



SLOVENSKI STANDARD
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Sanitarne armature - Termostatska mešalna armatura (PN 10) - Splošne tehnične zahteve

Sanitary tapware - Thermostatic mixing valves (PN 10) - General technical specification

Sanitärarmaturen - Thermostatische Mischer (PN 10) - Allgemeine technische Spezifikation

Robinetterie sanitaire - Mitigeurs thermostatiques (PN 10) - Spécifications techniques générales

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

Robinetterie sanitaire - Mitigeurs thermostatiques (PN 10) - Spécifications techniques générales

Sanitärarmaturen - Thermostatische Mischer (PN 10) - Allgemeine technische Spezifikation

This European Standard was approved by CEN on 24 April 2017.

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CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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EN 1111:2017 (E)**European Foreword**

This document (EN 1111:2017) 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of an identical text or by endorsement, at the latest by February 2018, and conflicting national standards shall be withdrawn at the latest by February 2018.

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

This document supersedes EN 1111:1998.

The main technical changes compared to the previous version are the following:

- a) the introduction of Clause 10 on backflow protection;
- b) the introduction of Clause 11 on test sequence;
- c) the introduction of Clause 13 on performance;
- d) the update of chapters on pressure resistance, torsional resistance and mechanical resistance;
- e) new Annexes A, B, C and D.

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

Introduction

In respect of potential adverse effects on the quality of water intended for human consumption, caused by the product covered by this standard, the following should be noted:

- this standard provides no information as to whether the product can be used without restriction in any of the Member state of the EU or EFTA;
- it should be noted that, while awaiting the adoption of verifiable European criteria, existing national regulations concerning the use and/or the characteristics of this product remain in force.

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1 Scope

This European Standard specifies general construction, performance and material requirements for PN 10 thermostatic mixing valves (TMV) and includes test methods for the verification of mixed water temperature performance at the point of use below 45 °C. This does not exclude the selection of higher temperatures where available. When these devices are used to provide anti-scald protection for children, elderly and disabled persons the mixed water temperature needs to be set at a suitable bathing temperature (body temperature approximately 38 °C) as children are at risk to scalding at lower temperatures than adults. This does not obviate the need for supervision of young children during bathing.

It applies to valves intended for use on sanitary appliances in kitchens, washrooms (incl. all rooms with sanitary tapware, e.g. toilets and cloakrooms) and bath rooms operating under the conditions specified in Table 1.

This standard allows TMVs to supply a single outlet or a small number of outlets in a “domestic” application (e.g. one valve controlling a shower, bath, basin and/or bidet), excluding valves specifically designed for supplying a large number of outlets (i.e. for institutional use).

The tests described are type tests (laboratory tests) and not quality control tests carried out during manufacture.

Table 1 — Conditions of use

Supply	Operating range	
	limits	recommended
Pressure	≤ 1 MPa [≤10 bar]	
Static		
Dynamic	≥ 0,05 MPa [≥0,5 bar]	(0,1 to 0,5) MPa [(1 to 5) bar]
Temperature	https://standards.iteh.ai/catalog/standards/sist/cc37b935-670d-4604-8ee5-57ad71173c6d/sist-en-1111-2017	
Hot	≤ 90°C	(55 to 65) °C
Cold	≤ 25°C	(5 to 20) °C

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 246, *Sanitary tapware - General specifications for flow rate regulators*

EN 248, *Sanitary tapware - General specification for electrodeposited coatings of Ni-Cr*

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

EN 1112, *Sanitary tapware - Shower outlets for sanitary tapware for water supply systems of type 1 and type 2 - General technical specification*

EN 1113, *Sanitary tapware - Shower hoses for sanitary tapware for water supply systems of type 1 and type 2 - General technical specification*

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

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

EN 13959, *Anti-pollution check valves - DN 6 to DN 250 inclusive family E, type A, B, C and D*

EN 14506, *Devices to prevent pollution by backflow of potable water - Automatic diverter - Family H, type C*

EN 16145, *Sanitary tapware - Extractable outlets for sink and basin mixers - General technical specification*

EN 60584 (all parts), *Thermocouples (IEC 60584)*

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 3822-1, *Acoustics - Laboratory tests on noise emission from appliances and equipment used in water supply installations - Part 1: Method of measurement (ISO 3822-1)*

EN ISO 3822-2, *Acoustics - Laboratory tests on noise emission from appliances and equipment used in water supply installations - Part 2: Mounting and operating conditions for draw-off taps and mixing valves (ISO 3822-2)*

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EN ISO 3822-3, *Acoustics - Laboratory tests on noise emission from appliances and equipment used in water supply installations - Part 3: Mounting and operating conditions for in-line valves and appliances*

EN ISO 3822-4:1997, *Acoustics - Laboratory tests on noise emission from appliances and equipment used in water supply installations - Part 4: Mounting and operating conditions for special appliances (ISO 3822-3:1997)*

EN ISO 5167-1, *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full - Part 1: General principles and requirements (ISO 5167-1)*

3 Terms and definitions

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

3.1

thermostatic mixing valve

TMV

valve, with one or more outlets, which mixes hot and cold water and automatically controls the mixed water to a selected temperature

3.2

fidelity

reproducibility and accuracy of temperature selection

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3.3 obturator
movable component of the valve whose position in the fluid flow path permits, restricts or obstructs the fluid flow

Note 1 to entry: The flow rate between no flow and maximum flow conditions can be affected either by the same control device or a separate flow control device, where fitted.

3.4 outlet 1
default position of the diverter

3.5 outlet 2
outlet(s) other than outlet 1

4 Symbols and units

For the purposes of this document, the symbols and units given in Table 2 apply.

Table 2 — Symbols and units

Symbol	Characteristic	Unit
D	internal diameter of tube or casing	mm
f	thickness of the annular slit of Type C pressure take-off tees	mm
i	width of the annular slit of Type C pressure take-off tees	mm
ϑ_{PP}	temperature peak to peak	°C
p_c	pressure of cold water supply	MPa (bar)
p_h	pressure of hot water supply	MPa (bar)
Q_c	flow rate of cold water	l/s (l/min)
Q_h	flow rate of hot water	l/s (l/min)
$Q_c + Q_h$	flow rate of mixed water	l/s (l/min)
t_0	time when equilibrium is disturbed	s
t_1	time when $\vartheta_{mix} = \vartheta_0 + \vartheta_x$	s
t_2	$= t_1 + 1 \text{ s}$	s
t_3	$= 5 \text{ s}$	s
T_c	temperature of cold water supply	°C
T_h	temperature of hot water supply	°C
T_m	temperature of mixed water	°C
x_1	distance	mm
x_2	distance	mm
ϑ_0	Set temperature	°C
ϑ_x	Temperature amplitude	°C

Symbol	Characteristic	Unit
ϑ_c	Cold water temperature (Outlet temperature)	°C
ϑ_h	Hot water temperature (Outlet temperature)	°C
ϑ_{mix}	Mixed water temperature	°C

5 Classification

This classification covers the following types of TMVs:

- a) Type 1 - Single control: valves with a single control device regulating flow and temperature; (actuator movement in two planes);
- b) Type 2 - Dual control: valves with separate control devices regulating flow and temperature;
- c) Type 3 - Single sequential control: valves with a single control operating through a predetermined sequence of flow and temperature. These shall have a shut-off device; (actuator movement in one plane);
- d) Type 4 - TMVs without flow control device;
- e) Type 5 - Preset: valves not adjustable by the user of a sanitary appliance;
- f) Type 6 - Other: valves with special control devices.

6 Designation

TMVs covered by this standard are designated as follows:

- a) its nominal inlet size, with or without diverter (see Table 3);
- b) type of body (see Table 3);
- c) type of outlet (see Table 3);
- d) the sanitary appliance on which it shall be used (Table 3);
- e) the method of mounting (see Table 3);
- f) its acoustic group and flow rate classes (Clause 17 and Clause 13);
- g) the reference to this standard (EN 1111).

EXAMPLE TMV 1/2 with diverter, exposed body, fixed nozzle outlet bath/shower, horizontal mounting, group I class C/B EN 1111.

Table 3 — Designation

Type of tap	TMV with or without diverter and type of diverter (if applicable)
Type of body	Single or multi-hole, exposed, or concealed
Type of outlet	Fixed, moveable spout, with or without flow rate regulator
Intended use	Basin, bidet, sink, bath or shower
Mounting method	Horizontal or vertical surfaces
Acoustic group and classification	Group I, or group II, or unclassified
Flow rate class	Z, A, S, B, C, D
Reference to this standard	EN 1111
Water saving properties	Yes / No

7 Marking/identification

7.1 Marking

TMVs shall be permanently and legibly marked with:

- a) the manufacturer's or agent's name or identification on the body or handle;
- b) the acoustic group and flow rate class or classes if classified.

A bath/shower mixer shall indicate both flow rate classes (the first for the bath outlet (outlet 1) and the second for the shower outlet (outlet 2)).

For water saving mixing valves, appropriate information to installers and users shall be provided.

7.2 Identification

The temperature control device for the valve shall be identified by means of a scale or symbols or colours or any combination thereof.

TMVs shall be legibly marked to indicate cold / hot inlets.

NOTE Exposed valves need only one identification of cold or hot inlet.

8 Materials

8.1 Chemical and hygiene requirements

All materials coming into contact with water intended for human consumption shall present no health risk nor cause any change to the water in terms of quality, appearances, smell or taste.

8.2 Exposed surface condition and quality of coating

Exposed chromium plated surfaces and Ni-Cr coatings shall comply with the requirements of EN 248.

9 Dimensional characteristics

9.1 General remarks

The design and construction of components without defined dimensions permits various design solutions to be adopted by the manufacturer.

Special cases are covered in 9.5.

9.2 Inlet dimensions

Inlet dimensions shall be as specified in Table 4, Figure 1, Figure 2 and Figure 3.

Table 4 — Inlet dimensions (Single- and multi-hole combination TMVs)

Inlet dimensions			Comments
Shank, Union, Captive nut			
<i>A</i>	G 1/2 B	Shank, Union	In accordance with EN ISO 228-1
<i>A 1</i>	G 3/4 B		
<i>A 2</i>	9 mm min	Captive nut	Useful thread length
<i>A 3</i>	15 mm min	Shank, Union (straight or eccentric)	
Connecting centres			
<i>G^a</i>	(150 ± 1) mm	2-hole wall mounted	Supply connection, Straight unions
<i>G 1</i>	(140 to 160) mm		with eccentric unions (extension of this range is permitted)
<i>G^a</i>	(150 ± 1) mm	Multi-hole combination TMV	
<i>G 2</i>	(200 ± 3,5) mm		
<i>G 3</i>	(180 ± 5) mm		
Inlet connections			
<i>N 1</i>	(12,3 + 0,2) mm	Type A size 1/2	
<i>N 2</i>	5 mm min		
<i>N 1</i>	(15,2 ± 0,05) mm	Type B size 1/2 30° chamfer/flat 0,3	
<i>N 2</i>	13 mm min		
<i>N 1</i>	(14,7 + 0,3) mm	Type C size 1/2	
<i>N 2</i>	6,4 mm min		