INTERNATIONAL STANDARD

ISO 21003-3

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AMENDMENT 1

2021-10

Multilayer piping systems for hot and cold water installations inside buildings —

Part 3: Fittings

AMENDMENT 1

Systèmes de canalisations multicouches pour installations d'eau chaude et froide à l'intérieur des bâtiments —

Partie 3: Raccords

AMENDEMENT 1

Reference number
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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 2, *Plastics pipes and fittings for water supplies,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 155, *Plastics piping systems and ducting systems,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

A list of all parts in the ISO 21003 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Multilayer piping systems for hot and cold water installations inside buildings —

Part 3: Fittings

AMENDMENT 1

Normative references

Add the following normative references:

ISO 2768-1, *General tolerances — Part 1: Tolerances for linear and angular dimensions without individual tolerance indications*

ISO 6506-1, *Metallic materials — Brinell hardness test — Part 1: Test method*

ISO 6509-1, *Corrosion of metals and alloys — Determination of dezincification resistance of copper alloys with zinc — Part 1: Test method*

ISO 6957, *Copper alloys — Ammonia test for stress corrosion resistance*

ISO 22081, *Geometrical product specifications (GPS) — Geometrical tolerancing — General geometrical specifications and general size specifications*

Delete the following normative reference:

EN 1254-3, *Copper and copper alloys — Plumbing fittings — Part 3: Fittings with compression ends for use with plastics pipes*

Terms and definitions

Replace the existing definition 3.1 with the following:

3.1
fitting
piping system component which connects two or more pipes and/or fittings together without any further function.

Note 1 to entry: Examples of mechanical fittings are compression fittings, radial press fittings, axial press fittings, flanged fittings, flat seat union fittings and push-fit fittings.

Note 2 to entry: Examples of fusion fittings are socket fusion fittings, electrofusion fittings, fittings with incorporated inserts and solvent-cemented fittings.

5.3

Replace the existing subclause 5.3 with the following:

5.3 Metallic fitting material

Metallic materials for fittings intended to be used with components conforming to ISO 21003 shall be either copper alloys or stainless steel alloys. The alloys shall be defined according to a standard or regulatory document.

NOTE Examples for such standards and regulatory documents are listed in the Bibliography.

For copper alloys, the fittings made thereof shall comply with the corrosion resistance requirements according to 9.2.

6.1

Replace the existing subclause 6.1 with the following:

6.1 Appearance

6.1.1 Appearance of plastic fittings

When viewed without magnification, the internal and external surfaces of fittings shall be smooth, clean and free from scoring, cavities and other surface defects to an extent that would prevent conformance with this document. The material shall not contain visible impurities. Slight variations in appearance of the colour shall be permitted. Each end of a fitting shall be perpendicular to its longitudinal axis.

6.1.2 Appearance of metal fittings

When viewed without magnification, the internal and external surfaces of fittings shall be clean, free from any residues from the production (e.g. free from cast sand, grease or release agent) and shall have no sharp edges or cracks.

6.2

Replace the existing title of subclause 6.2 with the following:

6.2 Opacity of plastic fittings

7.1.1, first sentence

Replace the existing first sentence of 7.1.1 with the following two sentences:

Dimensions of plastic fittings shall be measured in accordance with ISO 3126.

Dimensions of metal fittings shall be measured in accordance with ISO 2768-1 and/or ISO 22081.

7.3

Replace the existing subclause 7.3 with the following:

7.3 Dimensions of metallic fittings — Minimum wall thickness of fittings made of copper alloys

The minimum wall thickness shall be measured with a calibrated micrometer or equivalent instrument. The wall thickness shall be measured at three or more discrete places and efforts shall be made to find the minimum.

The minimum wall thickness at points A, B and C of the fitting made from rods or by pressing or by casting (see Figure B.1, Figure B.2 and Figure B.3) shall be in accordance with Annex B, Table B.1.

The minimum wall thickness specified does not apply along the cone angle or to the thickness of the loose ring or sleeve where such a ring or sleeve has been or is intended to be deformed to form a seal. It also does not apply to internal pipe supports.

Clause 9

Replace the existing Clause 9 with the following:

9 Physical and chemical characteristics of fittings

9.1 Physical and chemical characteristics of plastics fittings

9.1.1 Plastics fitting materials specified in reference product standards

The relevant characteristics shall be determined.

9.1.2 Plastics fitting materials not specified in reference product standards

The relevant characteristics shall be determined in accordance with Table 2.

9.2 Physical and chemical characteristics of metallic fittings

9.2.1 Fittings made of copper alloys — Resistance to stress corrosion

Fittings made of copper alloys shall be resistant to stress corrosion.

Fittings manufactured from copper-tin-zinc alloys (e.g. CuSnZnPb) and copper-zinc-silicon alloys containing ≥2 % Si are deemed to be resistant to stress corrosion.

Fittings manufactured from CuZn-alloys are deemed to be resistant to stress corrosion when the product has a hardness HBW 2,5/62,5 ≤ 110 measured according to ISO 6506-1 or a hardness HV_5 ≤ 134 measured according to ISO 6507-1.

Other fittings manufactured from copper alloys with a zinc content of 10 % or greater not mentioned above shall be tested according to ISO 6957 using a test solution of pH 9,5 without prior pickling. The fittings shall not show any evidence of cracking.

9.2.2 Fittings made of copper alloys — Resistance to dezincification

This requirement only applies where a fitting made of copper alloy is declared to be resistant to dezincification.

The resistance to dezincification of alloy fittings can be obtained by the correct material selection and processing of that material.

Copper alloys containing 15 % or less zinc provide a good resistance to dezincification and may be declared accordingly without testing.

For casted and wrought fittings, representative fitting samples shall be used.

For machined fittings, either representative fitting samples or alternatively representative material samples, prior to machining, shall be tested.

The samples shall be tested according to ISO 6509-1. The following acceptance criteria shall be met:

— Maximum dezincification depth: ≤200 µm

— Average dezincification depth: ≤100 µm

NOTE The requirement is a copy of ISO 6509-2:2017, Table 1, line (a).

9.3 Sealing elements

As specified in ISO 21003-5, the sealing element shall have no detrimental effect on the properties of the pipe or fitting and shall not cause the test assembly to fail.

The material of the sealing elements used in joint assemblies shall conform to EN 681-1 or EN 681-2, as applicable.

11.2, Table 3, 4th line

Replace:

"Nominal wall thickness(es) of the corresponding pipe(s) (for compression or crimped fittings only)"

by:

"Nominal wall thickness(es) of the corresponding pipe(s) (for compression, radial press, axial press or push-fit fittings only)"

Clause 12

Add the new Clause 12 below.

12 Fittings made from cast alloys — Tightness test

In order to identify cavities or holes that may cause leakage, fittings manufactured from casting alloys shall be tested on leak tightness. The tightness test has to be conducted after machining of the casted fitting. The fittings shall not show any form of leakage.

The tightness shall be tested by the use of compressed air with a pressure of ≥ 0,5 MPa (5 bar), when the fitting is immersed in water. Air bubbles indicate a leakage.

NOTE Alternative test methods can be applied.

Annex B

Add the following annex after Clause 12, before the Bibliography.

Annex B
(normative)

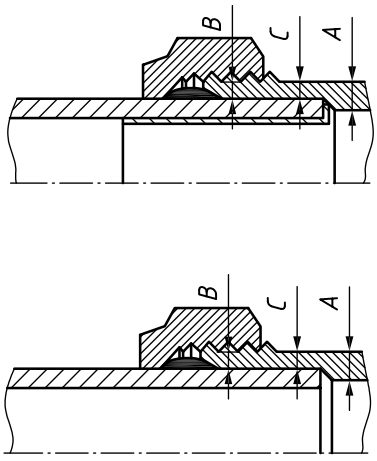
Dimensional requirements for metallic fittings — Minimum wall thickness of fittings made of copper alloys

The minimum wall thickness at points A, B and C of the fitting made from rods or by pressing or by casting (see Figure B.1, Figure B.2 and Figure B.3) shall be in accordance with Table B.1.

Table B.1 — Minimum wall thickness of fittings made of copper alloys

Dimensions in millimetres

Nominal diameter *D*	Minimum wall thickness of fittings made of copper alloys at points A, B and C	
	Machined and wrought fittings	Cast fittings
10	1,0	1,0
12	1,1	1,1
14		
14,7	1,2	1,2
15		
16		
17	1,4	1,4
18		
20		
21		
22		1,5
25		1,6
26		
27,4	1,5	
28		1,8
32	1,6	
34		
40	1,8	2,0
40,5		
50	1,9	2,3
53,6		
63	2,0	2,4
75	2,6	2,8
90	2,9	3,1
110	3,3	3,5
125	3,7	3,9
140	4,1	4,3
160	4,6	4,8



Key

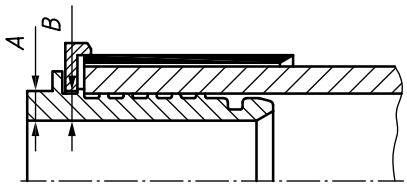
A, B, C points to measure the minimum wall thickness of the fitting

Figure B.1 — Examples of compression fittings

Key

A, B points to measure the minimum wall thickness of the fitting

Figure B.2 — Examples of an axial press fitting



Key

A, B points to measure the minimum wall thickness of the fitting

Figure B.3 — Examples of a radial press fitting

NOTE Figures B.1, B.2 and B.3 are examples only.