



SLOVENSKI STANDARD

oSIST prEN 1254-1:2019

01-september-2019

Baker in bakrove zlitine - Fitingi - 1. del: Fitingi za kapilarno mehko in trdo lotanje na bakrene cevi

Copper and copper alloys - Plumbing fittings - Part 1: Capillary fittings for soldering or brazing to copper tubes

Kupfer und Kupferlegierungen - Fittings - Teil 1: Weich- und Hartkapillarlötfitings für Kupferrohre

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Cuivre et alliages de cuivre - Raccords - Partie 1 : Raccords à braser par capillarité pour tubes en cuivre

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EUROPEAN STANDARD
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English Version

Copper and copper alloys - Plumbing fittings - Part 1: Capillary fittings for soldering or brazing to copper tubes

Cuivre et alliages de cuivre - Raccords - Partie 1 :
Raccords à braser par capillarité pour tubes en cuivre

Kupfer und Kupferlegierungen - Fittings - Teil 1:
Weich- und Hartkapillarlötfittings 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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COMITÉ EUROPÉEN DE NORMALISATION
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prEN 1254-1:2019 (E)**European foreword**

This document (prEN 1254-1:2019) 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 1254-1:1998.

This part of the standard (EN 1254-1) 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 EN 1254-1:1998 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 1254-1:2019 (E)**1 Scope**

This document specifies product characteristics, assessment methods, compliance criteria of the test results and a designation system for fittings with ends for capillary soldering or capillary brazing for connecting with copper tubes e.g. EN 1057, EN 13348, EN 13349, EN 12735-1, EN 12735-2 etc. For the purposes of joining copper tubes, the fitting ends have a size range from 6 mm to 108 mm. These fitting ends exist in three forms: end feed fittings and integral solder and integral brazing ring fitting ends. The fittings are designed for a service lifetime up to fifty years.

The fittings are used up to the operating temperatures and corresponding 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.

The capillary fittings for soldering or brazing to copper tubes are used with solder alloys in accordance with alloys specified in EN ISO 9453 and brazing alloys in accordance with alloys specified in EN ISO 17672.

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

Capillary fittings for soldering or brazing may also have flanged end connections according to EN 1092-3.

Capillary fittings for soldering or brazing 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;
- refrigeration systems;

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;
- medical gas systems according to EN ISO 7396;
- refrigeration 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 723, *Copper and copper alloys — Combustion method for determination of the carbon content on the inner surface of copper tubes or fittings*

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, *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 joint 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 12735-1, *Copper and copper alloys — Seamless, round tubes for air conditioning and refrigeration - Part 1: Tubes for piping systems*

EN 12735-2, *Copper and copper alloys — Seamless, round tubes for air conditioning and refrigeration — Part 2: Tubes for equipment*

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 13348, *Copper and copper alloys — Seamless, round copper tubes for medical gases or vacuum*

EN 13349, *Copper and copper alloys — Pre-insulated copper tubes with solid covering*

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)*

EN ISO 7396, *Medical gas pipeline systems*

EN ISO 9453, *Soft solder alloys — Chemical compositions and forms (ISO 9453)*

EN ISO 17672, *Brazing — Filler metals (ISO 17672)*

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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*

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**

When tested according to the method in 5.2 fittings shall show no signs of leakage or permanent distortion.

4.2 Tightness**4.2.1 Leak tightness under internal hydrostatic pressure**

Fittings assessed as indicated in 4.1 are considered to be leak tight under internal hydrostatic pressure.

4.2.2 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 fitting bodies shall show no visual indication of leakage.

4.3 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.

4.4 Durability**4.4.1 Durability of internal pressure****4.4.1.1 Resistance to stress corrosion**

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

Fittings manufactured from CuZn-alloys shall be considered 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.

4.4.2 Durability of tightness

4.4.2.1 Residual carbon contamination in the bore

Applies only to copper fittings and does not apply to copper alloy fittings.

4.4.2.1.1 Carbon film

When tested according to 5.4.2.1 there shall not be any visible carbon film.

4.4.2.1.2 Total carbon

When tested according to 5.4.2.2 the maximum total carbon level on internal surfaces shall not exceed $1,0 \text{ mg/dm}^2$.

4.4.2.2 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 5.4.2.3, the mean and maximum depth of dezincification in any direction shall be expressed in μm 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.

If the user needs to heat a dezincification resistant alloy fitting to a temperature exceeding $550 \text{ }^\circ\text{C}$ for example for brazing, advice should be sought from the manufacturer.

4.5 Dimensional tolerances of diameters to achieve reliable capillary flow

In order to achieve the capillary flow of a solder or brazing alloy when making a connection, the dimensions of a socket or male end shall be tightly controlled.

When assessed according to the method specified in 5.5, the diameter shall be within the tolerances expressed in Table 1 for the relevant diameters.

Table 1 — Tolerances on the nominal diameter

Values in millimetres

| Nominal diameter <i>D</i> | Tolerances on the mean diameter ^a with respect to the nominal diameter <i>D</i> | | Resulting diametrical difference | |
|------------------------------|---|------------------------------|-------------------------------------|------|
| | Outside diameter of male end | Inside diameter of socket | max. | min. |
| 6 | +0,04 -0,05 | +0,15 +0,06 | 0,20 | 0,02 |
| 8 | | | | |
| 10 | | | | |
| 12 | | | | |
| 14 | | | | |
| 14,7 | | | | |
| 15 | | | | |
| 16 | | | | |
| 18 | | | | |
| 21 | +0,05 -0,06 | +0,18 +0,07 | 0,24 | 0,02 |
| 22 | | | | |
| 25 | | | | |
| 27,4 | | | | |
| 28 | | | | |
| 34 ^b | +0,06 -0,07 | +0,23 +0,09 | 0,30 | 0,03 |
| 35 ^b | | | | |
| 40 ^b | | | | |
| 40,5 ^b | | | | |
| 42 ^b | | | | |
| 53,6 ^b | | | | |
| 54 ^b | | | | |
| 64 ^b | +0,07 -0,08 | +0,33 +0,10 | 0,41 | 0,03 |
| 66,7 ^b | | | | |
| 70 ^b | | | | |
| 76,1 ^b | | | | |
| 80 ^b | | | | |
| 88,9 ^b | | | | |
| 106 ^b | | | | |
| 108 ^b | | | | |