
Baker in bakrove zlitine - Fitingi - 6. del: Fitingi s "push-fit" zaključki

Copper and copper alloys - Plumbing fittings - Part 6: Fittings with push-fit ends

Kupfer und Kupferlegierungen - Fittings - Teil 6: Einsteckfittings

Cuivre et alliages de cuivre - Raccords - Partie 6: Raccords instantanés

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**Copper and copper alloys - Plumbing fittings - Part 6: Fittings
with push-fit ends**

Cuivre et alliages de cuivre - Raccords - Partie 6: Raccords
instantanés

Kupfer und Kupferlegierungen - Fittings - Teil 6:
Einsteckfittings

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Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN 1254-6:2012) has been prepared by Technical Committee CEN/TC 133 "Copper and copper alloys", the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by April 2013, and conflicting national standards shall be withdrawn at the latest by April 2013.

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

Within its programme of work, Technical Committee CEN/TC 133 requested CEN/TC 133/WG 8 "Fittings" to prepare the following standard:

EN 1254-6, *Copper and copper alloys — Plumbing fittings — Part 6: Fittings with push-fit ends.*

EN 1254 comprises the following parts under the general title "*Copper and copper alloys — Plumbing fittings*":

- *Part 1: Fittings with ends for capillary soldering or capillary brazing to copper tubes*
- *Part 2: Fittings with compression ends for use with copper tubes*
- *Part 3: Fittings with compression ends for use with plastics pipes*
- *Part 4: Fittings with threaded end connections*
- *Part 5: Fittings with short ends for capillary brazing to copper tubes*
- *Part 6: Fittings with push-fit ends*
- *Part 7: Fittings with press ends for metallic tubes*
- *Part 8: Fittings with press ends for use with plastics and multilayer pipes*

Part 7 will be the subject of future work.

According to the CEN/CENELEC Internal Regulations, the national standards organizations 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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

Products complying with this document may be used for the transport of water for human consumption if they comply with the relevant national, regional or local regulatory provisions applicable in the place of use.

This European Standard provides the basis for the assessment of a manufacturer's production process for products manufactured in accordance with this European Standard.

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1 Scope

This European Standard specifies materials and test requirements for fittings of copper and copper alloys.

This part of EN 1254 specifies push-fit end connections with or without plating or coating in the size range 6 mm to 54 mm for the purpose of joining tubes of copper, plated copper, multilayer pipes and plastics pipes, intended for use in hot and cold water systems according to EN 806, which are designed for service lifetime up to fifty years, as well as heating and cooling systems.

Permissible operating temperatures and maximum operating pressures are also established.

Fittings may comprise a combination of end types, specified in this European Standard, EN 1254, or other standards, providing they are suitable for the fluid being conveyed.

The standard establishes a designation system for the fittings.

This European Standard is applicable to push-fit fittings for joining one or more of the following tubes or pipes:

- Copper tubes to EN 1057;
- PE-X pipes to EN ISO 15875-2;
- PB pipes to EN ISO 15876-2;
- PP pipes to EN ISO 15874-2;
- PE-RT pipes to EN ISO 22391-2;
- Multilayer pipes to EN ISO 21003-2.

Fittings may be suitable for joining other tubes and pipes provided the push-fit joint with the specified tube or pipe meets the requirements of this standard.

Operating temperatures and pressures

For joints with copper tubes

It is essential that operating temperatures and maximum operating pressures for assembled joints do not exceed the values in Table 1.

**Table 1 — Operating temperatures and pressures
for fittings assembled to tubes**

Operating temperature °C	Maximum operating pressure (MOP) for nominal diameters from 6 mm up to and including 54 mm bar
30	16
95	6
<p>Intermediate pressure ratings are determined by linear interpolation.</p> <p>Certain designs of push-fit fittings are suitable for use at temperature/pressure ratings outside those given in this table. For such applications, the advice of the manufacturer should be sought.</p> <p>To allow for system malfunctions, it is essential that fittings be capable of temporary excursions up to a temperature of 110 °C at a pressure of 6 bar.</p>	

EN 1254-6:2012 (E)For joints with multilayer and plastics pipes

The operating temperatures and maximum operating pressures for the assembled joints should be determined in accordance with multilayer or plastics pipe material properties, details of which are specified in the relevant multilayer and plastics piping system standards.

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 681-1:1996, *Elastomeric seals — Materials requirements for pipe joint seals used in water and drainage applications — Part 1: Vulcanised rubber*

EN 712, *Thermoplastics piping systems — End-load bearing mechanical joints between pressure pipes and fittings — Test method for resistance to pull-out under constant longitudinal force*

EN 713, *Plastics piping systems — Mechanical joints between fittings and polyolefin pressure pipes — Test method for leaktightness under internal pressure of assemblies subjected to bending*

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

EN 1254-4, *Copper and copper alloys — Plumbing fittings — Part 4: Fittings combining other end connections with capillary or compression ends*

EN 1655, *Copper and copper alloys — Declarations of conformity*

EN 1982, *Copper and copper alloys — Ingots and castings*

EN 12164, *Copper and copper alloys — Rod for free machining purposes*

EN 12165, *Copper and copper alloys — Wrought and unwrought forging stock*

EN 12293, *Plastics piping systems — Thermoplastics pipes and fittings for hot and cold water — Test method for the resistance of mounted assemblies to temperature cycling*

EN 12294, *Plastics piping systems — Systems for hot and cold water — Test method for leaktightness under vacuum*

EN 12295, *Plastics piping systems — Thermoplastics pipes and associated fittings for hot and cold water — Test method for resistance of joints to pressure cycling*

EN 12449, *Copper and copper alloys — Seamless, round tubes for general purposes*

EN ISO 6509:1995, *Corrosion of metals and alloys — Determination of dezincification resistance of brass (ISO 6509:1981)*

EN ISO 15874-2¹⁾, *Plastic piping systems for hot and cold water installations — Polypropylene (PP) — Part 2: Pipes (ISO 15874-2)*

EN ISO 15874-5¹⁾, *Plastic piping systems for hot and cold water installations — Polypropylene (PP) — Part 5: Fitness for purpose of the system (ISO 15874-5)*

¹⁾ Currently under revision.

EN ISO 15875-2, *Plastics piping systems for hot and cold water installations — Crosslinked polyethylene (PE-X) — Part 2: Pipes (ISO 15875-2)*

EN ISO 15875-5, *Plastics piping systems for hot and cold water installations — Crosslinked polyethylene (PE-X) — Part 5: Fitness for purpose of the system (ISO 15875-5)*

EN ISO 15876-2, *Plastics piping systems for hot and cold water installations — Polybutylene (PB) — Part 2: Pipes (ISO 15876-2)*

EN ISO 15876-5, *Plastics piping systems for hot and cold water installations — Polybutylene (PB) — Part 5: Fitness for purpose of the system (ISO 15876-5)*

EN ISO 21003-2, *Multilayer piping systems for hot and cold water installations inside buildings — Part 2: Pipes (ISO 21003-2)*

EN ISO 21003-5, *Multilayer piping systems for hot and cold water installations inside buildings — Part 5: Fitness for purpose of the system (ISO 21003-5)*

EN ISO 22391-2, *Plastics piping systems for hot and cold water installations — Polyethylene of raised temperature resistance (PE-RT) — Part 2: Pipes (ISO 22391-2)*

ISO 815-1, *Rubber, vulcanized or thermoplastic — Determination of compression set — Part 1: At ambient or elevated temperatures*

ISO 6957:1988, *Copper alloys — Ammonia test for stress corrosion resistance*

ISO 9924-1, *Rubber and rubber products — Determination of the composition of vulcanizates and uncured compounds by thermogravimetry — Part 1: Butadiene, ethylene-propylene copolymer and terpolymer, isobutene-isoprene, isoprene and styrene-butadiene rubbers*

3 Terms and definitions

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

3.1

plumbing fitting

device used in a tube system for the purpose of connecting the tubes either to each other or to a component part of the system

3.2

push-fit end

end which incorporates a sealing element and a gripping device. The joint is made by pushing the tube into the fitting and a seal is achieved without the use of heat or tools

Note 1 to entry: In some designs, this type of joint can be disconnected and re-connected or disconnected and the fitting re-used elsewhere.

3.3

adaptor fitting

fitting combining more than one type of end

Note 1 to entry: For details of other ends, see the relevant parts of this European Standard or other standards.

3.4

nominal diameter

nominal diameter of the fitting end expressed as the nominal outside diameter of the connecting tube

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3.5 supporting sleeve
 insert stiffener
 device permanently inserted in the tube end to provide internal support for low strength tube or pipe materials

3.6 durably marked
 marked in such a way that the marking will remain readable at least up to the time of commissioning of the installation

Note 1 to entry: e.g. by ink marking.

3.7 permanently marked
 marked in such a way that the marking will remain readable up to the end of the life of the installation

Note 1 to entry: e.g. by stamping, etching or engraving.

3.8 type test
 test or series of tests aimed at approving a product to determine that the element designed is able to fulfil the requirements of the product specification

4 Requirements**4.1 General**

Fittings shall conform to the requirements of 4.2 to 4.4 and shall be capable of meeting the type testing requirements of 5.1 as relevant to the application.

4.2 Materials**4.2.1 General**

Fittings bodies shall be made from copper or copper alloys selected from materials specified in European Standards for copper and copper alloy products, provided that the fittings manufactured from them meet the functional requirements of this European Standard.

NOTE Some of the standardised coppers and copper alloys commonly used for the manufacture of fittings are shown in Table 2.

Table 2 — Examples of commonly used materials

Material designation		Standard
Symbol	Number	
Cu-DHP	CW024A	EN 12449
CuSn5Zn5Pb5-C	CC491K	EN 1982
CuZn36Pb2As	CW602N	EN 12164
CuZn39Pb3	CW614N	EN 12164
CuZn40Pb2	CW617N	EN 12165
CuZn33Pb2-C	CC750S	EN 1982
CuZn15As-C	CC760S	EN 1982
NOTE These examples do not constitute an exhaustive list.		

Other components can be made from metallic or non-metallic materials, provided that they do not prevent the fitting meeting the functional requirements of this standard and do not cause degradation of the connected tube or pipes.

Sealing elements shall conform to the requirements for elastomeric materials in EN 681-1 and Table 3 of this European Standard.

Table 3 — Requirements and tests for non-metallic sealing elements

Test procedures
Tear strength for butyl rubbers in accordance with EN 681-1:1996, Table 3. Minimum tear strength: ≥ 20 N.
Thermogravimetric analysis (TGA) for identity testing of elastomeric materials. The TGA is carried out in accordance with ISO 9924-1. Frequency of test — the TGA shall be carried out at the initial type testing stage to produce the master graph. Further analysis will be made to compare the production to the master graph at a frequency of once per year thereafter.

In order to demonstrate durability for long-term applications in water, elastomeric sealing elements shall be tested in accordance with the parameters shown in Table 4.

Table 4 — Durability test for elastomeric sealing elements for fittings for water applications

Test procedures	
Compression set test in water, in accordance with EN 681-1:1996, Annex B, and ISO 815-1.	
Test duration:	3 000 h
Test temperature:	110 °C
Test medium:	Distilled water
Compression set after 3 000 h:	≤ 30 %
Compression set increase between 1 000 h and 3 000 h	≤ 5 % / 1 000 h
Change in volume/Swelling (varying to EN 681-1 for IIR only).	
Test duration:	7 d
Test temperature:	95 °C
Test medium:	Distilled water
Change in volume	≤ 15 %

4.2.2 Reaction to fire

Copper and copper alloys are products/materials that do not require to be tested for reaction to fire (i.e. products/materials of class A.1 according to Commission Decision 96/603/EC, as amended 2000/605/EC).

4.2.3 Resistance to high temperature (for heating networks)

The mechanical properties of products which consist of copper or copper alloys at temperatures encountered in heating networks are not reduced significantly; for example, it is not necessary to include the maximum admissible stress in pressure calculations from ambient up to 120 °C.

4.3 Dimensions and tolerances

4.3.1 Minimum bore area

The minimum cross-sectional area of the bore through each fitting, excluding any internal pipe support, shall be not less than the theoretical minimum area of the bore given by reference to Table 5, except that for unequal-ended or adaptor fittings with ends specified in other parts of this standard or other standards, the smallest diameter shall apply provided that this diameter does not restrict other outlets.

Table 5 — Minimum bore diameter

Dimensions in millimetres

Nominal diameter <i>D</i>	Minimum bore diameter
6	4,0
8	6,0
10	7,0
12	9,0
14	10,0
14,7	11,0
15	11,0
16	12,0
17	13,0
18	14,0
20	16,0
21	18,0
22	18,0
25	21,0
27,4	23,0
28	23,0
32	26,0
34	29,0
35	29,0
40	35,0
40,5	36,0
42	36,0
50	40,0
53,6	47,0
54	47,0

4.3.2 Minimum bore area through fittings with an integral or separate internal support

When an internal support is provided, either as an integral part of the fitting or loose, the minimum cross-sectional area of the bore through the support shall be in accordance with Table 6.

Table 6 — Minimum cross-sectional area of bores

Nominal diameter D mm	Relationship of bore area to the theoretical minimum area of the bore of the pipe	
	for internal support with sealing element %	for fitting and internal support without sealing element %
6	18	35
8		
10		
12		
14	30	45
14,7		50
15		
16		
17		
18		
20		
21		
22	35	55
25		
27,4		
28		
32	45	60
34		
40		
40,5		
50	60	70
53,6		
54		

EXAMPLE

For 16 mm nominal diameter push-fit end for plastics pipe with 2,0 mm wall thickness, area of bore = 113,1 mm².

Permissible area of bore through an internal support with sealing element (from table) = 30 % × 113,1 mm² = 33,9 mm².

Therefore the minimum internal diameter of the internal support = 6,57 mm.

Permissible area of bore through an internal support without sealing element (from table) = 50 % × 113,1 mm² = 56,6 mm².

Therefore minimum internal diameter of the internal support = 8,49 mm.