

Translation from Finnish
Legally binding only in Finnish and Swedish

7/19

Decree of the Ministry of the Environment

on the Type Approval of Plumbing Fixtures Intended for Water Supply Systems of Buildings

By decision of the Ministry of the Environment, the following is enacted pursuant to section 6, subsection 3; section 9, subsection 2; and section 10, subsection 3 of the Act on the Type Approval of Certain Construction Products (954/2012):

Section 1

Scope of application

This Decree applies to the requirements of type approval of plumbing fixtures of water supply systems intended for conducting household water and domestic hot water in a building and on property.

Section 2

Definitions

In this Decree:

- 1) *A service valve of a plumbing fixture* means the combination of a shut-off device, an operating mechanism and an actuator. The shut-off device allows or prevents the flow of water through a plumbing fixture. The shut-off device is operated with the actuator using the operating mechanism. The actuator may be manually operated or it may function with electricity.
- 2) *An electronic plumbing fixture* means a faucet with an electronic service valve.

Section 3

Establishment of conformity

Type approval can be used to demonstrate that the plumbing fixtures comply with the essential technical requirements laid down in section 117 c of the Land Use and Building Act (132/1999), as amended by Act (958/2012), and thereunder.

Section 4

Suitability for conducting household water

An accredited testing laboratory shall inspect the information on the materials of plumbing fixtures.

An accredited testing laboratory shall test the concentration of lead dissolved into test water from the manufacturing material of a plumbing fixture with a 26-week long dissolution test, or the dissolution of lead and cadmium from the plumbing fixture with a 10-day test in accordance with Appendix 1.

Section 5

Chemical composition and corrosion resistance of metals

An accredited testing laboratory shall analyse the chemical composition of a plumbing fixture. The composition shall correspond to the composition stated by the manufacturer.

An accredited testing laboratory shall measure the dezincification resistance of a plumbing fixture if the zinc content of the composition of the plumbing fixture exceeds 15 per cent.

Section 6

Outer surface

An accredited testing laboratory shall visually inspect the outer surface of a plumbing fixture. An accredited testing laboratory shall check the surface temperature measurements of a plumbing fixture stated by the manufacturer.

Section 7

Installation and operation

An accredited testing laboratory shall inspect the installability and operation of a plumbing fixture. The plumbing fixture shall be installable in accordance with the installation instructions of the manufacturer. The plumbing fixture shall operate in accordance with the operating manual of the manufacturer. The functions of an electronic faucet shall be checked at least twice.

Section 8

Electronic faucets

An accredited testing laboratory shall inspect the electronic equipment of an electronic faucet. Of an electronic faucet, the IP rating of electronic equipment notified by the manufacturer shall be checked.

Of a mains-operated faucet, the closing of water flow from the faucet upon interruption of electric supply shall be checked.

Of a battery-operated faucet, it shall be checked that the faucet remains closed if the voltage of the battery falls below the operating limit. The test shall be carried out by replacing the battery with a power source the output voltage of which can be adjusted.

Section 9

Dimensions

An accredited testing laboratory shall check the structural and connection dimensions of the plumbing fixture.

Section 10

Tightness

An accredited testing laboratory shall test the tightness of the plumbing fixture. Tightness shall be tested with cold water at (25 ± 5) degrees Celsius in accordance with Table 1. In the tests, the plumbing fixture shall be tight. The exchanger shall operate in accordance with its intended use and the flow path in use may not run through another flow path. The plumbing fixture may not have cross flow.

Table 1. Tightness testing of plumbing fixtures.

Test target		Shut-off device	Output port	Pressure bar	Test periods
Service valve and body	Flow paths before the shut-off device	Closed	Open	16±0.5	60±5
	Flow paths after the shut-off device	Open	Closed	4±0.2	
		Open	Closed	0.2±0.02	
Exchanger, manually operated return	Shut-off device open, exchanger in tub position		T: closed / S: open	4±0.2 0.2±0.02	
	Shut-off device open, exchanger in shower position		S: closed / T: open		
Exchanger, automatic return	Shut-off device open, exchanger in tub position		Both open	4±0.2	
	Shut-off device open, exchanger in shower position			4±0.2 0.5±0.02	
	Shut-off device closed				
	Shut-off device open, exchanger in tub position			0.5±0.02	
Service valve	Cross-flow between inlets	Closed	Open	4±0.2	

T = tub, S = shower

Section 11

Pressure resistance

An accredited testing laboratory shall test the pressure resistance of the plumbing fixture. The pressure test shall be carried out with cold water at (25 ± 5) degrees Celsius in accordance with Table 2. In the test, the plumbing fixture may not show any permanent deformations or other damage.

Table 2. Pressure test of a plumbing fixture.

Test target	Shut-off device	Outlet	Pressure bar	Test periods
Flow paths before the shut-off device	Closed	Open	25 ± 0.5	60 ± 5
Flow paths after the shut-off device	Open	Open	4 ± 0.2	60 ± 5

Section 12

Standard flow rate

An accredited testing laboratory shall measure the standard flow rate of a plumbing fixture. The standard flow rate shall be measured with testing apparatus of plumbing fixtures at the water pressure of (3.0 ± 0.2) bar. In the tests, the service valve of the plumbing fixture is fully open. For a plumbing fixture of the mixer type, standard flow rate shall be measured for mixed water temperatures for cold water at $(10-15)$ degrees Celsius, 34 degrees Celsius, 38 degrees Celsius, 44 degrees Celsius and hot water at $(60-65)$ degrees Celsius.

Section 13

Control properties

An accredited testing laboratory shall test the control properties of a mixer-type plumbing fixture. The test shall be carried out with testing apparatus of plumbing fixtures using cold and hot water at the pressure of (3.0 ± 0.2) bar. The tests presented in Table 3 shall be carried out in the testing.

Table 3. Testing of the control properties of a plumbing fixture.

Test		Requirement	
Lever faucet		Shower faucets, Gv	Other faucets, Gv
Water temperature of mixed water T_s control sensitivity between $(T_m - 4)$ and $(T_m + 4)$	$r > 45$ mm	≥ 12 mm	≥ 10 mm
	$r \leq 45$ mm	$\geq 12^\circ$ tai ≥ 12 mm	$\geq 10^\circ$ tai ≥ 10 mm
Thermostatic faucets		Kitchen faucets	Other faucets
Control sensitivity between 34°C and 42°C		$Gt \geq 10$ mm	$Gt \geq 12$ mm
At the beginning of tests 1–3, $T_s = (38 \pm 1)^\circ\text{C}$			
1 Safety upon interruption of cold-water flow, amount of water		5 s: ≤ 200 ml, 30 s: ≤ 300 ml,	
2 Temperature stability upon change in cold water pressure Change in pressure: 3 bar \rightarrow 2 bar, 15 s \rightarrow 3 bar, 60 s \rightarrow 2 bar, 15 s \rightarrow 3 bar, 60 s		Deviation of T_s at most 2 K 20 s and after reset. In addition, with regard to other than tub outlets, the deviation of T_s at most 3 K after 1 s.	
3 Temperature stability upon change in the influent temperature Temperature change: hot water $+65^\circ\text{C} \rightarrow +55^\circ\text{C}$, 30 s $\rightarrow +65^\circ\text{C}$, 40 s			
T_s	temperature of mixed water		
T_m	temperature mean of cold and hot waters		
Gv	shift of the handle end of a single control handle faucet or change in the turning angle		
r	distance of the handle end from the central axis of the service valve		

Section 14

Endurance

An accredited testing laboratory shall test the endurance of the service valve of a plumbing fixture. The test shall be carried out in a testing apparatus where the discharge flow-through is repeatedly opened and closed with the valve. A manually operated service valve shall be moved at an angular velocity of (60 ± 5) degrees per second. The closed and open positions shall be held for $(5 \pm 0,5)$ seconds. The number of operating cycles in the endurance test and the test conditions are presented in Table 4.

After the endurance test, the plumbing fixture shall be tight when testing it in accordance with section 10 of this Decree.

Table 4. Test conditions and number of operating cycles in the endurance test.

Test target	Water temperature °C (cold/hot)	Pressure and flow	Number of cycles
Service valve, rotary	(≤ 30) / (65±2)	(4±0.5) bar (0.1±0.02) dm ³ /s	200,000
Service valve, single control handle faucet	(≤ 30) / (65±2)		70,000 ^{a)}
Service valve, thermostatic faucet	(≤ 30) / (65±2)		50,000
Exchanger	(≤ 30) / (65±2)		30,000
Siphon tube, turning	≤ 30		80,000
Washing machine spigot	≤ 30		10,000
Electronic plumbing fixture, outlet	(≤ 30) / (65±2)		210,000
Electronic plumbing fixture, mixer	(≤ 30) / (65±2)		70,000
^{a)} Single control handle faucets: rectangular or triangular trajectory including three open/closed cycles, duration of flow (5±0,5) s			

Section 15

Torsional strength of the service mechanism

An accredited testing laboratory shall test the torsional strength of the service mechanism of a plumbing fixture. The testing shall be carried out in accordance with Table 5. In the test, no permanent deformations or other damage may be caused to the plumbing fixture. In the tightness test to be carried out after the test, the plumbing fixture shall be tight. A thermostatic faucet shall meet the control property requirements.

Table 5. Torsional strength of the service mechanism.

Test target	Torque	Test period
Service valve: open/closed positions	(6±0.2) Nm	(300–315) s torque raise (4–6) s
Temperature control lever of a thermostatic faucet	(3+0/-0.15) Nm	

Section 16

Prevention of backflow

An accredited testing laboratory shall inspect the backsiphonage protection of a plumbing fixture.

Section 17

Sound level

An accredited testing laboratory shall measure the sound level of a plumbing fixture. To measure the sound level, an interchangeable part of a plumbing fixture may be replaced by flow resistance. This shall be selected to be of a flow class corresponding to that of the replaced part so that the flow requirement in accordance with the purpose of use of the plumbing fixture is met.

The sound level of the plumbing fixture and the corresponding flow shall be measured at water pressures of 0.1, 0.3 and 0.5 MPa. In the measuring, the pressure of 0.3 MPa that determines the sound level group of the plumbing fixture is used to establish the maximum sound level of the faucet by turning the service handles. The sound level group shall be determined on the basis of the measurements of three samples.

Section 18

Marking

An accredited testing laboratory shall inspect the markings of the plumbing fixtures.

Section 19

Type testing

For type approval, an accredited testing laboratory shall type test the plumbing fixture in accordance with the extent of testing presented in Table 2.1 of Appendix 2.

For type testing, the manufacturer shall, in addition to the samples, submit product designs with parts lists and raw-material information, material certificates and installation instructions.

Section 20

Quality control relating to type approval

The certifying body for quality control shall verify that the plumbing fixtures comply with the requirements of type approval and also meet the conditions set in the decision on type approval.

The certifying body for quality control shall carry out an initial inspection of the production, an on-going control of the internal production quality control as well as the selection of random samples of products and their testing once annually or more frequently if the products do not meet the type-approval requirements. The extent of testing of random samples is presented in Table 2.2 of Appendix 2.

The manufacturer's internal production quality control shall cover at least the inspections and tests presented in Table 3.1 of Appendix 3.

Section 21

Entry into force

This Decree enters into force on 1 January 2020.

Helsinki, 11 April 2019

Minister of the Environment, Energy and Housing Kimmo Tiilikainen

Senior Specialist Tomi Marjamäki

Dissolution of heavy metals - test method

Dissolution of heavy metals (cadmium, lead) shall be tested from the brass parts of a plumbing fixture that come into contact with water. The testing shall be carried out on an unused plumbing fixture with a ten-day test.

Test solution

The test solution (synthetic potable household water) shall be prepared by weighing 50 milligrams of NaCl, 50 milligrams of Na₂SO₄ and 50 milligrams of CaCO₃ (all p.a. quality) per litre of distilled and /or deionized water. The solution shall be stirred and CO₂ shall be bubbled therein until all CaCO₃ has dissolved. After that air shall be bubbled into the solution while stirring it until the pH value has reached 7.0± 0.1. Since CaCO₃ dissolves very slowly, it must be ensured that all CaCO₃ has dissolved before air is bubbled; if not, the solution will not stabilize.

The test solution may also be prepared by weighing 50 milligrams of NaCl, 50 milligrams of Na₂SO₄ and 37 milligrams of Ca(OH)₂ (all p.a. quality) per litre of distilled and /or deionized water. The solution shall be stirred until Ca(OH)₂ is almost dissolved and CO₂ shall be bubbled therein until the pH value is below five. After that air shall be bubbled into the solution while stirring it until the pH value has reached 7.0± 0.1. This preparation method will make the dissolution of the salts easier.

The synthetic potable household water shall be prepared either immediately before each water replacement or it shall be ensured that the solution is clear and that its pH value is 7.0 ± 0.1 at least in connection with the water replacements on days four, eight and nine. A blank sample shall be taken in connection with the water replacements on days 8 and 9.

Analysis apparatus

An atomic absorption spectrometer equipped with a graphite furnace or another sufficiently sensitive measuring instrument. The limit of determination shall be at least 0.1 micrograms per litre for lead (Pb) and 0.02 micrograms per litre for cadmium (Cd).

Test method

The sample shall be degreased with pure ethanol for those parts that come into contact with potable household water. After that, tap water shall be run through the sample for one hour at the standard flow rate of the plumbing fixture.

Stoppers made of colourless polyethylene or covered with a polyethylene coating shall be used in the flow orifices of the sample. The stoppers may also be made of other material as long as no cadmium or lead is dissolved therefrom. The sample shall be immediately rinsed with synthetic potable household water by filling it halfway and shaking it for approximately 30 seconds, after which the water is poured off. Immediately after that the sample shall be filled with synthetic potable household water so that no air remains inside it and its flow orifices are equipped with stoppers.

The synthetic potable household water shall be let stand in the sample for 24 hours, after which it is emptied, the amount of water is measured and the sample is refilled. The synthetic

potable household water in the sample shall be replaced after days 1, 2, 3, 4, 7, 8 and 9. It shall be checked that the amount of water emptied from the sample remains constant (± 10 per cent).

The water samples replaced after days 8 and 9 (test period of 9 and 10 days) shall be analysed for lead and cadmium. The measured concentrations deducted with the equivalent concentrations in the blank samples shall be indicated in the results (micrograms per litre). In addition, the total amounts of cadmium and lead (in micrograms) derived from the concentrations and the water volume of the sample as well as the water volume of the sample in litres shall be indicated.

Type testing and external quality control of a plumbing fixture

Table 2.1. The properties to be tested in the type testing of a plumbing fixture and extent of testing.

Property to be tested	Extent of testing pcs/product
Materials, properties Dissolution of heavy metals	once / material / type of faucet
Dimensions	1
Tightness	1
Pressure resistance	1
Flow-mechanical properties	1
Torsional strength of service handles	1
Endurance	1
Sound-technological properties	3

Table 2.2. Testing by external quality control and its minimum extent for plumbing fixtures.

Testing	Extent of testing
Visual inspection	once/product
Tightness	once/year/product family
Pressure resistance	once/year/product family
Sound-technological properties	once/year

Testing by the manufacturer's internal quality control

Table 3.1. Tests and inspections by internal quality control and their minimum extent for plumbing fixtures.

Testing	Extent of testing
Material acceptance inspection: raw materials, seals, other parts	Each accepted batch shall be recorded and the suitability of the accepted material shall be verified
Manufacturing process - Casting process - Machining - Chromizing - Assembly	- Continuous temperature monitoring and visual monitoring - Determination of the most critical dimensions and ensurance of the stability of dimensions - Visual inspection - Visual inspection
Operative properties - Tightness	- All products
Work instructions, procedures and designs	- The instructions for production phases shall be documented. Any changes in the documents shall be recorded and dated.
Handling of complaints	- A procedure for the handling of complaints shall exist.