



# SLOVENSKI STANDARD

## oSIST prEN 1254-1:2007

01-junij-2007

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

Copper and copper alloys - Plumbing fittings - Part 1: Fittings with ends for capillary soldering or capillary brazing to copper tubes

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23.040.40	Kovinski fittingi	Metal fittings
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ICS 23.040.40

Will supersede EN 1254-1:1998

English Version

## Copper and copper alloys - Plumbing fittings - Part 1: Fittings with ends for capillary soldering or capillary brazing to copper tubes

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.

This draft European Standard was established by CEN in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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## Foreword

This document (prEN 1254-1:2007) 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.

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

EN 1254-1:1998, *Copper and copper alloys — Plumbing fittings — Part 1: Fittings with ends for capillary soldering or capillary brazing to copper tubes.*

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directives.

For relationship with EU Directives, see informative Annex ZA, which is an integral part of this document.

In comparison with the first edition of EN 1254-1:1998, the following significant technical changes were made:

- Harmonization of the standard to the Construction Product Directive (CPD);
- introduction of new definitions: "maximum operating pressure (MOP)", "durably marked", "permanently marked", "initial type test (ITT)", and "factory production control (FPC)";
- due to the process of harmonization to the CPD, introduction of two new characteristics in Clause 5 Material characteristics inherent to copper material which are not to be tested;
- text in Clause 6 Evaluation of conformity added due to the process of harmonization to the CPD;
- for permanent and durable markings, specification of their applicability in Clause 9 Marking;
- improved presentation of test methods; in annexes;
- due to the process of harmonization to the CPD, introduction of Annex ZA.

This Standard for copper and copper alloy fittings for joining metallic tubes or plastics pipes is in seven Parts.

The other Parts are:

- 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.*

## Introduction

Products in conformity with this part of this standard are considered suitable for drinking water applications subject to either:

- 1) compliance with any national regulations in the country of intended destination, or
- 2) compliance in due course with the proposed European Acceptance Scheme (EAS) that will introduce common EU requirements for testing for fitness for contact with drinking water. When the EAS is implemented, this part of the Standard shall have added to it a special Annex (Z/EAS) to incorporate the provisions of the EC Mandate M 136 and 1) will no longer be applicable.

This part of this European Standard provides the basis for the assessment of a manufacturer's production process for products manufactured in accordance with this standard. The assessment could be based on initial and continuing surveillance of the factory production control system, which could be concurrent with an assessment of the manufacturer's quality management system against EN ISO 9001.

Regulatory marking and the means by which regulatory marking is applied is dealt with in Annex ZA.

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## 1 Scope

This European Standard specifies materials, assembly dimensions and tolerances and test requirements for fittings of copper and copper alloys with or without plating or coating.

This part of EN 1254 specifies connection end dimensions of capillary soldering and brazing ends in the size range 6 mm to 108 mm for the purposes of joining copper tubes intended for use in hot or cold or combined hot and cold water, heating and cooling systems, natural gas and liquefied petroleum gas systems.

Permissible operating temperatures and maximum operating pressures are also established.

This standard is applicable to capillary fittings for joining the following tubes:

- Copper tubes to EN 1057;
- Pre-insulated copper tubes to EN 13349.

Fittings may also be suitable for joining other tubes provided the capillary joint with the specified tube meets the requirements of this standard.

Fittings may comprise a combination of any of the end types specified in EN 1254 or other standards, provided they are suitable for the fluid/gas being conveyed.

The standard establishes a designation system for the fittings.

## 2 Normative references

The following referenced documents are indispensable for the application 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 carbon on the inner surface of copper tubes or fittings*

EN 1044, *Brazing — Filler metals*

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

EN 1254-2, *Copper and copper alloys — Plumbing fittings — Part 2: Fittings with compression ends for use with copper tubes*

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

EN 1254-4, *Copper and copper alloys — Plumbing fittings — Part 4: Fittings with threaded end connections*

EN 1254-5, *Copper and copper alloys — Plumbing fittings — Part 5: Fittings with short ends for capillary brazing to copper tubes*

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

prEN 1254-7, *Copper and copper alloys — Plumbing fittings — Part 7: Fittings with press ends for metallic tubes*

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

## prEN 1254-1:2007 (E)

EN 1775, *Gas supply — Gas pipework for buildings — Maximum operating pressure ≤ 5 bar — Functional recommendations*

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

EN 14905, *Copper and copper alloys — Plumbing fittings — Recommended practice for the installation of copper and copper alloy plumbing fittings*

EN 29453, *Soft solder alloys — Chemical compositions and forms (ISO 9453:1990)*

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

EN ISO 9001:2000, *Quality management systems — Requirements (ISO 9001:2000)*

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

NOTE Informative references to documents used in the preparation of this standard, and cited at the appropriate places in the text, are listed in the Bibliography.

### 3 Definitions

For the purposes of this standard, the following 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 a system

**3.2 capillary end**  
end in which the joint is made by the flow of solder or brazing alloy by capillary action into the annular space

**3.3 reducer (reducer for capillary soldering or brazing for copper tube)**  
component used to enable an end to connect tube of a smaller nominal diameter than the nominal diameter of the fitting end

**3.4 adaptor fitting**  
fitting combining more than one type of end

NOTE For details of the other ends, see the relevant Parts of this standard or other standards.

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

**3.6 maximum operating pressure MOP**  
maximum operating pressure at which pipework can be operated under normal operating conditions



### 3.7

#### **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 e.g. by ink marking.

### 3.8

#### **permanently marked**

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

NOTE e.g. by stamping, etching or engraving.

### 3.9

#### **initial type test**

##### **ITT**

complete set of tests or other procedures described in the technical specification, determining the performance of samples of products representative of the product type

NOTE Other procedures — e.g. calculation.

### 3.10

#### **factory production control**

##### **FPC**

means by which a manufacturer ensures that the performances declared by the manufacturer (obtained from ITT) continue to be valid for all subsequent products

## **4 Operating temperatures and operating pressures**

Operating temperatures and operating pressures for assembled joints shall not exceed the values in Table 1 for the relevant soldering or brazing alloy.

**Table 1 — Operating temperatures and operating pressures**

Method	Examples of soldering/brazing alloys	Operating temperature <sup>a</sup>  °C	Maximum operating pressures (MOP) for nominal diameters <sup>a, b</sup> bar		
			from 6 mm up to and including 34 mm	over 34 mm up to and including 54 mm	over 54 mm up to and including 108 mm
Soldering	lead/tin 50/50 % or 60/40 %	30	16	16	10
		65	10	10	6
		110	6	6	4
	tin/silver 95/5 % or tin/copper Cu 3 % max. 0,4 % min. remainder Sn	30	25	25	16
		65	25	16	16
		110	16	10	10
Brazing	silver/copper cadmium-free 55 % to 40 % Ag or copper/phosphorus 94/6 % or copper/phosphorus with 2 % silver 92/6/2 %	30	25	25	16
		65	25	16	16
		110	16	10	10

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NOTE Soldering or brazing alloys containing lead or cadmium as alloying elements are not permitted in installations for water for human consumption.

<sup>a</sup> For use in applications outside the scope of this table, the approval of the manufacturer should be obtained.

<sup>b</sup> Intermediate pressure ratings shall be obtained by interpolation.

## 5 Requirements

### 5.1 General

Fittings, including reducers, shall conform to the requirements of 5.2 to 5.4.

### 5.2 Materials

#### 5.2.1 General

Fittings bodies shall be made from copper or copper alloys selected from materials either:

- specified in European copper and copper alloy product standards; or
- registered by CEN/TC 133;

provided that the fittings manufactured from them meet the functional requirements of this standard.

NOTE Some of the standardized coppers and copper alloys commonly used for the manufacture of fittings are shown in Table 2. Details of registered alloys can be obtained from the CEN/TC 133 Secretariat.

**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 This table do not constitute an exhaustive list.		

Solder alloys shall be in accordance with alloys specified in EN 29453.

Brazing alloys shall be in accordance with alloys specified in EN 1044.

Products intended for use in drinking water applications shall meet the requirements of the European Acceptance Scheme (EAS).

In the absence of the EAS, national requirements apply.

### 5.2.2 Safety in case of fire — Reaction to fire

Products which consist of copper or 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).

### 5.2.3 Properties at high temperature

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.

### 5.2.4 Restrictions in the choice of materials

Cu-ETP (CW004A) is a permitted material only for integral solder ring fittings and shall not be used for other types of capillary fittings.

Leaded solders shall not be used for manufacture of integral solder ring fittings.

Brazing fittings that are required to be dezincification resistant shall not be produced from copper-zinc alloys containing more than 10 % zinc.

### 5.3 Dimensions and tolerances

#### 5.3.1 Tolerances on diameters

The standardised nominal dimensions, diameters and their tolerances, are given in Table 3.

The socket and male end tolerances on diameter shall be in accordance with Table 3, which shall be verified by the use of gauges shown in Figures 5 and 6 and Tables 10 and 11. For initial type testing, ovality of the end shall be checked by taking the average of direct measurement of the smallest and largest diameters of the socket. The limits are to be derived from the dimensions of the gauges and the tolerances given in Table 3.

NOTE 1 Tolerances in accordance with Table 3 and the use of gauges in accordance with Tables 10 and 11 will ensure the distribution of solder or brazing alloy throughout the joint and will allow for the alignment of the male end of a fitting or the free end of a tube in the socket.

NOTE 2 Because of potential difficulties due to maintaining correct form of tube ends, when capillary fittings are used for soldering or brazing to copper tubes, the ends of the tubes should be sized to the outside diameter dimensions specified in Table 3 for a length not less than the length of engagement of the fitting.

NOTE 3 Socket and male ends are shown diagrammatically in Figures 1 and 2.

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Table 3 — Tolerances on the nominal diameter

Values in millimetres

Nominal diameter <i>D</i>	Tolerances on the mean diameter <sup>a</sup> 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				
22	+ 0,05 − 0,06	+ 0,18 + 0,07	0,24	0,02
25				
27,4				
28				
34 <sup>b</sup>				
35 <sup>b</sup>	+ 0,06 − 0,07	+ 0,23 + 0,09	0,30	0,03
40 <sup>b</sup>				
40,5 <sup>b</sup>				
42 <sup>b</sup>				
53,6 <sup>b</sup>				
54 <sup>b</sup>				
64 <sup>b</sup>				
66,7 <sup>b</sup>				
70 <sup>b</sup>	+ 0,07 − 0,08	+ 0,33 + 0,10	0,41	0,03
76,1 <sup>b</sup>				
80 <sup>b</sup>				
88,9 <sup>b</sup>				
106 <sup>b</sup>				
108 <sup>b</sup>				
108 <sup>b</sup>				

<sup>a</sup> Arithmetical mean of two diameters at right angles in a cross-section taken anywhere on the length of the socket or of the male end.

<sup>b</sup> The soldering or brazing of tubes and fittings for these diameters requires more skilled techniques (further information is available in EN 14905).