



BSI Standards Publication

Threaded pipe fittings in malleable cast iron

National foreword

This British Standard is the UK implementation of EN 10242:2025. It supersedes BS EN 10242:1995 and BS 143 and 1256:2000, which are withdrawn.

The UK participation in its preparation was entrusted to Technical Committee ISE/110, Steel Tubes, and Iron and Steel Fittings.

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

BSI, as a member of CEN, is obliged to publish EN 10242:2023 as a British Standard and to withdraw any conflicting national standards. The UK committee would like to draw users' attention to the fact that most of the UK-specific requirements in BS 143 and 1256:2000 for malleable cast iron fittings are now included in BS EN 10242:2023; in particular, those pertaining to:

- joining threads complying with EN 10226-2 (taper external threads and taper internal threads);
- designation method B (but only for order processing and if agreed between purchaser and manufacturer); and
- UK-specific sizes.

UK users are encouraged to read the requirements for threaded pipe fittings in cast copper alloy found in BS EN 1254-4:2021, *Copper and copper alloys — Plumbing fittings — Part 4: Threaded fittings*.

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Date	Text affected
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English Version

Threaded pipe fittings in malleable cast iron

Raccords de tuyauterie filetés en fonte malléable

Gewindefittings aus Temperguss

This European Standard was approved by CEN on 17 November 2025.

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European foreword

This document (EN 10242:2025) has been prepared by Technical Committee CEN/TC 459 “ECISS - European Committee for Iron and Steel Standardization”¹, the Secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by June 2026 and conflicting national standards shall be withdrawn at the latest by June 2026.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 10242:1994.

This document includes the following significant technical changes with respect to EN 10242:1994:

- normative references have been updated;
- additional fittings types used in UK have been introduced in Table 1;
- terms and definitions under Clause 3 have been revised;
- requirements for hot dip galvanizing under 6.2.1 have been changed, and the chemical composition with regard to dangerous substances under 6.2.2 has been adjusted;
- malleable cast iron grades in 5.2.1 have been reduced and therefore the number of Design Symbols in Table 2 has been reduced;
- new subclause 8.5 “Reaction to fire” has been added;
- change from ISO to EN requirements in 12.3 has been made;
- Method B for designation has been moved to a note under 13.2;
- Clause 12 has become subclause 12.8.1 and has been updated;
- additional types and sizes used in UK have been introduced in the tables in Clause 15.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

¹ Through its sub-committee CEN/TC 459/SC 10 “Steel tubes, and iron and steel fittings” (secretariat: UNI).

1 Scope

This document specifies the requirements for the design and performance of threaded pipe fittings in malleable cast iron with black or hot dip galvanized surface.

These fittings are for general purposes for the transmission of fluids and gases up to the limits of operating pressure and operating temperature specified in this document. They are intended for the connection of elements threaded with sizes 1/8 to 6 (DN 6 to DN 150).

Fittings with alternative permanent coatings or permanent coatings on top of hot dip galvanizing do not fall under the scope of this document.

NOTE One main use is for the connection of non-alloy steel tubes according to EN 10255 and with support of the thread joint by using sealing materials according to the EN 751 series.

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 1562, *Founding — Malleable cast irons*

EN 10204, *Metallic products — Types of inspection documents*

EN 10216-1, *Seamless steel tubes for pressure purposes — Technical delivery conditions — Part 1: Non-alloy steel tubes with specified room temperature properties*

EN 10216-2, *Seamless steel tubes for pressure purposes — Technical delivery conditions — Part 2: Non-alloy and alloy steel tubes with specified elevated temperature properties*

EN 10217-1, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 1: Electric welded and submerged arc welded non-alloy steel tubes with specified room temperature properties*

EN 10217-2, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 2: Electric welded non-alloy and alloy steel tubes with specified elevated temperature properties*

EN 10226-1, *Pipe threads where pressure tight joints are made on the threads — Part 1: Taper external threads and parallel internal threads — Dimensions, tolerances and designation*

EN 10226-2, *Pipe threads where pressure tight joints are made on the threads — Part 2: Taper external threads and taper internal threads — Dimensions, tolerances and designation*

EN 10255, *Non-Alloy steel tubes suitable for welding and threading — Technical delivery conditions*

EN ISO 228-1, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation (ISO 228-1)*

EN ISO 1460, *Metallic coatings — Hot dip galvanized coatings on ferrous materials — Gravimetric determination of the mass per unit area (ISO 1460)*

EN ISO 2178, *Non-magnetic coatings on magnetic substrates — Measurement of coating thickness — Magnetic method (ISO 2178)*

EN ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature (ISO 6892-1)*

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

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

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

3.1 fitting

connecting piece for pipes and other piping accessories, consisting of one or more parts

3.2 jointing thread

thread complying with EN 10226-1 or EN 10226-2

3.3 fastening thread

thread complying with EN ISO 228-1

3.4 fitting size

nominal size of the connecting (steel) pipe(s)

Note 1 to entry: See also 8.1.

3.5 designation of thread size

size designation of the thread in inch according to EN 10226-1 or EN 10226-2

3.6 nominal size DN

alphanumeric designation of size for components of a pipework system, which is used for reference purposes

Note 1 to entry: See EN ISO 6708.

Note 2 to entry: It comprises the letters DN followed by a dimensionless whole number which is indirectly related to the physical size, in millimetres, of the bore or outside diameter of the end connections.

Note 3 to entry: Nominal size (DN) should not be used for the designation of fitting size.

Note 4 to entry: The relationship between fitting size and nominal size (DN) is given in Table 3 for information.

3.7**reinforcement**

additional material on the outside diameter of an internally threaded fitting

EXAMPLE Examples for reinforcements are shown in Figure 1.

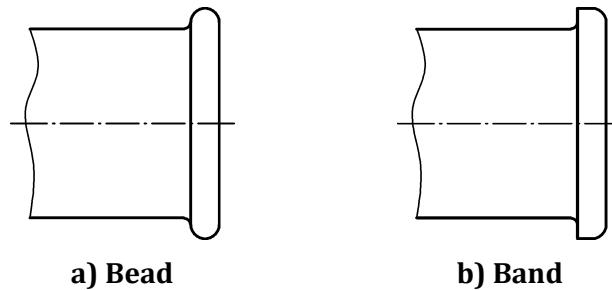


Figure 1 — Forms of reinforcement

3.8**rib**

local and axially aligned additional material on the outside or inside of a fitting for assistance in assembly or manufacturing

3.9**outlet**

end of a fitting for the purpose of connection with a pipe or other piping accessories

3.10**run**

two principal axially aligned outlets of a tee or cross

3.11**branch**

side outlet(s) of a tee or cross

3.12**chamfer**

removal of a conical portion at the entrance of a thread to assist assembly and prevent damage to the start of the thread

3.13**face-to-face dimension**

distance between the two parallel faces of axially aligned outlets of a fitting

3.14**face-to-centre dimension**

distance between the face of an outlet and the central axis of an angularly disposed outlet

3.15**laying length**

average distance from the assembled pipe end to the axis of the fitting, or between the ends of two assembled pipes

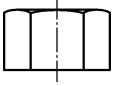
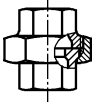
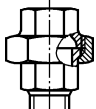
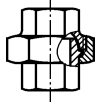
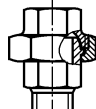
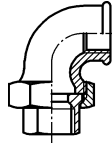
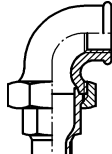
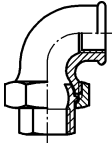
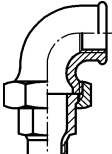
Note 1 to entry: See also 8.3.

4 Types of fittings

Table 1 gives an index to the fitting types, patterns and symbols. The symbols allow the identification of fittings and shall be used for designation (see 13.1).

Table 1 — Index of fitting types, symbols and index to tables and patterns

Types	Patterns					
Symbols	A1		A1/45°	A4		A4/45°
A Elbows						
	Table 9	Table 10	Table 11	Table 9	Table 10	Table 11
Symbols	B1					B4
B Tees						
	Table 9	Table 12	Table 12	Table 13	Table 13	Table 9
Symbols	C1					
C Crosses						
	Table 9	Table 14				
Symbols	D1	D4	D8			
D Short bends						
	Table 15	Table 15	Table 15			
Symbols	E1				E2	
E Pitcher tees Twin elbows						
	Table 15	Table 16	Table 16	Table 16	Table 15	Table 17
Symbols	G1	G1/45°	G4	G4/45°	G8	
G Long sweep bends						
	Table 18	Table 19	Table 18	Table 19	Table 18	

Types	Patterns				
Symbols	M2		M4		M3
M Sockets					
	Table 20	Table 20	Table 21	Table 21	Table 20
Symbols	N4		N8		
N Bushings Hexagon nipples					
	Table 22	Table 22	Table 22	Table 23	Table 23
Symbols	P4				
P Backnut					
	Table 24				
Symbols	T1		T8	T9	T11
T Caps Plugs					
	Table 25	Table 25	Table 25	Table 25	
Symbols	U1	U2	U11	U12	
U Unions					
	Table 26	Table 26	Table 26	Table 26	
Symbols	UA1	UA2	UA11	UA12	
UA Union elbows					
	Table 27	Table 27	Table 27	Table 27	
Symbols	Za1	Za2			
Za Side outlet elbows and tees					
	Table 9	Table 9			

5 Materials

5.1 General

All materials of fitting body and components shall be resistant against the medium of the respective application.

NOTE In case of potable water, national hygienic requirements apply.

No component of the fitting shall show any signs of damage, pitting, bubbles, sand, blisters, inclusions or cracks to an extent that would prevent compliance with this document. They shall not be treated to cover such defects. The sealing surfaces shall be free of all scratches, blisters or cracks that might affect the leak tightness of the assembled joint.

5.2 Material of the fitting

5.2.1 Malleable cast iron

The material used shall be malleable cast iron conforming to EN 1562. The grade of material used shall be selected from the following grades (see Clause 7):

- grade EN-GJMW-400-5 for fittings in whiteheart malleable cast iron;
- grade EN-GJMB-350-10 for fittings in blackheart malleable cast iron.

5.2.2 Other ferrous materials

Despite this requirement, any other ferrous materials which give mechanical properties at least equivalent to those malleable cast irons specified in EN 1562, shall be considered in compliance with this document for straight fittings not larger than 3/8, but excluding unions.

6 Corrosion protection

6.1 General

In applications where materials can be exposed to corrosion, the components shall be adequately protected as specified in 6.2.

6.2 Hot dip galvanizing

6.2.1 General

Where a protection by zinc coating is required, the zinc coating shall be applied by the hot dip galvanizing process and shall meet the following requirements.

Fittings with alternative permanent coatings or permanent coatings on top of hot dip galvanizing don't fall under the scope of this document.

For fittings supplied in other ferrous materials (such as carbon steel, see 5.2.2), an alternative zinc coating may be provided by agreement with the purchaser.

6.2.2 Chemical composition of the hot dip zinc coating

The content by mass of the accompanying elements in the finished zinc coating shall not exceed the following maximum values:

antimony	(Sb)	0,01 %
arsenic	(As)	0,02 %
bismuth	(Bi)	0,01 %
cadmium	(Cd)	0,01 %
lead	(Pb)	0,1 %

NOTE The chemical composition is restricted with regard to the limitation of dangerous substances also in respect to potable water applications. When fittings are used in potable water applications, relevant national hygienic regulations apply.

6.2.3 Coating mass per surface unit and layer thickness

The surface related mass of the zinc coating shall not be less than 500 g/m², which equals to a layer thickness of 70 µm. These limits refer to the average of 5 fittings with 10 measurements each, statistically distributed across the fitting. The layer mass/thickness measured on an individual sample shall not be less than 450 g/m² (63 µm).

The medium layer thickness $\bar{s}$ of the zinc coating in µm shall be calculated by using the approximation formula

$$\bar{s} = \frac{m_A}{7,2}$$

where

m_A is the surface related mass of the zinc coating in g/m².

6.2.4 Surface condition of the hot dip zinc coating

The internal zinc coating shall be continuous, with the exception of the machined black surfaces, and free from zinc blisters, zinc burrs or non-metallic additions. In the case of larger diameter items, iron-zinc alloy phases, leading to a dull grey finish, may be present, but this will not affect the degree of protection provided.

6.3 Dangerous substances

6.3.1 General

For the use of fittings produced in accordance with this document, national regulations with regard to dangerous substances can apply.

6.3.2 Hot dip zinc coating

The chemical composition of the hot dip zinc coating shall not exceed the limits given in 6.2.2.

6.3.3 Despatch conditions of finished fittings

The surfaces of the fittings shall be free of polycyclic aromatic hydrocarbons.

7 Design

7.1 General

The fittings are compatible with tubes according to EN 10255, EN 10216-1, EN 10216-2, EN 10217-1 and EN 10217-2.

The minimum wall thickness of the tube for thread cutting, given by EN 10255 shall be considered.

7.2 Design characteristic

Fittings shall be identified by the design symbol according to the selected material (see 5.2.1), the choice of thread (see 9.1.1) and the type of reinforcement, if applicable, as given in Table 2.

Table 2 — Design symbol

Design symbol	Thread type		Material grade	Reinforcement of internally threaded ends
	external	internal		
A	R	Rp	EN-GJMW-400-5 or EN-GJMB-350-10	Bead, see Figure 1a)
C	R	Rc	EN-GJMW-400-5 or EN-GJMB-350-10	Band, see Figure 1b)
NOTE Design symbols B and D have been removed during the latest revision.				

The drawings in Table 9 to Table 27 are schematic, without prejudice to the manufactured form.

Dimensionally standardized types and fitting sizes are shown in Table 9 to Table 27.

The dimensions of the gaskets for flat seat unions are specified in Table 28.

Fittings shall be reinforced at the internally threaded ends, except where they are polygonal in shape to allow for spanner flats, or where fittings have side outlets (type Za1 and Za2).

Manufacturers may incorporate ribs at their discretion. Ribs shall not project higher than the reinforcement.

Backnuts may be plain or recessed and one face may be machined.

Table 26 and Table 27 show two typical types of seats of unions and their designation. Other types of seat design and seat material shall be considered as complying with this document, if they meet the dimensions specified in Table 26 and Table 27 and the requirements of this document. Such unions do not have a specific designation according to this document.

8 Dimensions and tolerances

8.1 Relationship between fitting size and nominal size (DN)

The relationship between designation of the fitting size (equal to thread size) and nominal diameter (DN) is given in Table 3 for guidance only.

Table 3 — Fitting size and nominal diameter

Designation of thread size/fitting size	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6
Nominal size, DN	6	8	10	15	20	25	32	40	50	65	80	100	125	150

8.2 Tolerance of the dimensions

Fittings shall have the appropriate dimensions given in Table 9 to Table 27. Where maximum or minimum dimensions are not specified, the tolerances for the face-to-face and face-to-centre dimensions shall be as given in Table 4. The face-to-face and face-to-centre dimensions of unions may exceed the tolerance given due to the compound effect of piece tolerances upon the final assembly.

NOTE 1 Fitting sizes shown in brackets are optional sizes.

NOTE 2 The face-to-face and face-to-centre dimensions of unions can exceed the tolerance given due to the compound effect of piece tolerances upon the final assembly.

Table 4 — Tolerance on length

Dimensions in millimetres

Fitting measurement ^a	Tolerance
≤ 30	±1,5
> 30 ≤ 50	±2,0
> 50 ≤ 75	±2,5
> 75 ≤ 100	±3,0
> 100 ≤ 150	±3,5
> 150 ≤ 200	±4,0
> 200	±5,0
^a Measurements according to Table 9 to Table 27.	

8.3 Lengths of engagement

Laying lengths are given for assistance and guidance during installation. Their accuracy is dependent upon the tolerances given in 8.2 and on the tolerance of the threads specified in 9.1. The dimensions *z* given in Table 9 to Table 27 are the average distance from the pipe end to the axis of the fitting (see Figure 2) or the distance from pipe end to pipe end (see Figure 3).

These laying lengths are calculated by deducting average lengths of engagement from the face-to-face or face-to-centre dimensions given in the tables. The average lengths of engagement are rounded from the dimensions of the threads specified in 9.1.1 and are given in Table 5.

Table 5 — Lengths of engagement

Designation of thread size	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6
Length of engagement, mm	7	10	10	13	15	17	19	19	24	27	30	36	40	40