SLOVENSKI STANDARD
SIST EN 806-3:2006

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Specifikacije za napeljave za pitno vodo v stavbah – 3. del: Izračunavanje premera cevi – Poenostavljena metoda

Specifications for installations inside buildings conveying water for human consumption - Part 3: Pipe sizing - Simplified method

Technische Regeln für Trinkwasser-Installationen - Teil 3: Berechnung der Rohrinnendurchmesser - Vereinfachtes Verfahren

Spécifications techniques relatives aux installations d'eau destinée a la consommation humaine a l'intérieur des bâtiments - Partie 3: Dimensionnement - Méthode simplifiée

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Specifications for installations inside buildings conveying water for human consumption - Part 3: Pipe sizing - Simplified method

Spécifications techniques relatives aux installations d'eau destinée à la consommation humaine à l'intérieur des bâtiments - Partie 3: Calculations des diamètres intérieurs - Méthode simplifiée

Technische Regeln für Trinkwasser-Installationen - Berechnung der Rohrinnendurchmesser - Teil 3: Vereinfachtes Verfahren

This European Standard was approved by CEN on 3 February 2006.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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Contents

Foreword

This European Standard (EN 806-3:2006) 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of an identical text or by endorsement, at the latest by October 2006, and conflicting national standards shall be withdrawn at the latest by October 2006.

NOTE This is the third part of the European Standard (EN 806) consisting of five parts as follows:

Part 1: General

Part 2: Design

Part 3: Pipe sizing

Part 4: Installation

Part 5: Operation and maintenance

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, 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 United Kingdom.

1 Scope

This European Standard is in conjunction with EN 806-1 and EN 806-2 for drinking water systems within premises.

This European Standard describes a calculation method for the dimensioning of pipes for the type of drinking water standard-installations as defined in 4.2.

It contains no pipe sizing for fire fighting systems.

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

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

3 Terms, symbols and units

This Clause is enlarged in completion to EN 806-1, to have in the field of pipe sizing the same definitions in European standards.

Table 1 — Terms and definitions

Term	Symbol	Unit	Explanation (definition)
Flow-velocity	v	m/s	
Flow-rate, volume flow	Q	l/s m^3/h	Ratio of the volume of water passing through a specified flow cross-section and the time required for this
Minimum flow-rate at draw-off point	Q_{min}	l/s	Flow-rate at draw-off point which is just sufficient for the appliance to function
Draw-off flow-rate	Q_A	l/s	Assumed draw-off flow-rate at appliance for calculation purposes
Total flow-rate	Q_T	l/s	ΣQ_A, sum of all draw-off flow-rates of the water appliances supplied
Design flow-rate	Q_D	l/s	Flow-rate for hydraulic calculations, taking into consideration the probable simultaneous demand
Static pressure	p_R	Pa	Gauge pressure at a measuring point in the water supply system when no water flowing
Flow pressure	p_{Fl}	Pa	Gauge pressure at a measuring point in the water supply system when water flowing
Minimum flow pressure	p_{minFl}	Pa	Gauge pressure required at the connection to a draw-off point at its draw-off flow-rate
Pressure difference, head loss	Δp	Pa	Difference in pressure between two points in the drinking water installation, resulting from wall friction and individual head loss

(*To be continued*)

Table 1 (*concluded*)

Term	Symbol	Unit	Explanation (definition)
Head loss as a consequence of difference in elevation	Δp_e	Pa	-
Pipe length	l	m	-
Internal diameter of pipe	d_i	mm	-
External diameter of pipe	d_a	mm	-
Wall thickness of pipe	s	mm	-
Loading unit	LU	1	Factor taking into account the flow-rate required at an appliance, the length of time the appliance is in use and the frequency of use. One loading unit (1 LU) equalises a draw-off flow rate Q_A of 0,1 l/s.

4 Principles of pipe sizing calculations

4.1 General

Pipe sizing takes into consideration the character of the installation, the pressure conditions and the flow velocities. This part includes the underground pipes within the premises.

4.2 Characters of installations

In a building there are standard-installations and special-installations.

An installation can be called a standard-installation, when:

- the draw off flow rates do not exceed those set out in Table 2;
- the kind of demand does not exceed the design flow-rate as shown in Figure B.1 (see Annex B);
- it is not designed for continuous use of water. Continuous use being defined as use lasting more than 15 min.

Other installations are called special-installations.

4.3 Pressure conditions

Static pressure at draw off point — max. 500 kPa
(Exception: garden/garage taps max. 1 000 kPa);

Flow pressure at draw off point — min. 100 kPa.

Several draw off points, e.g. thermostatic mixing valves, need a higher flow pressure. Calculations have to consider this matter.

The difference between the static pressure at the lowest draw off point and the flow pressure at the hydraulic worst-case draw off point, reduced by the pressure losses (resulting from wall frictions and individual head losses), give the possible head of difference in elevation within a pressure section.

4.4 Maximum flow velocities

The figures given in Table 3 are based on the following flow velocities:

header pipes, rising pipes, floor service pipes max. 2,0 m/s;

connection pipes to one fitting (dead legs) max. 4,0 m/s.

NOTE National regulations may require lower flow velocities to avoid water hammer and noise.

5 Simplified method of pipe sizing

5.1 General

This clause shows a possibility for a simplified pipe sizing for standard-installations. This method can be used for all type of buildings, which do not have measurements, which highly exceed the average. That means that in most of the buildings the simplified method can be applied.

This method is equally used for cold and for hot water pipes.

5.2 Detailed calculations

The designer is free to use a nationally approved detailed calculation method for pipe sizing (see Annex C).

5.3 Hot water return pipes

As hot water return pipes have to fulfil other hydraulic requirements, they cannot be sized with this method. The flow-velocity in the hot water return pipes shall be calculated according to national or manufacturer's recommendation.

5.4 Loading unit

1 loading unit (LU) is equivalent to a draw-off flow rate Q_A of 0,1 l/s.

Table 2 — Draw-off flow-rates Q_A , minimum flow-rates at draw-off points Q_{min} and loading units for draw-off points

Draw-off point	Q_A	Q_{min}	Loading units
	l/s	l/s	
Washbasin, handbasin, bidet, WC-cistern	0,1	0,1	1
Domestic kitchen sink, - washing machine [a], dish washing machine, sink, shower head	0,2	0,15	2
Urinal flush valve	0,3	0,15	3
Bath domestic	0,4	0,3	4
Taps /garden/garage)	0,5	0,4	5
Non domestic kitchen sink DN 20, bath non domestic	0,8	0,8	8
Flush valve DN 20	1,5	1,0	15
[a] For non domestic appliances check with manufacturer.			

The values in this Table do not correspond with the values in product norms. They are only used for pipe sizing.

5.5 Application of the simplified method

Beginning at the last draw-off point, the loading units for each section of the installation have to be determined. The loading units must be added. The probability of simultaneous demand has been taken into consideration in Tables 3.1 to 3.8. Depending on the material chosen by the designer the pipe size can now be taken out of Tables 3.1 to 3.8. The design flow-rate Q_D as given in Figure B.1 is taken into account for the values in Tables 3.1 to 3.8.

Table 3 — Loading units for determination of pipe diameters

Table 3.1 — Hot-dip galvanised steel

Max. load	**LU**	**6**	**16**	**40**	**160**	**300**	**600**	**1 600**
Highest value	LU	4	15					
DN		**15**	**20**	**25**	**32**	**40**	**50**	**65**
d_i	mm	16	21,6	27,2	35,9	41,8	53	68,8
Max length of pipe	m	10	6					

Table 3.2 — Copper

Max. load	**LU**	**1**	**2**	**3**	**3**	**4**	**6**	**10**	**20**	**50**	**165**	**430**	**1 050**	**2 100**
Highest value	LU			2			4	5	8					
d_a x s	mm	**12** x 1,0			**15** x 1,0			**18** x 1,0	**22** x 1,0	**28** x 1,5	**35** x 1,5	**42** x 1,5	**54** x 2	**76,1** x 2
d_i	mm	10,0			13,0			16,0	20,0	25	32	39	50	72,1
Max length of pipe	m	20	7	5	15	9	7							

Table 3.3 — Stainless steel

Max. load	**LU**	**3**	**4**	**6**	**10**	**20**	**50**	**165**	**430**	**1 050**	**2 100**
Highest value	LU			4	5	8					
d_a x s	mm	**15** x 1,0			**18** x 1,0	**22** x 1,0	**28** x 1,2	**35** x 1,5	**42** x 1,5	**54** x 1,5	**76,1** x 2
d_i	mm	13,0			16,0	19,6	25,6	32	39	51	72,1
Max length of pipe	m	15	9	7							

Table 3.4 — PE-X

Max. load	**LU**	**1**	**2**	**3**	**4**	**5**	**8**	**16**	**35**	**100**	**350**	**700**
Highest value	LU					4	5	8				
d_a x s	mm	**12** x 1,7		**16** x 2,2			**20** x 2,8	**25** x 3,5	**32** x 4,4	**40** x 5,5	**50** x 6,9	**63** x 8,6
d_i	mm	8,4		11,6			14,4	18,0	23,2	29	36,2	45,6
Max length of pipe	m	13	4	9	5	4						