



**SLOVENSKI STANDARD**  
**oSIST prEN 1254-2:2019**  
**01-september-2019**

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**Baker in bakrove zlitine - Fitingi - 2. del: Fitingi z nakrčenima priključkoma za spajanje z bakrenimi cevmi**

Copper and copper alloys - Plumbing fittings - Part 2: Compression fittings for use with copper tubes

Kupfer und Kupferlegierungen - Fittings - Teil 2: Klemmverbindungen für Kupferrohre

Cuivre et alliages de cuivre - Raccords - Partie 2 - Raccords à compression pour tubes en cuivre

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**prEN 1254-2**

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## Copper and copper alloys - Plumbing fittings - Part 2: Compression fittings for use with copper tubes

Cuivre et alliages de cuivre - Raccords - Partie 2 :  
Raccords à compression pour tubes en cuivre

Kupfer und Kupferlegierungen - Fittings - Teil 2:  
Klemmverbindungen für Kupferrohre

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 133.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
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EUROPÄISCHES KOMITEE FÜR NORMUNG

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**prEN 1254-2:2019 (E)****European foreword**

This document (prEN 1254-2:2019) has been prepared by Technical Committee CEN/TC 133 “Copper and copper alloys”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 1254-2:1998.

This part of the standard (EN 1254-2) should be read in conjunction with prEN 1254-20:2019.

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

- Part 1: Capillary fittings for soldering or brazing to copper tubes
- Part 2: Compression fittings for use with copper tubes
- Part 3: Compression fittings for use with plastics and multilayer pipes
- Part 4: Threaded fittings
- Part 5: Capillary fittings with short ends for brazing to copper tubes
- Part 6: Push-fit fittings for use with metallic tubes, plastics and multilayer pipes
- Part 7: Press fittings for use with metallic tubes
- Part 8: Press fittings for use with plastics and multilayer pipes
- Part 20: Definitions, thread dimensions, test methods, reference data and supporting information

The main changes to EN1254-2:1998 are:

- separation of test methods into part 20.

## Introduction

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

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**prEN 1254-2:2019 (E)****1 Scope**

This document specifies product characteristics, assessment methods, compliance criteria of the test results and a designation system for compression fittings for connecting with copper tubes. Compression fittings exist with sealing elements - metallic and/or non-metallic - called non manipulative (commonly referenced as type A) and without sealing elements, called manipulative (commonly referenced as type B). For the purposes of joining copper tubes, the fitting ends have a size range from 6 mm to 108 mm. The compression fittings are designed for a service lifetime up to fifty years.

The fittings are used up to the operating temperatures and maximum operating pressures as indicated in Annex A.

This document applies to copper alloy fittings. A non-exhaustive list of these copper alloys is given in CEN/TS 13388.

Compression fitting ends, Type A, are used with copper tubes to EN 1057 in all material hardness conditions.

Compression fittings, Type A, will possibly require an internal support when used with R220 (annealed) copper tube and the manufacturer's advice should be sought.

Compression fitting ends, Type B, are used with R220 (annealed) or R250 (half-hard) copper tube to EN 1057.

Compression fittings, Type B, may be used with R290 (hard) copper tube and the manufacturer's advice should be sought.

Adaptor fittings for use with copper tubes may combine compression ends with fitting ends defined in the other parts of EN 1254.

Compression fittings for use with copper tubes may also have flanged end connections according to EN 1092-3.

Compression fittings for use with copper tubes may also have a plated or other decorative surface coating.

Fittings can be produced by machining, metal forming, casting, or fabrication.

Products covered by this standard are intended to be used in:

**a) liquid applications:**

- hot, cold or combined hot and cold water systems according to EN 806;
- closed heating systems according to EN 12828 and cooling systems;
- drainage systems;
- sprinkler systems according to EN 12845.

**b) gas applications:**

- natural gas and liquefied petroleum gas systems with a maximum operating pressure less than or equal to 5 bar according to EN 1775;
- compressed air systems.



## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 549:1994, *Rubber materials for seals and diaphragms for gas appliances and gas equipment*

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

EN 682, *Elastomeric Seals — Materials requirements for seals used in pipes and fittings carrying gas and hydrocarbon fluids*

EN 806 (series), *Specifications for installations inside buildings conveying water for human consumption*

EN 1057:2006+A1:2010, *Copper and copper alloys — Seamless, round copper tubes for water and gas in sanitary and heating applications*

EN 1092-3, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 3: Copper alloy flanges*

prEN 1254-20:2019, *Copper and copper alloys — Plumbing fittings — Part 20: Definitions, thread dimensions, test methods, reference data and supporting information*

EN 1775:2007, *Gas supply — Gas pipework for buildings — Maximum operating pressure less than or equal to 5 bar — Functional recommendations*

EN 10226-3, *Pipes threads where pressure-tight joints are made on the threads — Part 3: Verification by means of limit gauges*

EN 12502-2, *Protection of metallic materials against corrosion — Guidance on the assessment of corrosion likelihood in water distribution and storage systems — Part 2: Influencing factors for copper and copper alloys*

EN 12828, *Heating systems in buildings — Design for water-based heating systems*

EN 12845, *Fixed firefighting systems — Automatic sprinkler systems — Design, installation and maintenance*

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

EN ISO 6507-1, *Metallic materials — Vickers hardness test — Part 1: Test method (ISO 6507-1)*

ISO 7-2, *Pipe threads where pressure-tight joints are made on the threads — Part 2: Verification by means of limit gauges*

ISO 228-2, *Pipe threads where pressure-tight joints are not made on the threads — Part 2: Verification by means of limit gauges*

ISO 2859-1:1999, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

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

**prEN 1254-2:2019 (E)**

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 terms and definitions given in prEN 1254-20:2019 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

**4 Product characteristics****4.1 Internal pressure****4.1.1 For liquid applications**

When tested according to the method in 5.2.1 fittings shall show no signs of leakage or permanent distortion.

**4.1.2 For gas applications**

When tested according to the method in 5.2.2 fittings shall show no signs of leakage or permanent distortion.

**4.2 Tightness****4.2.1 General requirements****4.2.1.1 Integrity of fabricated fitting bodies or having an 'as cast' microstructure**

This requirement only applies to fitting bodies with an 'as cast' microstructure (excluding continuously cast materials) or fabricated by welding or brazing.

When tested according to the method in 5.3.1.1 fitting bodies shall show no visual indication of leakage.

**4.2.1.2 Resistance to pull-out**

When tested according to the method in 5.3.1.2 the joint assemblies shall withstand the pull-out force without being separated and shall show no signs of leakage when subjected to the subsequent leak tightness under internal hydrostatic pressure test as described in 5.2.1.

**4.2.1.3 Leak tightness under static flexural force**

When tested according to the method in 5.3.1.3 followed by 5.2.2 for gas applications, fittings shall show no signs of leakage or permanent distortion. This requirement is not applicable on threaded ends.

**4.2.2 Requirements for liquid applications****4.2.2.1 Leak tightness under internal hydrostatic pressure**

Fittings assessed as indicated in 4.1.1 are considered to be leak tight under internal hydrostatic pressure.

#### 4.2.2.2 Leak tightness under vacuum

When tested according to the method in 5.3.2.1 the change in pressure shall not be greater than 0,05 bar at the conclusion of the test.

#### 4.2.2.3 Leak tightness under temperature cycling

This requirement only applies to compression ends with non-metallic seals.

When tested according to the method in 5.3.2.2 fittings shall show no signs of leakage.

### 4.2.3 Requirements for gas applications

#### 4.2.3.1 Leak tightness under internal pneumatic pressure

Fittings assessed as indicated in 4.1.2 are considered to be leak tight under internal pneumatic pressure.

#### 4.2.3.2 Leak tightness under temperature cycling for gas applications

This requirement only applies to compression ends with non-metallic seals.

When tested according to the method in 5.3.3.1 fittings shall show no signs of leakage.

#### 4.2.3.3 Leak tightness at high temperature

This requirement only applies to compression ends with non-metallic seals for fuel gas applications.

When tested according to the method in 5.3.3.2, at any point during the test period the nitrogen leakage rate from an equal ended straight copper fitting shall not exceed 150 dm<sup>3</sup>/h per tested product.

#### 4.2.3.4 Compression fitting suited for fuel gas application inside buildings

The main aspect for the durability of tightness for fuel gas application inside buildings is the ozone behaviour of the elastomer. Therefore the elastomer shall be ozone resistant and comply with the requirements of EN 549 class B2 or higher.

#### 4.2.3.5 Compression fitting suited for fuel gas application outside buildings

The main aspect for the durability of tightness for fuel gas application outside buildings depends on the elastomeric sealing element. Therefore the elastomer shall comply with the requirements of EN 682 types GAL or GBL.

### 4.3 Resistance to high temperature (for heating networks)

The main aspect for the resistance to high temperature depends on the elastomeric sealing element. Therefore the elastomer shall have the appropriate characteristics as specified in EN 681-1. The elastomeric sealing elements shall conform to the requirements of EN 681-1:1996, Table 3 for continuous hot water supply up to 110 °C except for Isoprene-Isobutylene Copolymer (IIR) where a volume change in water up to and including 15 % is permitted.

### 4.4 Release of dangerous substances

National regulations on dangerous substances may require verification and declaration on release, and sometimes content, when construction products covered by this standard are placed on those markets. In the absence of European harmonized test methods, verification and declaration on release/content should be done taking into account national provisions in the place of use.

**prEN 1254-2:2019 (E)****4.5 Durability****4.5.1 Durability of internal pressure****4.5.1.1 Resistance to stress corrosion**

Fittings manufactured from copper and copper-tin-zinc alloys (CuSnZnPb) are deemed to be resistant to stress corrosion according to EN 12502-2 and copper-zinc-silicon alloys containing  $\geq 2\%$  Si are also considered to be resistant.

Fittings manufactured from CuZn-alloys are deemed to be resistant to stress corrosion when the product has a hardness  $HBW_{10} 2,5/62,5 \leq 110$  measured according to EN ISO 6506-1 or a hardness  $HV_5 \leq 134$  measured according to EN ISO 6507-1.

Fittings manufactured from copper alloys with a zinc content of 10 % or greater not mentioned above shall be tested and assessed according to 5.4.1.1, and shall show no evidence of cracking.

**4.5.2 Durability of tightness****4.5.2.1 Resistance to dezincification**

Does not apply to fittings for gas applications.

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

Alloys containing 10 % or less zinc provide a good resistance to dezincification and don't need to be tested.

Representative material samples, prior to machining, shall be tested. When tested according to 5.4.2.1, the mean and maximum depth of dezincification in any direction shall be expressed in  $\mu\text{m}$  and shall meet the acceptance criteria listed below for resistance to dezincification:

- for grade A: maximum 200  $\mu\text{m}$ ;
- for grade B: mean not to exceed 200  $\mu\text{m}$  and maximum 400  $\mu\text{m}$ .

If any of the test pieces do not meet the criteria for the chosen grade, a second lot of test samples from the same batch shall be selected and the test repeated. If any of the second lot of test pieces fails, then the batch represented shall be deemed not to conform to the requirements of this standard.

**4.5.2.2 Resistance to pressure cycling**

This requirement only applies to compression ends for liquid applications.

When tested according to the method in 5.4.2.2 fittings shall show no signs of leakage.

**4.6 Wall thickness at threaded portions of adaptor fittings**

This requirement only applies to adaptor fittings with an interface thread.

When assessed according to the method specified in 5.5 the minimum wall thickness at the interface thread shall be as expressed in prEN 1254-20:2019, 4.1 for the relevant diameters.

**4.7 Dimensions of tail pipe ends for swivel fittings**

This requirement only applies to tail pipe ends for swivel fittings.

When assessed according to the method specified in 5.6 the dimensions shall be as expressed in prEN 1254-20:2019, 4.2 for the thread size.