

Translation from Finnish

Legally binding only in Finnish and Swedish

1/19

Decree of the Ministry of the Environment

on the Type Approval of Mechanical Copper Pipe Fittings Intended for Water Supply Systems of Building

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 mechanical copper pipe fittings of water supply systems intended for conducting household water and domestic hot water in a building and on property.

This Decree covers straight nipple fittings and compression fittings with a nominal outside diameter of 10-108 millimetres meant for copper pipes as well as insert fittings of 10-54 millimetres meant for copper pipes.

Section 2

Definition

The nominal diameter of a mechanical copper pipe fitting means the nominal outside diameter of the copper pipe to be connected.

Section 3

Establishment of conformity

Type approval can be used to demonstrate that the mechanical copper pipe fittings 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 material of mechanical copper pipe fittings.

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

Section 5

Composition and materials

An accredited testing laboratory shall analyse the chemical composition of the metal of the body of a mechanical copper pipe fitting. The composition shall correspond to the composition stated by the manufacturer.

Section 6

Corrosion resistance of brass parts

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

An accredited testing laboratory shall test the occurrence of internal stress of the brass parts of a mechanical copper pipe fitting with a stress corrosion resistance test. In the test, no cracks that are visible with a ten-fold magnification may appear in the brass parts of the mechanical copper pipe fitting.

Section 7

Surface properties

An accredited testing laboratory shall examine the outer appearance of the fittings visually without magnification.

Section 8

Structure and dimensions

An accredited testing laboratory shall examine the structure and dimensions of mechanical copper pipe fittings.

Section 9

Seals

The manufacturer shall submit to the accredited testing laboratory test reports on the resistance of seals of the fittings. The accredited testing laboratory shall verify the equivalence of the seal material specified by the manufacturer with the seals used in the products. The test method applied may be either an IR analysis or a thermogravimetric analysis. In type testing, the suitability of the seal as an element of the system shall be tested as part of the systems tests of the copper pipe fittings.

Section 10

Tightness and resistance of fittings

An accredited testing laboratory shall test the suitability of the mechanical copper pipe fittings for connecting copper pipes in accordance with Table 1. The connections may not leak in the tightness tests. The connections shall be tight after a tensile test. The tensile stress in accordance with Table 2 shall be used in the tensile test.

Table 1. The properties of copper pipe fittings to be tested and test values.
Test temperature (23±5) °C, unless stated otherwise.

Property	Test pressure bar	Test period or number of cycles
All fitting types		
Tightness in excess pressure	24±1	1 h
in pressure cycling	(1±0,5) / (25±1) ^{a)}	10,000 cycles
Tensile stress resistance ^{b)}	-	1 h
Compression fittings and push-in fittings		
Detection of leak in a compression fitting without compression	1-6	
Tightness in underpressure	-0.8±0.05	1 h
in bending	10±0.5	1 h
in temperature variation ^{c)}	10±1	5,000 cycles
in vibration (20±2) Hz, ±1 mm	15±1	1,000,000 cycles
a)	(30±5) cycles/minute	
b)	Axial tension stress in Table 4, range +5/ -0% d _n is the nominal outside diameter (mm)	
c)	Water temperature (93±2)/(20±5) °C, duration 15/15 min, (30 minutes/cycle)	

Table 2. Test force in tensile load test

Nominal diameter of a mechanical copper pipe fitting D mm	Test force N
10	1,000
12	1,500
15	1,500
18	1,500
22	1,500
28	2,000
35	2,310
42	3,330
54	5,450
64	6,270
76.1	6,830
88.9	9,310
108	13,740

Section 11

Marking

An accredited testing laboratory shall inspect the markings of the fittings.

Section 12

Type testing

For type approval, an accredited testing laboratory shall type test the mechanical copper pipe fittings in accordance with the extent of testing presented in Tables 2.1-2.3 of Appendix 2. For type testing, the manufacturer shall, in addition to the samples, submit product and raw-material information.

Section 13

Quality control relating to type approval

The certifying body for quality control shall verify that the mechanical copper pipe fittings 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 3.1 of Appendix 3.

The manufacturer's internal production quality control shall cover at least the inspections and tests presented in Table 3.2 of Appendix 3.

Section 14

Entry into force

This Decree enters into force on 1 January 2020.

Helsinki, 9 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 (lead and cadmium) shall be tested on an unused fitting 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 flow rate corresponding to the flow rate of 1-2 meters per second in the fitting.

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 cadmium and lead. 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 of mechanical copper pipe fittings and the tests used in the verification of quality control

Table 2.1. The properties and the samples to be tested in the type testing of copper pipe fittings when the fittings of different sizes are identical with regard to material and the structure of the coupling head.

Property	Samples to be tested
Suitability for conducting household water	1-2 pcs, DN 28 or size closest to that
Dezincification resistance	1 pc, 1 size
Composition of material	Analysis where necessary, 1 pc
Stress corrosion resistance	3 pcs/size, 1 size
Outer appearance and dimensions	1 pc/all sizes
All fitting types	
Tightness in excess pressure	3 samples/size, 2 sizes/size group
in pressure cycling	2 pcs/size/size group
Tensile stress resistance	3 pcs/size
Compression fittings	
Leak in uncompressed fitting	2 samples/size
Tightness in underpressure	3 samples/size
in bending	
in underpressure	3 samples/size, 2 sizes/size group
in temperature variation	2 samples/size, 3 sizes/size group
in vibration	2 samples/size, 3 sizes/size group

The fittings to be tested shall be selected on the basis of Tables 2.2 and 2.3.

Table 2.2. Size grouping of copper pipe fittings

Size group	1	2	3
Nominal diameter of a mechanical copper pipe fitting D, mm	$10 \leq DN \leq 28$	$28 < DN \leq 54$	$54 < DN \leq 110$

Table 2.3. Fitting sizes to be selected for testing

Number of fitting sizes	Fitting sizes to be tested
1-3	All
4-9	All sizes from size group 1, however, at most 3, if they exist. In addition, 2 sizes from size group 2, if they exist.

Table 3.1. The properties to be tested in the verification of quality control of copper pipe fittings and the testing frequency when the fittings of different sizes are of identical material and structure.

Property	Testing frequency
Composition of material	1 pc/in 1-2 years
Outer appearance and dimensions	3 samples/size group/year
Tightness in excess pressure	3 samples/size/ 2 sizes/year Sizes to be tested are alternated annually
Tensile stress resistance	
Markings	All samples to be tested
Analysis of the sealing of compression and push-in fittings	Once a year/material

Testing by the manufacturer’s internal quality control

Table 3.2. Internal quality control tests of the manufacture of copper pipe fittings and their minimum extent.

Inspection	Inspection/test frequency
Material acceptance inspection	Each accepted batch, material certificates, inspections and any non-conformities observed shall be recorded.
Outer appearance	At the beginning and end of the manufacture of a production batch as well as at least once every eight hours.
Dimensions	
Tightness of cast parts	All fitting bodies
Markings	At the beginning and end of the manufacture of a production batch as well as at least once every eight hours.