (E)****Foreword**

This document (EN 806-4:2010) has been prepared by Technical Committee CEN/TC 164 “Water Supply”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by September 2010, and conflicting national standards shall be withdrawn at the latest by September 2010.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document is intended for the use of engineers, architects, surveyors, contractors, installers, water suppliers, consumers and regulatory authorities.

This standard has been written in the form of a practice specification. It is the fourth part of a European Standard consisting of five parts as follows:

— *Part 1: General*

— *Part 2: Design*

— *Part 3: Pipe sizing — Simplified method*

— *Part 4: Installation*

— *Part 5: Operation and maintenance*

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According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

## 1 Scope

This European Standard specifies requirements and gives recommendations for the installation of potable water installations within buildings and for pipework outside buildings but within the premises in accordance with EN 806-1. This European Standard is applicable to new installations, alterations and repairs.

## 2 Normative references

The following referenced documents are indispensable for the application 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 200, *Sanitary tapware — Single taps and combination taps for water supply systems of type 1 and type 2 — General technical specification*

EN 545:2006, *Ductile iron pipes, fittings, accessories and their joints for water pipelines — Requirements and test methods*

EN 681-1, *Elastomeric seals — Material requirements for pipe joint seals used in water and drainage applications — Part 1: Vulcanized rubber*

EN 751-1, *Sealing materials for metallic threaded joints in contact with 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> family gases and hot water — Part 1: Anaerobic jointing compounds*

EN 751-2, *Sealing materials for metallic threaded joints in contact with 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> family gases and hot water — Part 2: Non-hardening jointing compounds*

EN 751-3, *Sealing materials for metallic threaded joints in contact with 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> family gases and hot water — Part 3: Unsintered PTFE tapes*

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

EN 806-1:2000, *Specifications for installations inside buildings conveying water for human consumption — Part 1: General*

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

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

EN 1044, *Brazing — Filler metals*

EN 1057, *Copper and copper alloys — Seamless, round copper tubes for water and gas in sanitary and heating applications*

EN 1092 (all parts), *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated*

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

EN 1254-1, *Copper and copper alloys — Plumbing fittings — Part 1: Fittings with ends for capillary soldering or capillary brazing to copper tubes*

EN 1254-2, *Copper and copper alloys — Plumbing fittings — Part 2: Fittings with compression ends for use with copper tubes*

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EN 1254-4, *Copper and copper alloys — Plumbing fittings — Part 4: Fittings combining other end connections with capillary or compression ends*

EN 1254-5, *Copper and copper alloys — Plumbing fittings — Part 5: Fittings with short ends for capillary brazing to copper tubes*

EN 1514-1, *Flanges and their joints — Dimensions of gaskets for PN-designated flanges — Part 1: Non-metallic flat gaskets with or without inserts*

EN 1717:2000, *Protection against pollution of potable water in water installations and general requirements of devices to prevent pollution by backflow*

EN 10088-2, *Stainless steels — Part 2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes*

EN 10226 (all parts), *Pipe threads where pressure tight joints are made on the threads*

EN 10240, *Internal and/or external protective coatings for steel tubes — Specification for hot dip galvanized coatings applied in automatic plants*

EN 10242, *Threaded pipe fitting in malleable cast iron*

EN 10255, *Non-Alloy steel tubes suitable for welding and threading — Technical delivery conditions*

EN 10312, *Welded stainless steel tubes for the conveyance of aqueous liquids including water for human consumption — Technical delivery conditions*

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*

EN 15161, *Water conditioning equipment inside buildings — Installation, operation, maintenance and repair*

EN 29454-1:1993, *Soft soldering fluxes — Classification and requirements — Part 1: Classification, labelling and packaging (ISO 9454-1:1990)*

EN 60335-1, *Household and similar electrical appliances — Safety — Part 1: General requirements (IEC 60335-1:2001, modified)*

EN ISO 228-1, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation (ISO 228-1:2000)*

EN ISO 4016, *Hexagon head bolts — Product grade C (ISO 4016:1999)*

EN ISO 4034:2000, *Hexagon nuts — Product grade C (ISO 4034:1999)*

EN ISO 7091, *Plain washers — Normal series — Product grade C (ISO 7091:2000)*

EN ISO 9453, *Soft solder alloys — Chemical compositions and forms (ISO 9453:2006)*

EN ISO 15874-3, *Plastics piping systems for hot and cold water installations — Polypropylene (PP) — Part 3: Fittings (ISO 15874-3:2003)*

EN ISO 15875-3, *Plastics piping systems for hot and cold water installations — Crosslinked polyethylene (PE-X) — Part 3: Fittings (ISO 15875-3:2003)*

EN ISO 15876-3, *Plastics piping systems for hot and cold water installations — Polybutylene (PB) — Part 3: Fittings (ISO 15876-3:2003)*

EN ISO 15877-3, *Plastics piping systems for hot and cold water installations — Chlorinated poly(vinyl chloride) (PVC-C) — Part 3: Fittings (ISO 15877-3:2009)*



EN ISO 21003-3, *Multilayer piping systems for hot and cold water installations inside buildings — Part 3: Fittings (ISO 21003-3:2008)*

IEC 60449, *Voltage bands for electrical installations of buildings*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 806-1:2000 and EN 1717:2000 apply.

## 4 Work on site

### 4.1 General

This Clause gives requirements and recommendations on how installation work should be carried out in order to ensure the system fulfils its requirements for long-term safe and economic use and maintain environmental sustainability.

All products shall comply with the relevant product standards and, while awaiting the adoption of verifiable European criteria, with the national regulations.

### 4.2 Handling of materials

Pipes, fittings and other components shall be protected, handled and stored carefully to avoid damage and to prevent contamination by dirt, building materials, vermin and other extraneous matter.

Manufacturers' advice shall be followed concerning how their products should be loaded, transported, unloaded and stored.

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### 4.3 Bending pipes

Bending of a straight pipe shall be carried out by using purpose designed equipment.

When forming bends, care shall be taken to avoid rippling and throating and restricting the diameter of pipes when forming bends.

Bent pipes shall be inspected for damage before use.

Hot dipped zinc coated steel pipes over DN 50 shall not be bent (see EN 10240 and EN 10255).

### 4.4 Jointing of pipes

#### 4.4.1 General

All joints shall be made in accordance with the relevant standards and the manufacturer's instructions. Care shall be taken to establish satisfactory jointing techniques for all water service pipework. Pipes shall be cut at right angles to their axes. Burrs and ridges shall be removed before assembling a joint. If gouges, splits or damage to the pipe end are apparent, the end of the pipe should be re-cut to remove them. Materials used to make the joint should be prevented from entering the waterways. All pipes and fittings shall be internally clean and free from particles of sand, soil, metal filings and chips, etc.

All pipe joints shall be permanently watertight. Pipe joints shall be clad, plastered over or otherwise covered only after having been pressure tested (see 6.1), unless national regulations require accessibility of certain joints, then compliance with those national regulations shall be achieved.

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During installation all inlets and outlets of finished or partly finished pipework, to which draw off fittings or other components have not yet been connected, shall be tightly closed with stoppers, caps or blind flanges. Closed stop valves shall not count as tight closures.

When the installation is complete, flushing shall be carried out (see 6.2) to remove dust, debris and flux residues. Disinfection should also be undertaken when necessary (see 6.3).

All components shall be prepared in accordance with the relevant European Standards. Where threaded joints are used on metallic components, the sealing materials shall comply with EN 751-1, EN 751-2 and EN 751-3. Where threaded joints are used on plastic components, the sealing materials shall comply with EN 751-3.

For pipes in buildings and buried pipes within the premises, all joints shall be of endload bearing type.

**4.4.2 Pipe materials and jointing methods**

A listing of different jointing methods for different pipe materials and connection joints is listed in the following tables:

- Table 1: Jointing methods for metallic pipes;
- Table 2: Jointing methods for plastics pipes (PE-X, PE, PVC-U);
- Table 3: Jointing methods for plastics pipes (PVC-C, PP, PB);
- Table 4: Jointing methods for multilayer pipes

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Table 1 — Jointing methods for metallic pipes

Available jointing methods for metallic piping systems	Material for pipes			
	Ductile Iron	Stainless Steel	Hot dip galvanised steel (HDGS)	Copper
	Materials for fittings			
	Ductile Iron	Stainless steel and brass	Hot dip galvanised malleable cast iron	Copper and copper alloys
Soldering	-	-	-	X
Brazing	-	X <sup>d</sup>	X <sup>d</sup>	X <sup>c</sup>
Welding	-	X <sup>d</sup>	-	X <sup>c</sup>
Threaded joint <sup>a</sup>	X <sup>b</sup>	X <sup>b</sup>	X	X <sup>b</sup>
Compression fittings	-	X	X	X
Press-fit fittings	-	X	-	X
Sockets with elastomeric sealing ring and spigot ends	X	-	-	-
Push fit joint	X	X	X	X
Flanges	X	X	X	X
Demountable unions	X <sup>b</sup>	X <sup>b</sup>	X <sup>b</sup>	X <sup>b</sup>
NOTE For written description of jointing methods, see Annex A.				
<p>a Thread in accordance with either EN 10226-1 or EN 10226-2</p> <p>b Thread on transition fittings</p> <p>c See national regulations and standards.</p> <p>d Corrosion risks have to be considered, see also national regulations and standards.</p> <p>X Existing</p> <p>- Not existing</p>				

Table 2 — Jointing methods for plastics pipes (PE-X, PE, PVC-U)

Available jointing methods for plastics piping systems	Material for pipes									
	PE-X		PE (cold water only)						PVC-U	
	Material for fitting									
	Plastic fittings	Metallic fittings	Ductile Iron	Malleable Cast Iron	Copper alloys	POM	PP	PE	Ductile Iron	PVC-U
Welding (electro fusion, butt... fusion...)	-	-	-	-	-	-	-	X	-	-
Solvent cemented joints	-	-	-	-	-	-	-	-	-	X
Threaded joint <sup>a</sup>	X <sup>b</sup>	X <sup>b</sup>	X <sup>b</sup>	X <sup>b</sup>	X <sup>b</sup>	X <sup>b</sup>	X <sup>b</sup>	X <sup>b</sup>	-	X <sup>b</sup>
Compression fittings	X	X	X	X	X	X	X	-	X	X
Crimped / Press-fit fittings	X	X	-	-	-	-	-	-	-	-
Sockets with elastomeric sealing ring and spigot ends	-	-	X	X	-	X	-	X	X	X
Push fit joint	X	X	-	-	X	-	-	-	-	-
Flanges	X	X	X	X	X	-	X	X	X	X
Demountable unions	X	X	X	X	X	-	-	X	X	X
NOTE For written description of jointing methods, see Annex A.										
a Thread in accordance with either EN 10226-1 or EN 10226-2										
b Thread on transition fittings										
X Existing										
- Not existing										

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Table 3 — Jointing methods for plastics pipes (PVC-C, PP, PB)

Available jointing methods for plastics piping systems	Materials for pipes								
	PVC-C			PP			PB		
	Material for fittings								
	Stainless Steel	Copper Alloys	PVC-C	Plastic fittings other than PP	Metallic fittings, except CU and CU alloys	PP	Plastic fittings other than PB	Metallic fittings	PB
Welding	-	-	-	-	-	X	-	-	X
Solvent cemented joints	-	-	X	-	-	-	-	-	-
Threaded joint <sup>a</sup>	X <sup>b</sup>	X <sup>b</sup>	X <sup>b</sup>	X <sup>b</sup>	X <sup>b</sup>	X <sup>b</sup>	X <sup>b</sup>	X <sup>b</sup>	X <sup>b</sup>
Compression fittings	X	X	-	X	X	X	X	X	X
Crimped / press-fit fittings	-	-	-	-	-	-	X	X	-
Sockets with elastomeric sealing ring and spigot ends	-	-	-	-	-	-	-	-	-
Push fit joint	-	-	-	X	X	-	X	X	X
Flanges	X	X	X	X	X	X	X	X	X
Demountable unions	X	X	X	X	X	X	X	X	X
NOTE For written description of jointing methods, see Annex A									
a Thread in accordance with either EN 10226-1 or 10226-2									
b Thread on transition fittings									
X Existing									
- Not existing									

Table 4 — Jointing methods for multilayer pipes

Available jointing method	Material for fittings	
	Plastic fittings	Metallic fittings
Welding	X	-
Threaded joint <sup>a</sup>	X <sup>b</sup>	X <sup>b</sup>
Compression fittings	X	X
Crimped / press-fit fittings	X	X
Push fit joint	X	X
Flanges	X	X
Demountable unions	X	X
a Thread in accordance with EN 10226-1 and 10226-2 b Thread on transition fittings X Existing - Not existing		

NOTE Multilayer pipes are not mentioned in EN 806-2.

#### 4.4.3 Boilers and instantaneous water heaters connection

Boilers and instantaneous water heaters shall not be connected directly to plastics pipework where the safety devices allow short term (< 10 s) maximum temperatures higher than 95 °C and a water pressure higher than the maximum design pressure (MDP) (< 10 %).

### 4.5 Joining pipes to cisterns

#### 4.5.1 General

Where appropriate, cisterns shall be fully supported across the base to avoid deformation when filled and to avoid undue stress on the pipe connections. Holes shall be correctly positioned for the connection of pipes to cisterns. Holes shall not be cut with flame cutters. Where practicable, all outlets from a cistern should be taken from the bottom of the cistern to prevent the retention of sediment. All debris, fillings, borings and blanks shall be removed from the inside of the cistern.

#### 4.5.2 Steel pipes to steel, fibre cement or glass reinforced plastics cisterns

The threaded end of the pipe shall be secured in the hole in the cistern either by backnuts and washers both inside and outside (soft washers being used additionally with glass reinforced plastics and fibre-cement cisterns or where there are irregular surfaces) or by using bolted or welded flanged connections.

#### 4.5.3 Copper or plastics pipe to steel, fibre cement or glass reinforced plastics cisterns

A copper alloy connector, having a shoulder to bear on the inside, of the cistern and secured by a backnut to the outside shall be used. Corrosion resistant support washers shall be used both on the inside and the outside of the cistern, additional soft washers shall be used as in 4.5.2.

Because of the risk of galvanic corrosion of the cistern connection of copper pipework to galvanized steel cisterns shall be avoided (see Clause 5).

#### 4.5.4 Concrete cisterns

Connections to concrete cisterns shall be made preferably by the use of short thread flanged connections having an anchor flange (fixing point) either cast or welded on. Alternative suitable methods of connection can be used. Care shall be taken to ensure that the connections are properly aligned both in the horizontal and vertical planes when being cast into the concrete, which shall be compacted around the anchor flange to ensure a watertight joint.

#### 4.5.5 Thermo-plastics cisterns

The following detailed items shall be followed in accordance with the manufacturer's instructions.

Pipes shall be carefully connected to plastics cisterns and supported to avoid distortion of the cistern.

Scribing tools shall not be used to scratch or mark the position of a hole to be cut in a plastics cistern.

Holes for pipes shall be cut in plastics cisterns with a tank cutting bit or hole saw. They shall be truly circular, having clean edges and be free from notches. The cistern wall shall be supported during the cutting operation by a wooden or other suitable strut.

A supporting back plate shall be used on the outside of the cistern where the float-operated valve is fitted, to spread the thrust of the lever arm over a greater area of the side wall. Corrosion resistant support washers shall be used both on the inside and the outside of the cistern with additional soft washers.

#### 4.6 Underground pipe laying

Requirements for underground pipe laying within the curtilage of the building shall be in accordance with those specified in EN 805.

Where ground contamination is encountered or suspected suitable impermeable pipework shall be used or the pipe shall be sleeved. No pipe susceptible to deterioration by contact with any substance shall be laid or installed in a place where such deterioration is likely to occur.

Every underground pipe entering a building shall do so with due regard to frost protection and accessibility.

Where a pipe enters a building it shall be accommodated in a suitable sleeve that prevents the passage of water, gas or vermin, i.e. the ends of the sleeve shall be sealed.

#### 4.7 Pipework in buildings

##### 4.7.1 Allowances for thermal movement and prevention of noise

In installations that do not have limited straight runs and many bends and offsets, allowance for expansion and contraction of the pipes shall be made by:

- forming expansion loops;
- introducing changes of direction to avoid long straight runs;
- fitting proprietary expansion joints.

In installations with limited straight runs and many bends and offsets, thermal movement is accommodated automatically.

Where applicable, pipes should be fitted clear of joints, beams, floor boards and other pipes. Where this is not possible, pads of insulating material should be fitted between the pipe and the structure to minimise noise.