



SLOVENSKI STANDARD

oSIST prEN 1254-2:2007

01-junij-2007

Baker in bakrove zlitine - Fitingi - 2. del: Fitingi za spajanje z bakrenimi cevmi s stiskanjem

Copper and copper alloys - Plumbing fittings - Part 2: Fittings with compression ends for use with copper tubes

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

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English Version

Copper and copper alloys - Plumbing fittings - Part 2: Fittings with compression ends for use with copper tubes

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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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 1254-2:2007) 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 1254-2:1998.

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 1254-2:1998, *Copper and copper alloys — Plumbing fittings — Part 2: Fittings with compression ends for use with 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 1254-2:1998, 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 three new characteristics in Clause 6 Material characteristics inherent to copper material which are not to be tested;
- text in Clause 7 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 fittings of copper and copper alloys for joining metallic tubes or plastics pipes is in seven parts. The other parts are:

- *Part 1: Fittings with ends for capillary soldering or capillary brazing to 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 and test requirements for fittings of copper and copper alloys with or without plating or coating.

This part of EN 1254 specifies compression end connections in the size range 6 mm to 108 mm for the purpose 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 compression 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 compression fitting joint with the specified tube meets the requirements of this standard.

Fittings may comprise a combination of end types, specified in this standard, EN 1254, or other standards, providing 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 437, *Test gases — Test pressures — Appliance categories*

EN 549, *Elastomeric materials for seals and diaphragms for gas appliances and gas systems*

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

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

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

EN 1254-1, *Copper and copper alloys — Plumbing fittings — Part 1: Fittings with ends for capillary soldering or capillary brazing to 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 combining other end connections with capillary or compression ends*

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*

EN 1775, *Gas supply — Gas pipework for buildings — Maximum operating pressure \leq 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 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 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*

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.

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3 Definitions

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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 the system

3.2

compression end

end in which the joint is made by the compression of a ring or sleeve on the outside wall of the tube

3.2.1

compression end, Type A

end that requires no preparation of the ends of the tube other than that they are cut square and deburred, or chamfered when specified, and in which the joint is made by the compression of a ring or sleeve onto the outside wall of the tube with or without additional sealing elements and with or without an internal tube support

NOTE The sealing element may be metallic or non-metallic.

3.2.2

compression end, Type B

end that requires forming of the tube at its end, and in which the joint is made by compressing the formed portion of the tube against the formed end of the fitting or a loose ring or sleeve within the fitting/tube

3.3 reducer (compression end for copper tube)
component or components used to enable a compression 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 other ends, see the relevant parts of this standard or other standards.

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

3.6 fuel gas
combustible gases which are gaseous at 15 °C and 1 013 mbar and are generally odorized for safety reasons, are commonly referred to as manufactured gas, natural gas or liquefied petroleum gases (LPG)

NOTE They are also referred to as first, second or third family gases (see EN 437:1993, Table 1).

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

3.8 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 Marked e.g. by ink marking.

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

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

3.10 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.

3.11 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 Types

There are three types of compression fitting ends depending on the medium with which they are suitable for use, as shown in Table 1.

Table 1 — Types of fitting ends

Type	Medium used
1	Water
2	Fuel gas
3	Water and fuel gas

5 Operating temperatures and operating pressures

Operating temperatures and operating pressures for assembled joints shall not exceed the values in Tables 2, 3 or 4 according to classification and medium.

Table 2 — Operating temperatures and operating pressures for Type 1 and Type 3 fitting ends with metallic sealing elements when used with water

Operating temperature °C	Fitting size and maximum water operating pressure (MOP) bar			
	6 mm to 15 mm	> 15 mm to 28 mm	> 28 mm to 54 mm	> 54 mm to 108 mm
95	25	16	13	10

NOTE 1 Certain designs of compression fitting ends 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.

NOTE 2 To allow for system malfunctions, fittings shall be capable of temporary excursions up to a temperature of 110 °C at a pressure of 10 bar.

Table 3 — Operating temperatures and operating pressures for Type 2 and Type 3 fitting ends when used with gas

Operating temperature °C	Maximum operating pressure for nominal diameters from 6 mm up to and including 54 mm bar	
	MOP 5	MOP 1
- 20 to + 70	5	1

6 Requirements

6.1 General

Fittings, including reducers, shall conform to the requirements of 6.2 to 6.5

6.2 Materials

6.2.1 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 4. Details of registered alloys can be obtained from the CEN/TC 133 Secretariat.

Table 4 — Examples of commonly used materials

Symbol	Material designation Number	Standard
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.		

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.

Non-metallic sealing elements for Type 1 and Type 3 fitting ends for water applications shall conform to the requirements for elastomeric materials in EN 681-1 and Table 5 of this standard.

Table 5 — Non metallic sealing elements when used in Type 1 or Type 3 fittings — additional requirements and tests

No.	Test procedures
1	<p>Tear strength in accordance with EN 681-1, Table 3.</p> <p>This requirement applies to all elastomeric sealing materials for water applications.</p> <p>Minimum tear strength: > 20 N</p>
2	<p>Thermogravimetric analysis for identity testing of elastomeric materials for water applications. The TGA is carried out in accordance with ISO 9924-1.</p> <p>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 curve at a frequency of once per year thereafter.</p>

Non-metallic sealing elements for Type 2 and Type 3 fitting ends for use with gas shall conform to the requirements for elastomeric materials in EN 549 and Table 6 of this standard.

Table 6 — Sealing elements for Type 2 and Type 3 fittings — additional requirements and tests

Test procedures
<p>Ozone resistance testing and requirements in accordance with EN 549, 7.8 and 6.2, Table 3.</p> <p>Requirement — no cracks</p>
<p>Material identity. Infrared spectra.</p> <p>The elastomer and the seal shall meet EN 549, Annex B.2 requirements for infrared spectra.</p> <p>Frequency of test — the test 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.</p>

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.

6.2.2 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).

6.2.3 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, no adjustment to maximum admissible stress in pressure calculations would be necessary for temperatures from ambient up to 110 °C.

Elastomeric seals shall conform to the requirements of EN 681-1, Table 3 for continuous temperatures up to 110 °C.

6.3 Minimum bore area

The minimum cross-sectional area of the bore through each fitting, excluding any internal support, shall be not less than the theoretical minimum area of the bore given in Table 7, except that for unequal-ended or adaptor fittings with ends specified in EN 1254, or other standards, the smallest diameter shall apply provided that this diameter does not restrict other outlets.

Table 7 — 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	
16	12,0
18	14,0
21	18,0
22	
25	21,0
27,4	23,0
28	
34	29,0
35	
40	35,0
40,5	36,0
42	
53,6	47,0
54	
64	55,0
66,7	57,0
70	60,0
76,1	65,0
80	68,0
88,9	76,0
108	92,0

6.4 Tolerance for the alignment of the fitting ends

The alignment of the ends of the fitting shall be within 2° of the specified axis.

6.5 Design and manufacture

Joints with seals shall be designed to meet the expected lifetime of a building or to the first expected renovation period of the building.

The tightness of the joint, on the grounds of actual technical knowledge, is presumed to be capable of maintaining required performance over a period of at least 50 years under the influence of foreseeable actions and normal maintenance to fulfil the essential requirements, if the joint itself is in conformity with the requirements of this standard.

6.5.1 Compression fittings, Type A

Compression fittings, Type A, are suitable for use with copper tubes to EN 1057 in all temper conditions.

NOTE 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.

6.5.2 Compression fittings, Type B

Compression fittings, Type B, are suitable for use with R220 (annealed) or R250 (half-hard) copper tube to EN 1057.

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

6.5.3 Tube abutment

Fitting ends are usually manufactured with an abutment to limit tube insertion.

Fittings may be produced for special purposes, particularly useful for repairs, where the fitting ends do not incorporate abutments, allowing for the fitting to slide along the tube.

6.5.4 Tightening systems

Shapes for transmitting tightening torques are required on compression nuts and straight bodies.

6.5.5 Surface condition

Fittings shall be clean and free from sharp edges.

6.5.6 Plated or coated surfaces

Requirements for plated or coated surfaces shall be the subject of agreement between the purchaser and the manufacturer and shall not impair the performance of the joint.

7 Evaluation of conformity

7.1 General

The conformity of plumbing fittings to the requirements of this standard and with the stated values shall be demonstrated by:

- initial type testing;
- factory production control by the manufacturer, including product assessment.