BS EN 1254-8:2012

BSI Standards Publication

Copper and copper alloys — Plumbing fittings

Part 8: Fittings with press ends for use with plastics and multilayer pipes

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National foreword

This British Standard is the UK implementation of EN 1254-8:2012.

The UK participation in its preparation was entrusted to Technical Committee NFE/34/3, Copper and copper alloy fittings for tube and pipe.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

ISBN 978 0 580 69897 2

ICS 23.040.40

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 October 2012.

Amendments issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1254-8

October 2012

ICS 23.040.40

English Version

Copper and copper alloys - Plumbing fittings - Part 8: Fittings with press ends for use with plastics and multilayer pipes

Cuivre et alliages de cuivre - Raccords - Partie 8: Raccords à sertir pour tuyaux en plastique et tubes multicouches

Kupfer und Kupferlegierungen - Fittings - Teil 8: Pressfittings für den Einsatz mit Kunststoff- und Mehrschichtverbundrohren

This European Standard was approved by CEN on 11 August 2012.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 1254-8:2012: E

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Foreword

This document (EN 1254-8:2012) 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of an identical text or by endorsement, at the latest by April 2013, and conflicting national standards shall be withdrawn at the latest by April 2013.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 European Standard:

EN 1254-8, *Copper and copper alloys — Plumbing fittings — Part 8: Fittings with press ends for use with plastics and multilayer pipes*

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.

1 Scope

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

This part of EN 1254 specifies press end connections with or without plating or coating in the size range 10 mm to 110 mm for the purpose of joining plastics and multilayer pipes 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 or gas systems, including fuel gas systems.

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 / gas being conveyed.

The European Standard establishes a designation system for the fittings.

This European Standard is applicable to press fittings for joining the following plastics and multilayer pipes:

EN ISO 15874, *Plastics piping systems for hot and cold water installations — Polypropylene (PP);*

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

EN ISO 15876, *Plastics piping systems for hot and cold water installations — Polybutylene (PB);*

EN ISO 15877, *Plastics piping systems for hot and cold water installations — Chlorinated poly (vinyl chloride) (PVC-C);*

EN ISO 21003, *Multilayer piping systems for hot and cold water installations inside buildings;*

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

ISO 17484*, Plastics piping systems — Multilayer pipe systems for indoor gas installations with a maximum operating pressure up to and including 5 bar (500 kPa).*

Fittings may be suitable for joining other pipes provided the fitting joint with the specified pipe meets the requirements of this European Standard and the relevant pipe standard.

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 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: Vulcanised rubber*

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 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, *Plastics piping systems for hot and cold water installations — Polypropylene (PP)*

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

EN ISO 15876, *Plastics piping systems for hot and cold water installations — Polybutylene (PB)*

EN ISO 15877, *Plastics piping systems for hot and cold water installations — Chlorinated poly (vinyl chloride) (PVC-C)*

EN ISO 21003, *Multilayer piping systems for hot and cold water installations inside buildings*

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

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*

ISO 17484-1:2006*, Plastics piping systems — Multilayer pipe systems for indoor gas installations with a maximum operating pressure up to and including 5 bar (500 kPa) — Part 1: Specifications for systems*

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
press end
end which may incorporate a sealing element and in which the joint is effected by radial compression of the ends of the fitting and the tube with a pressing tool

Note 1 to entry: Some designs may incorporate an additional device to aid retention.

Note 2 to entry: Compression of the ends of the fitting and the tube can be achieved directly or indirectly by radial compression.

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

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, including reducers, shall conform to the requirements of 4.2 to 4.4.

Details of applications and classes of service conditions are specified in the relevant plastics piping systems standards.

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 1.

Table 1 — 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 European Standard and do not cause degradation of the connected pipe.

Copper is not acceptable for use with polypropylene pipes – alloys are acceptable.

In the case of multi-layer pipes, the fitting design shall avoid contact between dissimilar metallic components that might give rise to corrosion.

Non-metallic sealing elements for fitting ends for water applications shall conform to the requirements for elastomeric materials in EN 681-1 and Tables 2 and 3 of this European Standard.

Table 2 — Requirements and tests for non-metallic sealing elements

Test Procedures
Tear strength in accordance with EN 681-1:1996, Table 3. This requirement applies to all elastomeric sealing materials. Minimum tear strength: ≥ 20 N
Thermogravimetric analysis 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 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 3.

Table 3 — 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 %

Non-metallic sealing elements for fitting ends for use with gas shall conform to the requirements for elastomeric materials in EN 549 and Table 4 of this European Standard.

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

Test procedures
Ozone resistance testing and requirements in accordance with EN 549:1994, 7.8 and 6.2, Table 3.
Requirement — no cracks
Material identity.
Infrared spectra.
The elastomer and the seal shall meet EN 549:1994, B.2; requirements for infrared spectra.
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.

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 shall be in accordance with Table 5, 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.

4.3.2 Minimum bore area through an 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 5.

Table 5 — 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 %
10	18	35
12		
14	30	45
14,7		50
15		
16		
17		
18		
20		
21	35	55
22		
25		
27,4	45	60
28		
32		
34	55	65
40		
40,5	60	70
50		
53,6		
63		
75		
90		
110		

EXAMPLE

For 15 mm nominal diameter compression end for copper tube with 0,8 mm wall thickness, area of bore = 141,0 mm^2.

Permissible area of bore through an internal support with sealing element (from table) = 30 % $\times$ 141,0 mm^2 = 42,3 mm^2.

Therefore internal diameter of the internal support = 7,3 mm.

Permissible area of bore through an internal support without sealing element (from table)= 50 % $\times$ 141,0 mm^2 = 70,5 mm^2.

Therefore internal diameter of the internal support = 9,5 mm.

4.3.3 Tolerance for the alignment of the fitting ends

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

4.4 Design and manufacture

4.4.1 Press fittings

Fittings for gas applications shall include an internal support.

Internal supports or fittings incorporating fixed internal supports shall be selected for suitability for use with the pipe material and its dimensions.

Internal supports are specific to the type of pipe and to each manufacturer of fittings. They should not be interchanged.

4.4.2 Pipe abutment

Fittings shall be manufactured, usually with an abutment to limit pipe insertion.

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

4.4.3 Surface condition

Fittings shall be clean and free from sharp edges.

4.4.4 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.

5 Testing, assessment and sampling methods

5.1 Type testing

5.1.1 General

Type testing shall be performed once to prove the product design by conformity with the type test requirements in this European Standard.

Further type testing shall be performed when a change has been made to the design, material or process, which may affect the performance characteristics, the type tests shall be repeated for those characteristics.

All sizes of fitting unless otherwise specified, shall be type tested but combinations within a test rig are permissible.

New fittings are required for each test.

Details of type tests and methods applicable to the relevant plastics pipe materials by reference to the plastics pipe system standard are given in Table 6.

Table 6 — Test criteria, depending on application and plastics pipe material, to test pipe joints of metallic fittings with press ends

Description of test	Application and plastics pipe material					
	hot and cold water					
	PE-RT	ML[a]	PE-X	PB	PP	PVC-C
	Relevant plastics pipe systems standard specifying test					
	EN ISO 22391	EN ISO 21003	EN ISO 15875	EN ISO 15876	EN ISO 15874	EN ISO 15877
	Test relevant					
Leak tightness under:						
- internal hydrostatic pressure	yes	yes	yes	yes	yes	yes
- internal pneumatic pressure	no	no	no	no	no	no
- internal hydrostatic pressure whilst subject to bending	yes	yes	yes	yes	yes	yes
Resistance to pull-out	yes	yes	yes	yes	yes	yes
External pressure test	no	no	no	no	no	no
Vacuum	yes	yes	yes	yes	yes	yes
Temperature cycling	yes	yes	yes	yes	yes	yes
Pressure cycling	yes	yes	yes	yes	yes	yes
Stress corrosion	yes	yes	yes	yes	yes	yes

[a] ML = Multilayer

5.1.2 Gas application

For gas applications, in addition the requirements of ISO 17484-1:2006, Table 4 have to be fulfilled.

5.1.3 Preparation of fittings for testing

The fittings to be tested shall be assembled with the relevant pipe, in accordance with the manufacturer's instructions.

The fittings shall be assembled and type tested with pipe as specified by the manufacturer.

Tests on the maximum and minimum wall thickness of pipe cover the range.

Combinations of fitting size within a test rig are permissible. The minimum distance between the fitting under test and each end of the assembly shall be 100 mm.

5.1.4 Test temperature

Tests shall be conducted at a temperature of (23 ± 5) °C unless otherwise stated.

5.2 Resistance to stress corrosion

Fittings manufactured from copper-zinc alloys containing more than 10 % zinc shall be resistant to stress corrosion. When tested in accordance with Table 7, components shall show no evidence of cracking.

Table 7 — Stress corrosion resistance test parameters

Fitting material	Test solution	Number of test pieces per size	Test method
Copper-zinc alloy Zinc >10 %	pH 9,5	1	Annex A

5.3 Factory production control system

5.3.1 General

In order to assure every production batch will meet the requirements of this European Standard, the manufacturer shall operate a quality system that checks at the minimum, on a regular basis, the aspects shown in Table 8 that can vary during production.

Table 8 — List of factory production checks required

Description of check or test	Check required
Dimensions as determined by the manufacturer shall be confirmed on a sampling basis	Measure or gauge to manufacturing drawing
Pressure test for fittings bodies with as-cast microstructure or fabricated by welding or brazing	see 5.3.2
Resistance to dezincification	see 5.3.3

The frequency and number of test pieces is dependent on the manufacturer's quality system.

5.3.2 Integrity of fittings bodies with as-cast microstructure or fabricated by welding or brazing

When tested in accordance with the parameters shown in Table 9, fittings bodies after machining shall give no visual indication of leakage within the pressure zone of the assembled fitting.

Table 9 — Pressure test parameters

Fitting material	Test pressure		Frequency and number of test pieces per size	Test method
	pneumatic	hydrostatic		
Cast or fabricated bodies	(5 ± 0,5) bar	(24 ± 1) bar	see NOTE	Annex B
NOTE 1 The frequency and number of test pieces is dependent on the manufacturer’s quality system. NOTE 2 Other pressure tests of equivalent performance may also be used.				

5.3.3 Resistance to dezincification

Components which are manufactured from alloys containing more than 10 % zinc and which are declared to be resistant to dezincification, shall be capable of meeting the acceptance criteria for resistance to dezincification. When tested in accordance with Annex C/EN ISO 6509:1995, the depth of dezincification, in any direction, shall be:

— for grade A: maximum 200 μm;

— for grade B: mean not to exceed 200 μm and max. 400 μm.

If any of the test pieces fail the dezincification resistance test, further test samples from the same batch shall be selected for re-testing.

If all the further test pieces pass the test, the batch represented shall be deemed to conform to the requirements of this European Standard for dezincification resistance. If any of the further test pieces fail, then the batch represented shall be deemed not to conform to this European Standard.

NOTE The frequency and number of test pieces are dependent on the manufacturer's quality system.

6 Evaluation of conformity

6.1 General

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

— type testing;

— factory production control by the manufacturer, including product assessment.

For the purposes of testing, plumbing fittings may be grouped into families, where it is considered that the selected property/properties is/are common to all the fittings within that family.

6.2 Type testing

6.2.1 General

A type test is the complete set of tests or other procedures, determining the performance of samples of products representative of the product type.

Type testing shall be performed to show conformity with this European Standard.

6.2.2 Requirements and characteristics

All requirements in Clause 4 and in 5.2 shall be subject to type testing. The metallic material characteristics in 4.2.2 and 4.2.3 do not need testing because:

— reaction to fire – copper and copper alloys are class A.1 according to Commission Decision;

— resistance to high temperature – mechanical properties are not reduced significantly at temperatures concerned.

6.2.3 Use of historical data

Tests previously performed on fittings of the same design and dimension in accordance with the provisions of this European Standard (same characteristic(s), test method, sampling procedure, system of attestation of conformity, etc.) may be taken into account.

6.2.4 Further type testing

Whenever a change occurs in the fitting design, the raw material or supplier of the components, or the production process (subject to the definition of a family), which would change significantly one or more of the characteristics, the type tests shall be repeated for the appropriate characteristic(s).

6.3 Sampling, testing and conformity criteria

6.3.1 Sampling

Type testing shall be performed on representative samples of plumbing fittings production.

6.3.2 Testing and conformity criteria

Plumbing fittings shall be tested for conformity to the requirements and characteristics listed in Clauses 4 and 5 in accordance with the relevant test methods.

The results of all type tests shall be recorded and held by the manufacturer for at least five years.

6.4 Factory production control (FPC)

6.4.1 General

The manufacturer of the fitting shall establish, document and maintain an FPC system to ensure that the products placed on the market conform to the declared performance characteristics. The FPC system shall consist of written procedures (works' manual), regular inspections and tests and/or assessments and the use of the results to control raw and other incoming materials, equipment, the production process and the product.

All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures. This production control system documentation shall ensure a common understanding of conformity evaluation and enable the achievement of the required component characteristics and checking the effective operation of the production control system.

Factory production control therefore brings together operational techniques and all measures allowing maintenance and control of the conformity of the component with its technical specifications. Its implementation may be achieved by controls and tests on measuring equipment, raw materials and constituents, processes, machines and manufacturing equipment and finished components, including material properties in components, and by making use of the results thus obtained.

The FPC system may be part of a Quality Management system, e.g. in accordance with EN ISO 9001:2008.

The manufacturer shall establish procedures to ensure that the production tolerances allow for the plumbing fittings' performances to be in conformity with the declared values derived from type testing.

The requirements and characteristics, and the means of verification, are given or indicated in Clause 4, in 5.3 and Annexes B and C, and the minimum frequency of testing is given by the manufacturer's quality system.

The manufacturer shall record the results of the tests specified above. These records shall at least include the following information:

— identification of the plumbing fittings tested;

— the date of testing;

— the test results.

The results of inspections, tests or assessments requiring action shall be recorded, as shall any action taken. The action to be taken when control values or criteria are not met shall be recorded and retained for the period specified in the manufacturer's FPC procedures.

6.4.2 Personnel

The responsibility, authority and the relationship between personnel that manages, performs or verifies work affecting product conformity, shall be defined. This applies in particular to personnel that need to initiate

actions preventing product non-conformities from occurring, actions in case of non-conformities and to identify and register product conformity problems.

6.4.3 Equipment

All weighing, measuring and testing equipment necessary to achieve, or produce evidence of, conformity shall be calibrated or verified and regularly inspected according to documented procedures, frequencies and criteria.

All equipment used in the manufacturing process shall be regularly inspected and maintained to ensure use, wear or failure does not cause inconsistency in the manufacturing process.

Inspections and maintenance shall be carried out and recorded in accordance with the manufacturer's written procedures and the records retained for the period defined in the manufacturer's FPC procedures.

6.4.4 Raw materials and components

The specifications of all incoming raw materials and components shall be documented, as shall the inspection scheme for ensuring their conformity.

6.4.5 In-process control

The manufacturer shall plan and carry out production under controlled conditions.

6.4.6 Traceability and marking

Batches or packages of plumbing fittings shall be identifiable and traceable with regards to their production origin. The manufacturer shall have written procedures ensuring that processes related to affixing traceability codes and/or markings (see Clause 8) are inspected regularly.

6.4.7 Non-conforming products

The manufacturer shall have written procedures, which specify how non-conforming products shall be dealt with. Any such events shall be recorded as they occur and these records shall be kept for the period defined in the manufacturer's written procedures.

6.4.8 Corrective action

The manufacturer shall have documented procedures that instigate action to eliminate the cause of non-conformities in order to prevent recurrence. Compliance with EN ISO 9001:2008, 8.5.2 is deemed to satisfy the requirements of this clause.

6.4.9 Handling, storage, packaging

The manufacturer shall have written procedures providing methods of product handling and shall provide suitable storage areas preventing damage or deterioration.

7 Classification and designation

Fittings shall be designated by quoting:

a) common term or manufacturer's catalogue number (see note below);

b) number and part of this European Standard (EN 1254-8);

c) size of the connecting ends by the nominal outside diameter of the connecting pipe or, in the case of fittings incorporating threaded connections in accordance with EN 1254-4 or other standards, by the thread designation (see paragraph below for sequence of specifying ends);

d) the specification of the plastics pipe with which the fitting is intended to be used;

e) without abutment, if applicable;

f) if required, the grade of dezincification resistance acceptance criteria;

g) if required, the type of plating or coating.

NOTE Fittings are normally designated either by a manufacturer's catalogue number or by the common terms, coupling, bend, elbow, tee, etc.

The preferred sequence a) for specifying ends is run-branch-run-branch (omitting where necessary for tees). The non-preferred sequence b) is run-run-branch-branch (omitting where necessary for tees). Ordering details should state if the non-preferred sequence system was used.

For fittings with equal ends, the nominal size can be specified by the one diameter. For fittings with unequal ends, the largest size should be quoted first. For adaptor fittings, the ends are specified in the same order, but the largest end of the run should be quoted first.

8 Marking

8.1 General

Each fitting shall be legibly and permanently marked, at the minimum, with the following:

— manufacturer's identity symbol.

If it is practicable, each fitting should be legibly and durably marked with the nominal diameter, otherwise it should be on the label or packaging.

The manufacturer has the option to mark the number and part of this European Standard on either the packaging or the fitting.

8.2 Dezincification resistant copper-zinc alloys

When national regulatory requirements demand, components manufactured from dezincification resistant copper-zinc alloys and capable of meeting the requirements of 5.3.3 shall be legibly and durably marked in accordance with either a) or b), as follows:

a) for grade A material, use symbol ŒRor characters DRA;

b) for grade B material, use characters DRB.

9 Documentation

9.1 Declaration of conformity

When national regulatory requirements demand, or when requested by the purchaser, the supplier shall give a written declaration in accordance with EN 1655 that the push fitting connections fulfil the requirements of this European Standard.

9.2 User instructions

User instructions shall be available from the manufacturer.

Annex A
(normative)

Resistance to stress corrosion

A.1 Introduction

ISO 6957 specifies a method for the determination of resistance to stress corrosion using ammonia.

The principle of the method, the reagents, materials and apparatus required and the procedure for the selection and preparation of the test pieces, are all in accordance with ISO 6957.

A.2 Test piece

Test pieces shall be complete fittings incorporating all components and shall be assembled to any relevant pipe with the joints made.

A.3 Procedure

Fittings shall be tested in accordance with the procedure stated in ISO 6957:1988, Clause 8 using a test solution of pH 9,5 but without prior pickling.

A.4 Test report

The test report shall make reference to this European Standard, the test date, the pH value of the solution used, the exposure temperature, the number of replicated samples, and the test result – cracks or no cracks.

Annex B
(normative)

Pressure test for fitting bodies with as cast microstructure or fabricated by welding or brazing

B.1 Introduction

This annex specifies the test method for determining the resistance of bodies with as cast microstructure or fabricated by welding or brazing to internal pressure.

B.2 Principle

The test pieces are subjected to a specified internal pressure either pneumatic whilst the fittings are entirely immersed in water or a hydrostatic water pressure for a specified period of time.

B.3 Apparatus

B.3.1 Pressure measurement device, capable of checking the conformity to the specified test pressure. In the case of gauges or similar calibrated pressure measurement devices, the range of the gauge shall be such that the required pressure setting shall lie within the calibrated range of the device used.

NOTE The use of master gauges for calibration of the apparatus is recommended.

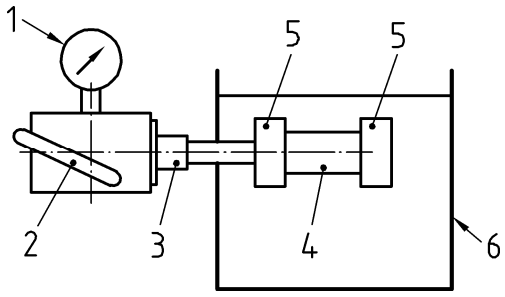
B.3.2 Pressurizing device, capable of applying and maintaining the required pressure as stated in Table 8 for the duration of the test.

B.3.3 Pressure connection, capable of connecting the pressurizing device to the test piece and remaining leaktight for the duration of the test.

B.4 Test piece

The test piece shall consist of the fitting to be tested, which has been machined and is not assembled to any other component.

The test piece and apparatus shall be arranged as shown schematically in Figure B.1.



Key
1 pressure measurement device
2 pressurizing device
3 connection device
4 fitting under test
5 end sealing device
6 tank for pneumatic test

Figure B.1 — Typical arrangement of apparatus for internal pressure test of fitting bodies with as cast microstructure or fabricated by welding or brazing

B.5 Procedure

Apply an internal pressure of either:

a) pneumatic pressure as specified in Table 9 for a duration of 5 s, or

b) hydrostatic pressure as specified in Table 9 for a duration of 5 min, or

c) to any other pressure test of equivalent performance.

Inspect the fitting for leaks for the duration of the test.

Annex C
(normative)

Determination of mean depth of dezincification

C.1 Introduction

EN ISO 6509 specifies a method for the determination of the maximum depth of dezincification of a brass specimen. In accordance with the ruling given in EN ISO 6509:1995, 7.5.3 the following procedure extends the method to cover the determination of the mean depth of dezincification, in order to verify conformity to the dezincification resistance acceptance criteria for dezincification alloy grade B products.

The principle of the method, the reagents, materials and apparatus required and the procedure for the selection and preparation of the test pieces, are all in accordance with EN ISO 6509.

C.2 Procedure

Having determined the maximum depth of dezincification in a longitudinal direction, in accordance with EN ISO 6509:1995, Clause 7 (see 5.3.3), carry out the following operations to determine the mean depth of dezincification.

Adjust the magnification of the microscope to suit the general depth of dezincification and use the same magnification for all measurements. Examine the entire length of the section for evaluation, in contiguous visual fields of the microscope.

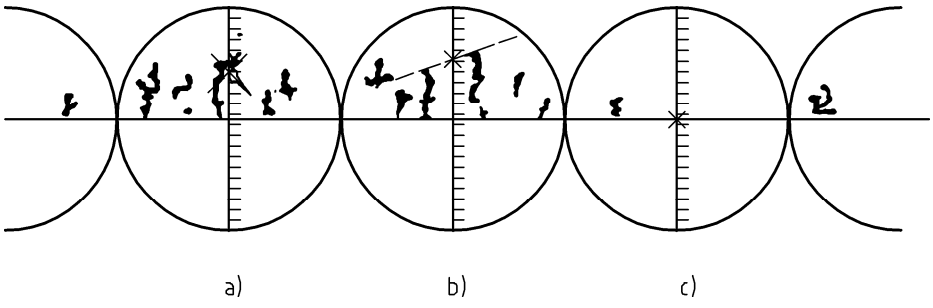
To ensure the best accuracy of measurement, the largest number of contiguous fields at the greatest possible magnification should be measured.

Using the measuring scale incorporated in the microscope, measure and record the dezincification depth, i.e. the point of intersection of the scale and the dezincification front [see Figure C.1 a)], for each contiguous field. If the scale lies between two dezincified areas within the visual field, the dezincification depth shall be recorded as the point of intersection of the scale and an imaginary line joining the extremities of the two dezincification fronts adjacent to the scale [see Figure C.1 b)].

If there is no evidence of dezincification in the field examined, or only one dezincified area which does not intersect the scale, then record the dezincification depth of that field as zero [see Figure C.1 c)].

C.3 Expression of results

After measurement of all the contiguous fields along the entire length of the section for evaluation, calculate and report the mean dezincification depth as the sum of the measured depths for every field, divided by the number of contiguous fields examined.



NOTE The locations for the measurement of dezincification depth, in three different cases, are marked X.

Figure C.1 — Example of contiguous fields

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