

© British Standards Institution. No part of this publication may be photocopied or otherwise reproduced without the prior permission in writing of BSI

British Standard Specification for Malleable cast iron and cast copper alloy threaded pipe fittings

Raccords de tuyauteries filetés en fonte malléable et alliages de cuivre moulés — Spécifications

Rohrverschraubungen aus Temperguß und Kupfer-Gußlegierung

Foreword

This British Standard has been prepared under the direction of the Piping Systems Components Standards Committee. This standard constitutes a revision of BS 143 and BS 1256: 1968 which is withdrawn.

The standard for malleable cast iron fittings was originally published in 1922 as BS 143 and complemented BS 154 for malleable and soft cast iron fittings. These standards were revised in 1938 and combined into one standard, BS 143. In 1945, BS 1256 was published for fittings with parallel internal threads and taper external threads, and both BS 143 and BS 1256 were again revised in 1952. In 1968, the two standards were revised and incorporated into one standard BS 143 and BS 1256. This combined standard was aligned as far as possible with ISO R 49 'Malleable cast iron fittings screwed in accordance with ISO Recommendation R 7', published by the International Organization for Standardization (ISO) in 1957, but certain fittings which could not be aligned were retained in their previous format, or not included in the British Standard.

This revision of BS 143 and BS 1256 is related to and follows the general format of ISO 49 'Malleable cast iron fittings threaded to ISO 7/1', published by ISO in 1983.

Not all fittings specified in this standard are in regular production in the United Kingdom. Reference should be made to the manufacturer for details of fittings available. A future revision of this standard will align the scope of the fittings sizes specified with those in regular production in the United Kingdom.

The main differences in this revision are the inclusion of bushes, backnuts, unions and certain types of sockets, plugs and caps previously specified in ISO R 49. The fittings have been updated, additional technical requirements and definitions have been included, and provision for BS 1256 design fittings in blackheart malleable iron has been made. The range of fittings specified has been reduced to align with the current production of UK manufacturers, and is published in metric dimensions only. This standard gives details of sizes and types of fittings in general demand, but is equally applicable to basically similar types of fittings deleted from earlier editions of BS 143 and BS 1256.

All drawings in this standard are diagrammatic without prejudice to the manufacturer's form.

Appendix A lists information to be supplied by the purchaser.

Compliance with a British Standard does not of itself confer immunity from legal obligations.



Contents

	Page		Page
Foreword	Inside front cover	11 45° elbows A1/45°, 45° male and female elbows A4/45°	10
Committees responsible	Back cover	12 Tees, reducing on the branch B1, tees, increasing on the branch B1	11
Specification		13 Tees, reducing on the run and the branch B1, tees, reducing on the run and equal on the branch B1	12
1 Scope	2	14 Bends D1, male and female bends D4, male bends D8, pitcher tees E1, twin elbows E2	13
2 Definitions	2	15 45° male and female bends D4/45°	13
3 Types of fittings and symbols	2	16 Pitcher tees, reducing on the branch E1, pitcher tees, reducing on the run E1, pitcher tees, reducing on the branch and run E1	14
4 Designation of fitting size	2	17 Long sweep bends G1, male and female long sweep bends G4	15
5 Size range	6	18 Return bends Kb1	15
6 Pressure/temperature ratings	6	19 Sockets M2, sockets, reducing M2, sockets, eccentric, reducing M3, male and female sockets, reducing M4	16
7 Dimensions and tolerances	6	20 Bushes N4	17
8 Threads	7	21 Hexagon nipples N8, hexagon nipples reducing N8	18
9 Materials	7	22 Backnuts P4	18
10 Design	7	23 Hexagon caps T1, round caps T2, plain plugs T8, beaded plugs T9, countersunk plugs T11, and alternative slotted head plugs for sizes 5 and 6	19
11 Testing and inspection	8	24 Unions flat seat U1, unions, taper seat U11, male and female unions, taper seat U12	20
12 Test certificate	8	25 Elbow unions, taper seat UA11, male and female elbow unions, taper seat UA12	20
13 Marking	8	26 Gaskets for unions flat seat U1	21
Appendices		27 Thread designation and nominal size (DN)	22
A Information to be supplied by the purchaser	22	Figures	
B Relationship between fitting size and nominal size (DN)	22	1 Method of specifying outlets of fittings having more than two outlets	2
C Effect of non-metallic materials on water quality	22	2 Forms of reinforcement	8
Tables			
1 Index of fitting types, symbols and index to tables	3		
2 Pressure/temperature ratings	6		
3 Minimum wall thickness	6		
4 Minimum dimensions of reinforcement	6		
5 Minimum depth of spanner flats	6		
6 Tolerance on length	7		
7 Jointing threads	7		
8 Design test pressures	7		
9 Elbows A1, male and female elbows A4, tees B1 and crosses C1	9		
10 Elbows, reducing A1, male and female elbows, reducing A4	9		



Specification

1 Scope

BS 143 & 1256: 1986

This British Standard specifies requirements for the design and performance of various fitting sizes and types which are not included in BS EN 10242. In addition, requirements for the design and performance of cast copper alloy pipe fittings are specified. Two basic designs of fittings are covered:

- (a) BS 143 having *taper external* and *taper internal* threads in malleable cast iron and cast copper alloy;
- (b) BS 1256 having *taper external* and *parallel internal* threads in malleable cast iron only.

The fittings are for general purposes for the transmission of fluids within the pressure and temperature ranges specified.

Fittings have dimensions that are not specified in this standard and requirements for these are outside the scope of this standard.

NOTE 1. Reference should be made to BS EN 10242 for those malleable cast iron pipe fittings not covered by this standard.

NOTE 2 The titles of publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this British Standard the following definitions apply:

2.1 fitting. A connecting piece, of one or more parts.

2.2 fitting size. The size of thread with which the fitting has been furnished (see clause 4 for fittings having more than one thread size).

2.3 nominal size (DN). A numerical designation of size that is common to all components in a piping system other than components designated by outside diameters or by thread size. It is a convenient round number for reference purposes and is only loosely related to manufacturing dimensions.

NOTE 1. Nominal size is designated by the letters DN followed by the appropriate number.

NOTE 2. This definition is identical to ISO 6708.

NOTE 3. The relationship between fitting size and nominal size (DN) is given in appendix B for guidance only.

NOTE 4. Nominal size (DN) should not be used for the designation of fitting size.

2.4 fastening thread. A thread for fittings (or parts of a fitting) requiring simple mechanical assembly.

2.5 jointing thread. A thread for fittings requiring simple mechanical assembly plus pressure tightness through the mating of the threads, with or without the use of thread sealants.

2.6 chamfer. Machined or cast surface in the form of a cone at the entrance of a thread to assist assembly and prevent damage to the start of the thread.

2.7 reinforcement. Additional material on the outside diameter of an internally threaded fitting in the form of a band or bead.

2.8 rib. Local and axially aligned additional material on the outside or inside of a fitting for assistance in manufacturing or assembly.

2.9 outlet. Internally or externally threaded end of a fitting, that connects with a tube, fitting or other component.

2.10 run. Two principal axially aligned outlets of fittings having more than two outlets.

2.11 branch. Side outlet(s) of a tee, pitcher tee or cross.

2.12 face-to-face dimension. The distance between the two parallel faces of axially aligned outlets of a fitting.

2.13 face-to-centre dimension. The distance between the face of an outlet and the central axis of an angularly disposed outlet.

2.14 centre-to-centre dimension. The distance between the axes of the two outlets of a return bend.

3 Types of fittings and symbols

Details of fittings specified in this standard, together with an index to table references, are given in table 1. Table 1 also gives the symbols for each type of fitting.

4 Designation of fitting size

4.1 Fitting size

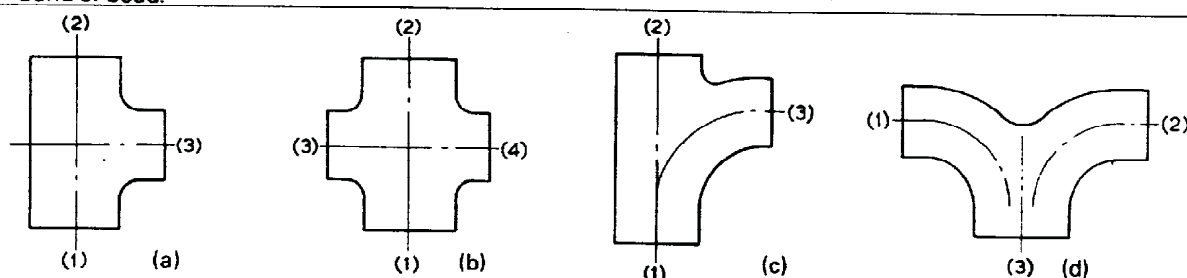
4.1.1 Equal fittings. Equal fittings where all outlets are the same size shall be specified by that one size, irrespective of the number of outlets. (See figure 1.)

4.1.2 Unequal fittings. Unequal fittings shall be specified by the sizes of each outlet, the sequence being dependent upon the number of outlets, as follows:

(a) for fittings having two outlets: the larger outlet shall be specified first;

(b) for fittings having more than two outlets: these shall be specified in accordance with the sequence given in figure 1, e.g. a female reducing tee, type B1 having thread sizes of 1 1/2 for outlet (1), 1 for outlet (2) and 1 1/2 for outlet (3) shall have the fitting size designation of '1 1/2 x 1 x 1 1/2';

(c) tees type B1 and pitcher tees type E1 with equal outlets on the run and an increasing or reducing outlet on the branch shall be specified by stating the size of the run followed by the size of the branch, e.g. a female reducing tee type B1 having thread sizes of 1 1/2 for outlet (1), 1 1/2 for outlet (2) and 1 for outlet (3) shall have the fitting size designation of '1 1/2 x 1'.



NOTE. The method of specifying outlets is in accordance with method (b) in ISO 49.

Figure 1. Method of specifying outlets of fittings having more than two outlets

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

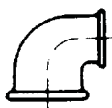
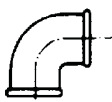
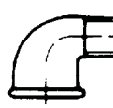
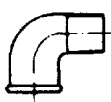
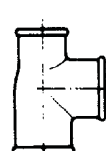
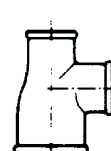
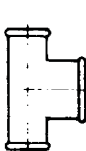
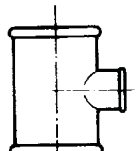
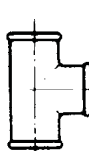
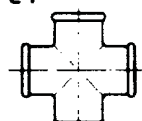
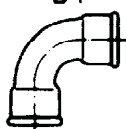
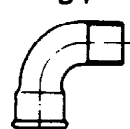
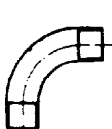
Type	Description	Symbol			
A	Elbows	A1 		A4 	
	Outlets	Female-equal	Female-reducing	Male and female-equal	Male and female-reducing
	Table no.	9	10	9	10
A	45° elbows	A1/45° 		A4/45° 	
	Outlets	Female-equal		Male and female-equal	
	Table no.	11		11	
B	Tees	B1 			
	Outlets	Female-equal	Female-reducing	Female-increasing	Female-reducing
	Table no.	9	12	12	13
C	Crosses	C1 			
	Outlets	Female-equal			
	Table no.	9			
D	Bends	D1 	D4 	D8 	
	Outlets	Female-equal	Male and female-equal	Male-equal	
	Table no.	14	14	14	
D	45° bends	D4/45° 			
	Outlets	Male and female-equal			
	Table no.	15			

Table 1. (continued)

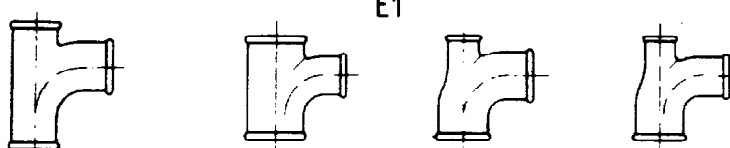
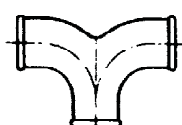
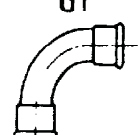
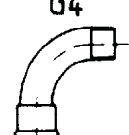
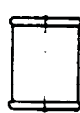
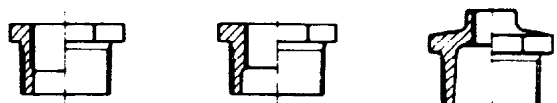
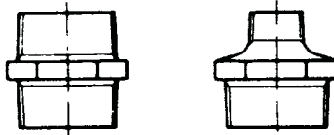
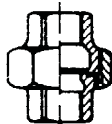
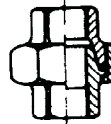
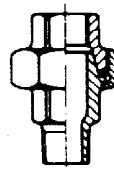
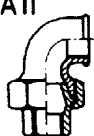
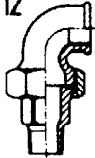
Type	Description	Symbol			
E	Pitcher tees	E1 			
	Outlets	Female-equal	Female-reducing		
	Table no.	14	16		
E	Twin elbows	E2 			
	Outlets	Female-equal			
	Table no.	14			
G	Long sweep bends	G1 	G4 		
	Outlets	Female-equal	Male and female equal		
	Table no.	17	17		
Kb	Return bends	Kb1 			
	Outlets	Female-equal			
	Table no.	18			
M	Sockets	M2 		M3 	M4 
	Outlets	Female-equal	Female-reducing	Female-reducing	Male and female-reducing
	Table no.	19	19	19	19
N	Bushes	N4 			
	Pattern	I	II	III	
	Table no.	20	20	20	

Table 1. (concluded)

Type	Description	Symbol		
N	Hexagon nipples	N8 		
		Outlets	Male-equal	Male-reducing
	Table no.	21	21	
P	Backnuts	P4 		
	Table no.	22		
T	Caps	T1 	T2 	
		Pattern	Hexagon	Round
	Table no.	23	23	
T	Plugs	T8 	T9 	T11 
		Pattern	Plain	Beaded
	Table no.	23	23	23
U	Unions	U1 	U11 	U12 
		Ends-pattern	Female-flat seat	Female-taper seat
	Table no.	24	24	24
UA	Elbow unions	UA11 	UA12 	
		Ends-Pattern	Female-taper seat	Male and female-taper seat
	Table no.	25	25	

5. Size range

The fitting size shall be specified by the thread size(s) of the outlet(s) and shall be selected from the following range:

(a) for malleable cast iron: 1/8, 1/4, 1/2, 3/4, 3/8, 1, 1 $\frac{1}{4}$, 1 $\frac{1}{2}$, 2, 2 $\frac{1}{2}$, 3, 4, 5, 6;

(b) for cast copper alloy: 1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 $\frac{1}{4}$, 1 $\frac{1}{2}$, 2.

NOTE 1. Malleable cast iron fittings conforming to BS 143 & BS 1256 designs having threads conforming to BS 21 (see 8.1), but which are not covered by BS EN 10242 and ISO 49 are printed in bold type in tables 9 to 25.

Malleable cast iron fittings conforming to BS 143 design having threads conforming to ANSI/ASME B1.201 (see 8.1) are printed in normal or bold type in tables 9 to 25.

Cast copper alloy fittings conforming to BS 143 design having threads conforming to BS 21 or ANSI/ASME B1.201 (see 8.1) are printed in normal or bold type in tables 9 to 25 within the range of fitting sizes indicated in 5.1b.

NOTE 2. Not all fittings specified in this standard are in regular production in the United Kingdom (see foreword). Reference should be made to the manufacturer for details of fittings available.

6 Pressure/temperature ratings

All fittings shall be suitable for operation at the maximum working pressures within the temperature ranges given in table 2. Intermediate pressure ratings at temperatures between 120 °C and 300 °C shall be obtained by linear interpolation. Hot-dip zinc coated fittings shall be limited to a minimum temperature of -10 °C.

Table 2. Pressure/temperature ratings

Material	Service temperature	Maximum permissible working pressure
	°C	bar*
Malleable cast iron	-20 to 120 300	25 20
Cast copper alloy	-20 to 120 300	16 10

* 1 bar = 10⁵ N/m² = 100 kPa

NOTE. Cast copper alloy fittings can be used at temperatures below -20 °C, but due consideration should be given to any applicable codes and the suitability of the connecting pipe material, the threaded joint and any thread sealants.



7 Dimensions and tolerances

7.1 Fitting dimensions

Fittings shall have the appropriate dimensions given in tables 9 to 25, and be subject to the tolerances specified in 7.5.

NOTE 1. Only basic dimensions are specified in this standard and other dimensions are at the discretion of the manufacturer.

NOTE 2. Malleable cast iron fittings standardized and in regular production in the United Kingdom but which are not included in BS EN 10242 and ISO 49 are printed in bold type in tables 9 to 25.

7.2 Wall thickness

The wall thickness shall be not less than the minimum dimension given in table 3. For reducing fittings the wall thickness at each outlet shall be that appropriate to the fitting size of the outlet.

7.3 Reinforcement

The minimum dimensions of the height and width of the reinforcement (band or bead) (see 10.2) shall be as given in table 4. In the case of reducing fittings, the dimensions of the reinforcement at each outlet shall be those appropriate to the fitting/thread size of the outlet.

7.4 Spanner flats

Fittings required with flats for assembly purposes are specified in 10.3 and the minimum depth of a spanner flat measured at its corners shall be as given in table 5.

For backnuts any chamfering shall not reduce the depth of spanner flat below the minimum dimension given in table 5.

NOTE. The across-flats dimension 's' in tables 20 to 25 inclusive should be such as to accept open-ended wrenches selected from table 1 of BS 192: 1982.



Table 3. Minimum wall thickness

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
Minimum wall thickness (mm)	1.8	2.0	2.0	2.0	2.2	2.4	2.8	3.0	3.2	3.4	3.8	4.4	5.2	6.0

Table 4. Minimum dimensions of reinforcement

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
Minimum height (mm)	1.0	1.3	1.3	1.5	1.5	1.8	1.8	2.0	2.3	2.5	2.8	3.3	4.0	4.6
Minimum width (mm)	3.0	3.6	4.0	4.6	4.6	5.1	5.1	5.6	6.1	6.1	6.1	7.1	8.1	8.9

Table 5. Minimum depth of spanner flats

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
Minimum depth of spanner flats (mm)	4	4	5	5	5.5	6	6.5	6.5	7	7	7.5	8	12	15

7.5 Tolerance on face-to-face, face-to-centre and centre-to-centre dimensions

Except where stated as minimum dimensions, tolerances on face-to-face, face-to-centre and centre-to-centre dimensions shall be in accordance with table 6.

NOTE. Tolerances for unions apply to the individual component parts, not assembled unions.

Table 6. Tolerance on length	
Dimension	Tolerance
mm	mm
≤ 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

8 Threads

8.1 Jointing threads

Jointing threads shall be in accordance with table 7.

Table 7. Jointing threads			Fitting sizes applicable
Fitting type	External thread	Internal thread	
BS 143	Taper to BS 21 or ANSI/ASME* B1.20.1	Taper to BS 21 or ANSI/ASME* B1.20.1	See note 1 See note 2
BS 1256	Taper to BS 21	Parallel to BS 21	See note 3
* American National Standards Institute/American Society of Mechanical Engineers. NOTE 1. Applicable to malleable cast iron fitting sizes printed in bold type in table 9 to 25 and to all fittings sizes of cast copper alloy fittings. NOTE 2. Applicable to all fitting sizes of malleable cast iron and cast copper alloy fittings. NOTE 3. Applicable to malleable cast iron fittings having fitting sizes printed in bold type in tables 9 to 25. NOTE 4. The purchaser should specify the type of jointing thread required on his enquiry or order in accordance with item (d) of appendix A. If the purchaser does not specify the type of thread then the manufacturer will supply fittings having jointing threads in accordance with BS 21.			

8.2 Fastening threads

The threads of union nuts and their mating threads, and of backnuts shall be in accordance with BS 2779.

8.3 Gauging of threads

8.3.1 Jointing threads. Jointing threads shall be gauged in accordance with system A or B of BS 21, except that for internal threads the theoretical location of the gauge plane shall be at the position where the chamfer intersects the major thread diameter. American pipe threads shall be gauged in accordance with ANSI/ASME B1.20.1.

8.3.2 Fastening threads. Fastening threads shall be gauged to ensure that thread diameters are in accordance with BS 2779.

8.4 Alignment of threads

The axes of the screw threads shall be accurate to within ± 0.5° of the specified angle.

8.5 Chamfering of threads

8.5.1 Outlets of fittings shall be chamfered.

8.5.2 On internal threads, the chamfer shall have an included angle of 90° and the diameter of the chamfer at the face of the fitting shall exceed the major diameter of the thread at the face.

8.5.3 On external threads, the chamfer shall have a minimum included angle of 60° and the diameter of the chamfer at the face of the fitting shall not exceed the minor diameter of the thread at the face.

9 Materials

9.1 Material of the fitting

9.1.1 Malleable cast iron. Fittings in accordance with BS 143 and BS 1256 designs shall be made of blackheart malleable cast iron or whiteheart malleable cast iron complying with BS 6681.

9.1.2 Cast copper alloy. All cast copper alloy fittings in accordance with BS 143 design shall be made of material complying with grade LG2 of BS 1400.

9.2 Hot-dip zinc coating

Malleable cast iron fittings are supplied:

- (a) without hot-dip zinc coatings;
- (b) with hot-dip zinc coatings.

When hot-dip zinc coatings are specified, the coatings shall be applied by the hot dip process in accordance with BS 729 and have a coating mass of not less than 610 g/m².

NOTE 1. The zinc coating may be applied prior to or after machining or threading.

NOTE 2. The purchaser should state on his enquiry and/or order whether hot-dip zinc coated fittings are required (see item (f) of appendix A).

9.3 Impregnation

Castings shall not be subject to any impregnation process.

10 Design

10.1 General

Pressure-containing fittings shall be designed to withstand the design test pressures given in table 8. Each size of fitting shall be type tested in accordance with table 8.

Table 8. Design test pressures		
Material	Hydrostatic Design test pressure (gauge)	
	Sizes 1/8 to 4	Sizes 5 and 6
Malleable cast iron	100 bar	64 bar
Cast copper alloy	64 bar	—

It is permissible for there to be leakage from a union joint at a pressure below the pressure given in table 8, provided that the pressure is not less than $1.5 \times$ maximum working pressure at ambient temperature.

10.2 Reinforcement

Fittings shall be reinforced at the internally threaded ends by a band or bead (see figure 2 and table 4) except where the ends are polygonal in shape to allow for spanner flats.

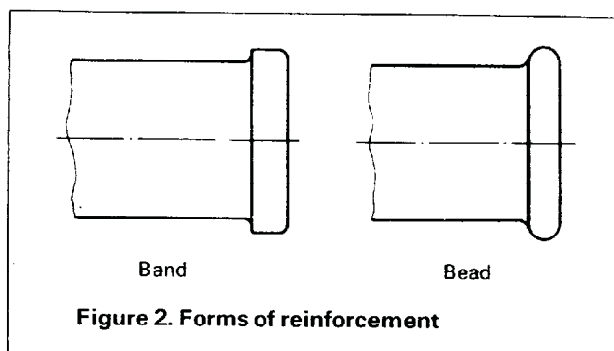


Figure 2. Forms of reinforcement

The incorporation of strengthening ribs is outside the scope of this standard, but where such ribs are included, they shall not project higher than the reinforcing band or bead.

10.3 Flats for bushes, nipples, backnuts, caps (hexagon), plugs and unions

Fittings shall be provided with flats for assembly purposes. Flats on plugs shall be square except that for sizes 5 and 6 a slotted head may be provided as shown in table 23. Flats on other fittings (except unions) shall be hexagonal on sizes $3/4$ and below, and hexagonal or octagonal on sizes above $3/4$. Flats on unions may be hexagonal, octagonal or decagonal.

10.4 Bushes

Bushes for sizes 2 and above shall be manufactured in either pattern II or pattern III as detailed in table 20.

10.5 Backnuts

Backnuts shall be plain or recessed.

NOTE. One face may be machined.

10.6 Plugs

Plugs shall be:

- (a) solid type only for sizes $1/8$ and $1/4$;
- (b) either:
 - (1) solid type for sizes $3/8$ to 4; or
 - (2) hollow type for sizes $3/8$ to 4;
- (c) hollow type only for sizes 5 and 6.

10.7 Unions

Two typical types of seat for unions and their designation are given in tables 24 and 25, but other types of seat design and materials shall be considered as complying with this standard, providing that they are in accordance with tables 24 and 25 and other requirements of this standard; such unions do not have a formal designation. Gaskets for type U1 unions shall be as given in table 26. If the gasket would, or is likely to, come into contact with potable water then the gasket material shall comply with appendix C.

Caution. Unions should only be used as complete assemblies because component parts of unions made by different manufacturers, or component parts of different types of union made by the same manufacturer, are not necessarily interchangeable.

11 Testing and inspection

11.1 Leak tightness

All pressure-containing fittings shall be leak tightness tested after machining and threading or hot-dip zinc coating, but before the application of any temporary protective coatings. Each fitting shall show no sign of leakage when tested by one of the following methods:

- (a) by the application of an internal hydrostatic pressure of not less than 20 bar;
- (b) by the application of an internal pneumatic pressure of not less than 5 bar, whilst the fitting is completely immersed in water or light oil;
- (c) other tests which shall be capable of being demonstrated to be equivalent to (a) or (b).

Any fitting failing the leak tightness test shall be considered not to comply with this standard.

11.2 Final inspection

The fitting shall be free from visible casting or threading defects.

12 Test certificate

If a test certificate is issued, it shall contain a statement by the manufacturer confirming that the fittings have been tested in accordance with this standard and stating the actual pressures and medium used in the test.

NOTE. If a test certificate is required this should be specified by the purchaser in accordance with item (h) of appendix A.

13 Marking

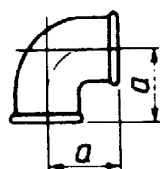
Unless it is not practicable because of casting method space limitations, fittings shall be marked at least with the following:

- (a) the manufacturer's name or trade mark;
- (b) the fitting size (as defined in 2.2).

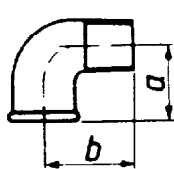
Other markings shall not conflict with the markings given in (a) and (b)*.

When it is not practicable to mark fittings because of casting method space limitations, it is permissible to omit either or both of the markings given in (a) and (b), providing the omitted markings are given on the packing material, but in this case the fittings shall not be marked with any other markings.

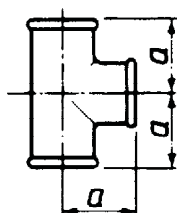
* Marking BS 143 and BS 1256 on or in relation to a product is a claim by the manufacturer that the product has been manufactured to the requirements of the standard. The accuracy of such a claim is therefore solely the manufacturer's responsibility. Enquiries as to the availability of third party certification should be addressed to the appropriate certification body.

Table 9. Elbows A1, male and female elbows A4, tees B1 and crosses C1

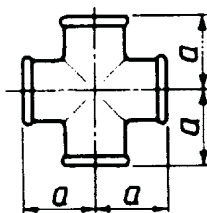
Elbows A1



Male and female elbows A4

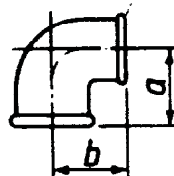


Tees B1

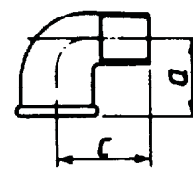


Crosses C1

Fitting sizes				Dimensions	
A1	A4	B1	C1	a	b
				mm	mm
1/8	1/8	1/8	—	19	25
1/4	1/4	1/4	1/4	21	28
3/8	3/8	3/8	3/8	25	32
1/2	1/2	1/2	1/2	28	37
3/4	3/4	3/4	3/4	33	43
1	1	1	1	38	52
1 1/4	1 1/4	1 1/4	1 1/4	45	60
1 1/2	1 1/2	1 1/2	1 1/2	50	65
2	2	2	2	58	74
2 1/2	2 1/2	2 1/2	2 1/2	69	88
3	3	3	3	78	98
4	4	4	4	96	118
5	—	5	—	115	—
6	—	6	—	131	—

Table 10. Elbows, reducing A1, male and female elbows, reducing A4

Elbows, reducing A1



Male and female elbows, reducing A4

Fitting sizes		Dimensions		
A1	A4	a	b	c
		mm	mm	mm
3/8 x 1/4	—	23	23	—
1/2 x 1/4	—	25	25	—
1/2 x 3/8	—	26	26	—
3/4 x 1/2	3/4 x 1/2	30	31	40
1 x 1/2	1 x 1/2	32	34	51
1 x 3/4	1 x 3/4	35	36	46
1 1/4 x 1/2	—	34	39	—
1 1/4 x 3/4	—	36	41	—
1 1/4 x 1	1 1/4 x 1	40	42	56
1 1/2 x 3/4	—	39	44	—
1 1/2 x 1	—	42	46	—
1 1/2 x 1 1/4	—	46	48	—
2 x 3/4	—	41	50	—
2 x 1	—	44	51	—
2 x 1 1/4	—	48	53	—
2 x 1 1/2	—	52	55	—
3 x 1 1/2	—	58	71	—
3 x 2	—	64	73	—
3 x 2 1/2	—	72	76	—
4 x 2	—	70	87	—
4 x 2 1/2	—	77	89	—
4 x 3	—	84	91	—

NOTE. Sizes not covered by BS EN 10242 and ISO 49 are printed in bold type.

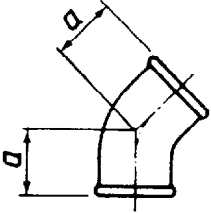
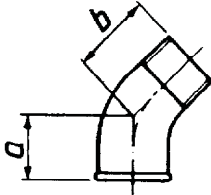
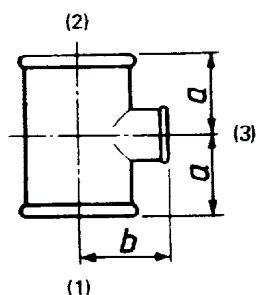
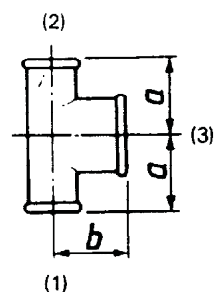
Table 11. 45° elbows A1/45°, 45° male and female elbows A4/45°			
			
45° elbows A1/45°		45° male and female elbows A4/45°	
Fitting sizes		Dimensions	
A1/45°	A4/45°	a	b
		mm	mm
1/4	—	19	—
3/8	3/8	20	25
1/2	1/2	22	28
3/4	3/4	25	32
1	1	28	37
1 1/4	1 1/4	33	43
1 1/2	1 1/2	36	46
2	2	43	55
2 1/2	2 1/2	50	62
3	3	55	70
4	—	66	—
6	—	88	—
NOTE. Sizes not covered by BS EN 10242 and ISO 49 are printed in bold type.			



Table 12. Tees, reducing on the branch B1, tees, increasing on the branch B1



Tee, reducing on the branch B1



Tees, increasing on the branch B1

Tees, reducing on the branch

Fitting sizes (1) & (2) (3)	Dimensions	
	a	b
	mm	mm
3/8 x 1/4	23	23
1/2 x 1/4	24	24
1/2 x 3/8	26	26
3/4 x 1/4	26	27
3/4 x 3/8	28	28
3/4 x 1/2	30	31
1 x 1/4	28	31
1 x 3/8	30	32
1 x 1/2	32	34
1 x 3/4	35	36
1 1/4 x 1/2	34	38
1 1/4 x 3/4	36	41
1 1/4 x 1	40	42
1 1/2 x 1/2	36	42
1 1/2 x 3/4	38	44
1 1/2 x 1	42	46
1 1/2 x 1 1/4	46	48
2 x 1/2	38	48
2 x 3/4	40	50
2 x 1	44	52
2 x 1 1/4	48	54
2 x 1 1/2	52	55

Fitting sizes (1) & (2) (3)	Dimensions	
	a	b
	mm	mm
2 1/2 x 1/2	41	57
2 1/2 x 3/4	44	59
2 1/2 x 1	47	60
2 1/2 x 1 1/4	52	62
2 1/2 x 1 1/2	55	63
2 1/2 x 2	61	66
3 x 1/2	51	68
3 x 3/4	51	68
3 x 1	51	67
3 x 1 1/4	55	70
3 x 1 1/2	58	71
3 x 2	64	73
3 x 2 1/2	72	76
4 x 1	56	81
4 x 1 1/4	61	83
4 x 1 1/2	64	84
4 x 2	70	86
4 x 2 1/2	77	89
4 x 3	84	92
6 x 3	92	121
6 x 4	105	125

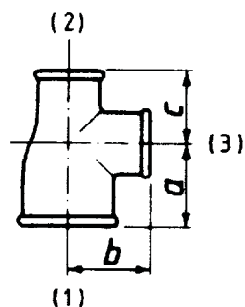
Tees, increasing on the branch

Fitting sizes (1) & (2) (3)	Dimensions	
	a	b
	mm	mm
1/2 x 3/4	31	30
3/4 x 1	36	35
1 x 1 1/4	42	40
1 x 1 1/2	46	42

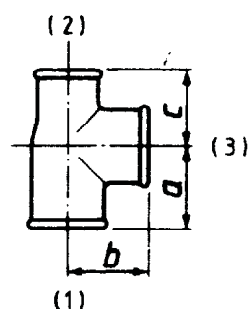
Fitting sizes (1) & (2) (3)	Dimensions	
	a	b
	mm	mm
1 1/4 x 2	54	48
1 1/2 x 2	55	52
2 x 2 1/2	66	61

NOTE. Sizes not covered by BS EN 10242 and ISO 49 are printed in bold type.

Table 13 Tees, reducing on the run and the branch B1, tees, reducing on the run and equal on the branch B1



Tees, reducing on the run and the branch B1



Tees reducing on the run and equal on the branch B1

Tee, reducing on the run and the branch

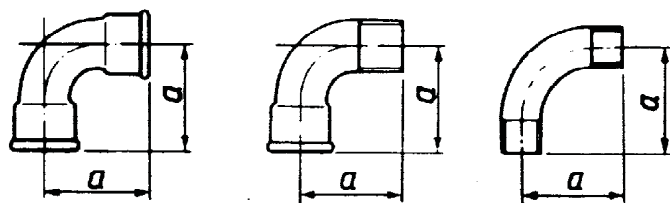
Fitting sizes			Dimensions		
(1)	(2)	(3)	a	b	c
			mm	mm	mm
1/2	x 3/8	x 3/8	26	26	25
3/4	x 1/2	x 1/2	30	31	28
1	x 3/4	x 1/2	32	34	30
1	x 3/4	x 3/4	35	36	33
1 1/4	x 1	x 1/2	34	38	32
1 1/4	x 1	x 3/4	36	41	35
1 1/4	x 1	x 1	40	42	38
1 1/2	x 1	x 1	42	46	38
1 1/2	x 1 1/4	x 1/2	36	42	34
1 1/2	x 1 1/4	x 1	42	46	40
1 1/2	x 1 1/4	x 1 1/4	46	48	45
2	x 1 1/2	x 3/4	40	50	38
2	x 1 1/2	x 1	44	52	42
2	x 1 1/2	x 1 1/4	48	54	46
2	x 1 1/2	x 1 1/2	52	55	50
2 1/2	x 2	x 2	61	66	57
3	x 2	x 2	64	73	57

Tees, reducing on the run only

Fitting sizes			Dimensions		
(1)	(2)	(3)	a	b	c
			mm	mm	mm
1/2	x 1/4	x 1/2	28	28	25
3/4	x 1/2	x 3/4	33	33	31
1	x 1/2	x 1	38	38	34
1	x 3/4	x 1	38	38	36
1 1/4	x 1/2	x 1 1/4	45	45	38
1 1/4	x 3/4	x 1 1/4	45	45	41
1 1/4	x 1	x 1 1/4	45	45	42
1 1/2	x 1/2	x 1 1/2	50	50	42
1 1/2	x 3/4	x 1 1/2	50	50	44
1 1/2	x 1	x 1 1/2	50	50	46
1 1/2	x 1 1/4	x 1 1/2	50	50	48
2	x 1/2	x 2	57	57	48
2	x 3/4	x 2	58	58	50
2	x 1	x 2	58	58	52
2	x 1 1/2	x 2	58	58	55
2 1/2	x 1 1/2	x 2 1/2	69	69	64
3	x 2	x 3	78	78	73
4	x 3	x 4	96	96	91

NOTE. Sizes not covered by BS EN 10242 and ISO 49 are printed in bold type.

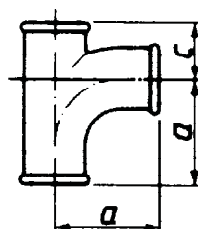
Table 14. Bends D1, Male and female bends D4, Male bends D8, Pitcher tees E1, twin elbows E2



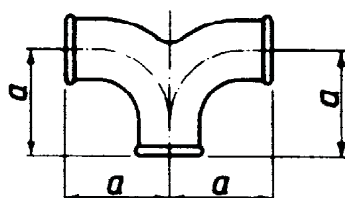
Bends D1

Male and female bends D4

Male bends D8



Pitcher tees E1

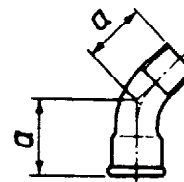


Twin elbows E2

Fitting sizes					Dimensions	
D1	D4	D8	E1	E2	a	c
1/4	1/4	—	—	—	mm	mm
3/8	3/8	—	—	—	30	—
1/2	1/2	1/2	1/2	1/2	36	19
3/4	3/4	3/4	3/4	3/4	45	24
1	1	1	1	1	50	28
1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	63	33
1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	76	40
2	2	2	2	2	85	43
2 1/2	2 1/2	—	2 1/2	2 1/2	102	53
3	3	—	3	3	114	61
4	4	—	4	—	127	70
5	—	—	—	—	165	87
6	6	—	—	—	191	102
					229	120

NOTE. Sizes not covered by BS EN 10242 and ISO 49 are printed in bold type.

Table 15. 45° Male and female bends D4/45°

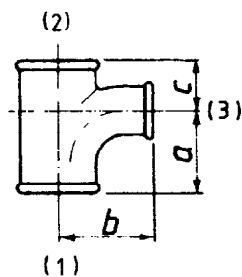


D4/45°

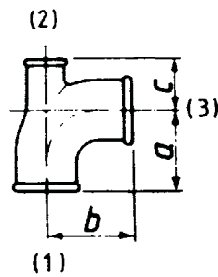
Fitting sizes	Dimensions
D4/45°	a
	mm
1/4	19
3/8	21
1/2	25
3/4	29
1	35
1 1/4	42
1 1/2	48
2	55
2 1/2	61
3	68
4	87

NOTE. Sizes not covered by BS EN 10242 and ISO 49 are printed in bold type.

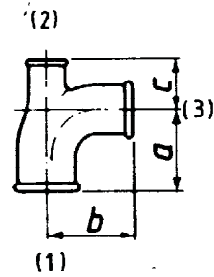
Table 16. Pitcher tees, reducing on the branch E1, pitcher tees, reducing on the run E1, pitcher tees, reducing on the branch and run E1



Pitcher tees, reducing on the branch E1



Pitcher tees, reducing on the run E1



Pitcher tees, reducing on the branch and run E1

Pitcher tees, reducing on the branch

Fitting sizes	Dimensions		
(1)&(2) (3)	a	b	c
	mm	mm	mm
3/4 × 1/2	47	48	25
1 × 1/2	49	51	28
1 × 3/4	53	54	30
1 1/4 × 1/2	51	56	30
1 1/4 × 3/4	55	58	33
1 1/4 × 1	66	68	36
1 1/2 × 1/2	52	58	29
1 1/2 × 3/4	55	61	33
1 1/2 × 1	66	71	36
1 1/2 × 1 1/4	77	79	41
2 × 1/2	54	64	32
2 × 3/4	58	67	35
2 × 1	70	77	40
2 × 1 1/4	80	85	45
2 × 1 1/2	91	94	48

Fitting sizes	Dimensions		
(1)&(2) (3)	a	b	c
	mm	mm	mm
2 1/2 × 1/2	60	75	37
2 1/2 × 3/4	60	75	37
2 1/2 × 1	72	85	40
2 1/2 × 1 1/4	83	93	45
2 1/2 × 1 1/2	94	103	48
2 1/2 × 2	104	109	54
3 × 3/4	63	82	39
3 × 1	74	91	43
3 × 1 1/2	96	109	50
3 × 2	106	116	56
4 × 2 1/2	121	133	69
4 × 3	132	139	75

Pitcher tees, reducing on the run

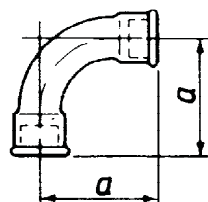
Fitting sizes	Dimensions		
(1) (2) (3)	a	b	c
	mm	mm	mm
3/4 × 1/2 × 3/4	50	50	27

Pitcher tees, reducing on the run and branch

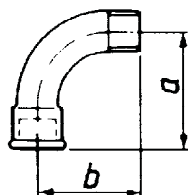
Fitting sizes	Dimensions		
(1) (2) (3)	a	b	c
	mm	mm	mm
3/4 × 1/2 × 1/2	47	48	24
1 × 3/4 × 1/2	49	51	25
1 × 3/4 × 3/4	53	54	28

NOTE. Sizes not covered by BS EN 10242 and ISO 49 are printed in bold type.

Table 17. Long sweep bends G1, male and female long sweep bends G4

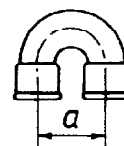


Long sweep bends G1

Male and female
long sweep bends G4

Fitting sizes		Dimensions	
G1	G4	a	b
		mm	mm
1/4	1/4	40	36
3/8	3/8	48	42
1/2	1/2	55	48
3/4	3/4	69	60
1	1	85	75
1 1/4	1 1/4	105	95
1 1/2	1 1/2	116	105
2	2	140	130
2 1/2	2 1/2	176	165
3	3	205	190
4	4	260	245

Table 18. Return bends Kb1

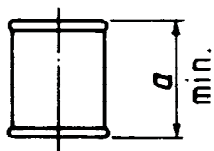


Kb1

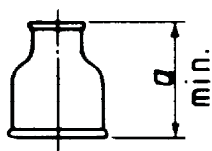
Fitting sizes	Dimensions
Kb1	a
	mm
1/2	38
3/4	50
1	64
1 1/4	76
1 1/2	89
2	102

NOTE. Sizes not covered by BS EN 10242 and ISO 49 are printed in bold type.

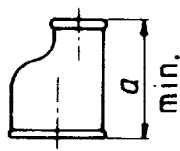
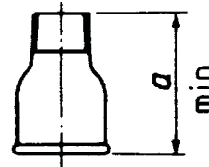
Table 19. Sockets M2, sockets, reducing M2, sockets, eccentric, reducing M3, male and female sockets, reducing M4



Sockets M2



Sockets, reducing M2

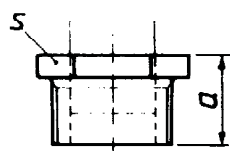
Sockets, eccentric,
reducing M3Male and female sockets,
reducing M4

Fitting sizes				Dimensions
M2	M2, reducing	M3	M4	a min.
1/8	—			mm
1/4	1/4 × 1/8			23.5
3/8	3/8 × 1/4			25.5
1/2	1/2 × 1/4 1/2 × 3/8			28.5
3/4	3/4 × 1/4 3/4 × 3/8 3/4 × 1/2	3/4 × 1/2	3/4 × 1/2	34
1	1 × 1/4 1 × 3/8 1 × 1/2 1 × 3/4	1 × 1/2 1 × 3/4		37
1 1/4	1 1/4 × 1/2 1 1/4 × 3/4 1 1/4 × 1	1 1/4 × 1/2 1 1/4 × 3/4 1 1/4 × 1	1 1/4 × 3/4 1 1/4 × 1	43
1 1/2	1 1/2 × 1/2 1 1/2 × 3/4 1 1/2 × 1 1 1/2 × 1 1/4	1 1/2 × 1/2 1 1/2 × 3/4 1 1/2 × 1 1 1/2 × 1 1/4		48
				52.5

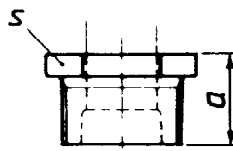
Fitting sizes			Dimensions
M2	M2, reducing	M3	a min.
			mm
2	2 × 1/2 2 × 3/4 2 × 1 2 × 1 1/4 2 × 1 1/2	2 × 1/2 2 × 3/4 2 × 1 2 × 1 1/4 2 × 1 1/2	62.5
2 1/2	2 1/2 × 1/2 2 1/2 × 1 2 1/2 × 1 1/4 2 1/2 × 1 1/2 2 1/2 × 2	2 1/2 × 1/2 2 1/2 × 1 1/2 2 1/2 × 2	71.5
3	3 × 1 3 × 1 1/2 3 × 2 3 × 2 1/2	3 × 2 3 × 2 1/2	77
4	4 × 1 1/2 4 × 2 4 × 2 1/2 4 × 3		91
5	—		105.5
6	6 × 3 6 × 4 6 × 5		116.5

NOTE. Sizes not covered by BS EN 10242 and ISO 49 are printed in bold type.

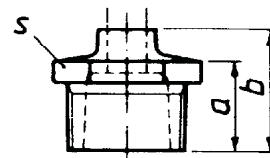
Table 20. Bushes N4



Pattern I



Pattern II



Pattern III

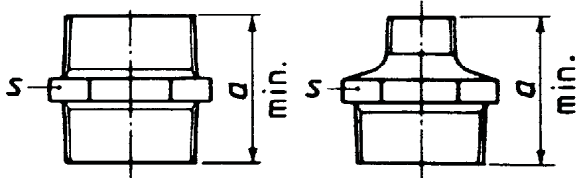
Fitting sizes	Patterns	Dimensions	
		a	b
		mm	mm
1/4 × 1/8	I	20	—
3/8 × 1/8	II	20	—
3/8 × 1/4	I	20	—
1/2 × 1/8	II	24	—
1/2 × 1/4	II	24	—
1/2 × 3/8	I	24	—
3/4 × 1/8	II	26	—
3/4 × 1/4	II	26	—
3/4 × 3/8	II	26	—
3/4 × 1/2	I	26	—
1 × 1/4	II	29	—
1 × 3/8	II	29	—
1 × 1/2	II	29	—
1 × 3/4	I	29	—
1 1/4 × 1/4	II	31	—
1 1/4 × 3/8	II	31	—
1 1/4 × 1/2	II	31	—
1 1/4 × 3/4	II	31	—
1 1/4 × 1	I	31	—
1 1/2 × 1/4	II	31	—
1 1/2 × 3/8	II	31	—
1 1/2 × 1/2	II	31	—
1 1/2 × 3/4	II	31	—
1 1/2 × 1	II	31	—
1 1/2 × 1 1/4	I	31	—

Fitting sizes	Patterns	Dimensions	
		a	b
		mm	mm
2 × 3/8	II or III	35	48
2 × 1/2	II	35	48
2 × 3/4	II	35	48
2 × 1	II	35	—
2 × 1 1/4	II	35	—
2 × 1 1/2	II	35	—
2 1/4 × 1/4	II or III	40	54
2 1/4 × 3/4	II or III	40	54
2 1/4 × 1	II	40	54
2 1/4 × 1 1/4	II	40	54
2 1/4 × 1 1/2	II	40	—
2 1/2 × 2	II	40	—
3 × 1/2	II or III	44	59
3 × 3/4	II or III	44	59
3 × 1	II	44	59
3 × 1 1/4	II	44	59
3 × 1 1/2	II	44	59
3 × 2	II	44	—
3 × 2 1/2	II	44	—
4 × 1	II or III	51	69
4 × 1 1/4	II or III	51	69
4 × 1 1/2	II or III	51	69
4 × 2	II	51	69
4 × 2 1/2	II	51	69
4 × 3	II	51	—
5 × 4	II	59	—
6 × 2	II	62	—
6 × 3	II	62	—
6 × 4	II	62	—

NOTE 1. Dimension s: see 7.4.

NOTE 2. Sizes not covered by BS EN 10242 and ISO 49 are printed in bold type.

Table 21. Hexagon nipples N8, Hexagon nipples, reducing N8



Hexagon nipples N8

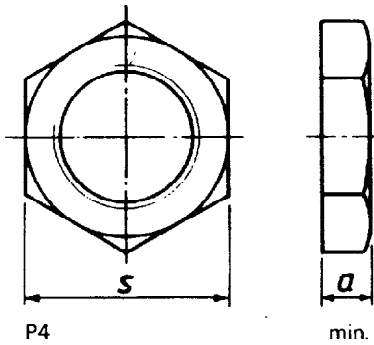
Hexagon nipples, reducing N8

Fitting sizes		Dimensions
N8	N8 reducing	a min
		mm
1/8	—	27.5
1/4	1/4 × 1/8	34
3/8	3/8 × 1/4	36
1/2	1/2 × 1/4	42
	1/2 × 3/8	42
3/4	3/4 × 3/8	45
	3/4 × 1/2	45
1	1 × 1/2	50.5
	1 × 3/4	50.5
1 1/4	1 1/4 × 1/2	54.5
	1 1/4 × 3/4	54.5
	1 1/4 × 1	54.5
1 1/2	1 1/2 × 3/4	56.5
	1 1/2 × 1	56.5
	1 1/2 × 1 1/4	56.5
2	2 × 1	65.5
	2 × 1 1/4	65.5
	2 × 1 1/2	65.5
2 1/2	2 1/2 × 1 1/2	72.5
	2 1/2 × 2	72.5
3	3 × 2	80
	3 × 2 1/2	80
4	—	92
6	—	106.5

NOTE 1. Dimension *s*: see 7.4.

NOTE 2. Sizes not covered by BS EN 10242 and ISO 49 are printed in bold type.

Table 22. Backnuts P4



Fitting sizes	Dimensions
	a min
	mm
1/4	6
3/8	7
1/2	8
3/4	9
1	10
1 1/4	11
1 1/2	12
2	13
2 1/2	16
3	19

NOTE 1. Dimension *s*: see 7.4.

NOTE 2. Dimension 'a' is measured at the full thickness of the backnut.



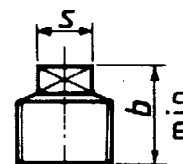
Table 23. Hexagon caps T1, round caps T2, plain plugs T8, beaded plugs T9, countersunk plugs T11 and alternative slotted head plugs for sizes 5 and 6



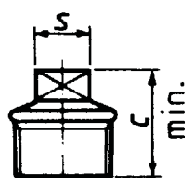
Hexagon caps T1



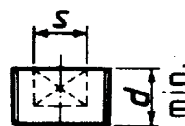
Round caps T2



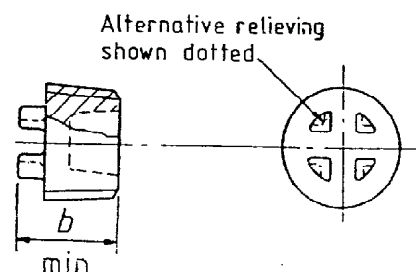
Plain plugs T8



Beaded plugs T9



Countersunk plugs T11



Alternative slotted head plugs for sizes 5 and 6

Fitting sizes					Dimensions			
T1	T2	T8	T9	T11	a min.	b min.	c min.	d min.
					mm	mm	mm	mm
1/8	1/8	1/8	—	—	13	11	—	—
1/4	1/4	1/4	1/4	1/4	15	14	22	11
3/8	3/8	3/8	3/8	3/8	17	15	24	11
1/2	1/2	1/2	1/2	1/2	19	18	26	15
3/4	3/4	3/4	3/4	3/4	22	20	32	16
1	1	1	1	1	24	23	36	19
1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	27	29	39	20
1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	27	30	41	20
2	2	2	2	2	32	36	48	27
2 1/2	2 1/2	2 1/2	—	2 1/2	35	39	—	33
3	3	3	—	—	38	44	—	—
4	4	4	—	—	45	58	—	—
—	—	5	—	—	—	62	—	—
—	—	6	—	—	—	64	—	—

NOTE 1. Dimension s: see 7.4.

NOTE 2. Sizes not covered by BS EN 10242 and ISO 49 are printed in bold type.

Table 24. Unions flat seat U1, unions, taper seat U11, male and female unions taper seat U12

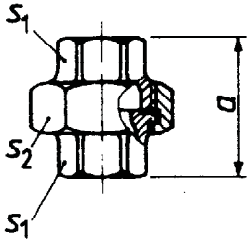
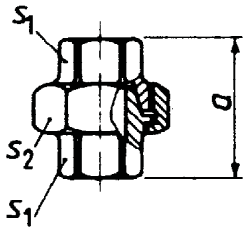
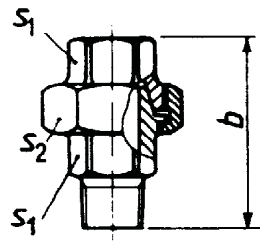
				
Unions, flat seat U1				
				
Unions, taper seat U11				
				
Male and female unions, taper seat U12				
Fitting sizes			Dimensions	
U1	U11	U12	a	b
			mm	mm
—	1/8	—	38	—
—	1/4	1/4	42	55
—	3/8	3/8	45	58
1/2	1/2	1/2	48	66
3/4	3/4	3/4	52	72
1	1	1	58	80
1 1/4	1 1/4	1 1/4	65	90
1 1/2	1 1/2	1 1/2	70	95
2	2	2	78	106
—	2 1/2	2 1/2	85	118
—	3	3	95	130
—	4	—	110	—
NOTE. Dimensions S ₁ and S ₂ : see 7.4.				

Table 25. Elbow unions, taper seat UA11, male and female elbow unions, taper seat UA12

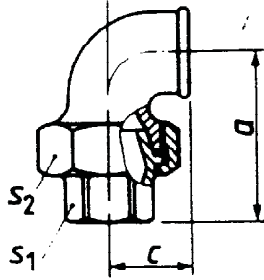
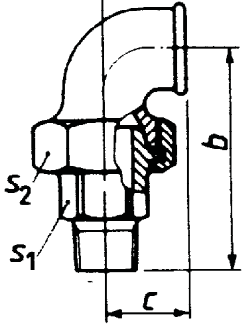
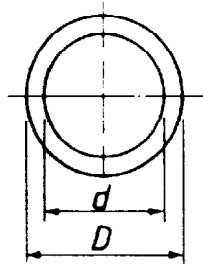
				
Elbow unions, taper seat UA11				
				
Male and female elbow unions, taper seat UA12				
Fitting sizes		Dimensions		
UA11	UA12	a	b	c
		mm	mm	mm
1/2	1/2	58	76	28
3/4	3/4	62	82	33
1	1	72	94	38
1 1/4	1 1/4	82	107	45
1 1/2	1 1/2	90	115	50
2	2	100	128	58
NOTE. Dimensions S ₁ and S ₂ : see 7.4.				

Table 26. Gaskets for unions flat seat U1



U1

Fitting sizes of unions	Diameters of gasket	
	<i>d</i>	<i>D</i>
	mm	mm
1/2	21	30
	24	34
3/4	27	38
1	32	44
1 1/4	42	55
1 1/2	46	62
2	60	78

NOTE 1. The material of the gasket is not covered by this standard but if a specific material is required then this should be specified by the purchaser in accordance with item (i) of appendix A.

NOTE 2. If the gasket would, or is likely to, come into contact with potable water then the gasket material has to comply with appendix C.

NOTE 3. The 21 × 30 gasket is intended for use with unions having union nut threads complying with BS 2779 size 1 and the 24 × 34 gasket is intended for use with unions having union nut threads complying with BS 2779 size 1½.

Appendices

Appendix A. Information to be supplied by the purchaser

The following information should be supplied by the purchaser in his enquiry or order:

- (a) the number of this British Standard and whether BS 143 or BS 1256 design is required (see clause 1);
- (b) the fitting size (see 2.2 and 4.1);
- (c) the symbol (see clause 3), e.g. A1;
- (d) the thread (see 8.1);
- (e) the material (see 9.1);
- (f) whether hot-dip zinc coating is required (see 9.1);
- (g) for bushes, backnuts, plugs and unions where design options are permitted, whether a specific design is required (see 10.4 to 10.7);
- (h) If a test certificate is required (see clause 12);
- (i) If a particular type of gasket material is required for unions, type U1 (see table 26).

Appendix B. Relationship between fitting size and nominal size (DN)

The relationship between designation of thread size, which is the fitting size, and nominal size (DN) is given in table 27 for guidance only.



Table 27. Thread designation and nominal size (DN)

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
Nominal size (DN)	6	8	10	15	20	25	32	40	50	65	80	100	125	150

Appendix C. Effect of non-metallic materials on water quality

When used under the conditions for which they are designed, non-metallic materials in contact with or likely to come into contact with potable water shall not constitute a toxic hazard, shall not support microbial growth and shall not give rise to unpleasant taste or odour, cloudiness or discoloration of the water.

Concentrations of substances, chemicals and biological agents leached from materials in contact with potable water, and measurements of the relevant organoleptic/physical parameters, shall not exceed the maximum values recommended by the World Health Organization in its publication 'Guidelines for drinking water quality' Vol 1 'Recommendations' (WHO, Geneva 1984) or as required by the EEC Council Directive of 15 July 1980 relating to the quality of water intended for human consumption (Official Journal of the European Communities L229, 11-29), whichever in each case is the more stringent.

NOTE 1. Requirements for the testing of non-metallic materials in these respects are set out in the UK Water Fittings Byelaws

Scheme Information and Guidance Note 5-01-02, ISSN 0267-0313, obtainable from the Water Research Centre Water Byelaws Advisory Service, 660 Ajax Avenue, Slough, Berkshire SL1 4BG.

NOTE 2. Pending the determination of suitable means of characterizing the toxicity of leachates from materials in contact with potable water, materials approved by the Department of the Environment Committee on Chemicals and Materials of Construction for use in Public Water Supply and Swimming Pools are considered free from toxic hazard for the purposes of compliance with this clause. A list of approved chemicals and materials is available from the Technical Secretary of that Committee at the Department of the Environment, Water Division, Romney House, 43 Marsham Street, London SW1P 3PY.

NOTE 3. Products manufactured for installation and use in the United Kingdom which are verified and listed under the UK Water Fittings Byelaws Scheme administered by the Water Research Centre Water Byelaws Advisory Service, 660 Ajax Avenue, Slough, Berkshire SL1 4BG are deemed to satisfy the requirements detailed in this appendix.

Publications referred to



BS 21	Specification for pipe threads for tubes and fittings where pressure-tight joints are made on the threads (metric dimensions)
BS 192	Specification for open-ended wrenches
BS 729	Hot dip galvanized coatings on iron and steel articles
BS 1400	Specification for copper alloy ingots and copper alloy and high conductivity copper castings
BS 2779	Pipe threads where pressure-tight joints are not made on the threads
BS 6681	Specification for malleable cast iron
ISO 49	Malleable cast iron fittings threaded to ISO 7/1
ISO 6708	Pipe components— Definition of nominal size
ANSI/ASME B1.20.1	Pipe threads, general purpose (inch)
	Guidelines for drinking water quality, Volume 1 Recommendations*
	Official Journal of the European Communities L229†
	UK Water Fittings Byelaws Scheme Information and Guidance Note 5-01-02, ISSN 0267-0313‡



BS EN 10242 : 1995 *Threaded pipe fitting in malleable cast iron*

* Published by the World Health Organization.

† Published by the EEC.

‡ Published by the Water Research Centre Water Byelaws Advisory Service.

This British Standard, having been prepared under the direction of the Piping Systems Components Standards Committee, was published under the authority of the Board of BSI and comes into effect on 30 May 1986.

© British Standards Institution, 1986

BS 143. First published June 1922

First revision December 1938

Second revision September 1952

BS 1256. First published July 1945

First revision September 1952

First published in combined edition, January 1968

First revision in combined edition May 1986

ISBN 0 580 15031 3

British Standards Institution

Incorporated by Royal Charter, BSI is the independent national body for the preparation of British Standards. It is the UK member of the International Organization for Standardization and UK sponsor of the British National Committee of the International Electrotechnical Commission.

Copyright

Users of British Standards are reminded that copyright subsists in all BSI publications. No part of this publication may be reproduced in any form without the prior permission in writing of BSI. This

does not preclude the free use, in the course of implementing the standard, of necessary details such as symbols and size, type or grade designations. Enquiries should be addressed to the Publications Manager, British Standards Institution, Linford Wood, Milton Keynes MK14 6LE. The number for telephone enquiries is 0908 320033 and for telex 825777.

Contract requirements

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Revision of British Standards

British Standards are revised, when necessary, by the issue either of amendments or of revised editions. It is important that users of British Standards should ascertain that they are in possession of the latest amendments or editions. Information on all BSI publications is in the *BSI Catalogue*, supplemented each month by *BSI News* which is available to subscribing members of the Institution and gives details of new publications, revisions, amendments and withdrawn standards. Any person who, when making use of a British Standard, encounters an inaccuracy or ambiguity, is requested to notify BSI without delay in order that the matter may be investigated and appropriate action taken.

The following BSI references relate to the work on this standard: Committee reference PSE/9 Draft for comment 85/72518 DC

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Piping Systems Components Standards Committee (PSE/—) to Technical Committee PSE/9, upon which the following bodies were represented:

Association of Hydraulic Equipment Manufacturers

British Compressed Air Society

British Gas Corporation

British Hydromechanics Research Association

British Internal Combustion Engine Manufacturers' Association

British Malleable Tube Fittings Association

British Steel Industry

British Valve Manufacturers' Association Ltd.

Department of Trade and Industry (National Engineering Laboratory)

Energy Industries Council

Engineering Equipment and Materials Users' Association

Gauge and Tool Makers' Association

Institution of Civil Engineers

Institution of Gas Engineers

Institution of Public Health Engineers

Institution of Water Engineers and Scientists

Water Authorities Association

Water Companies Association

Wrought Fitting Makers' Association

Amendments issued since publication

Amd. No.	Date of issue	
7692	19.4.83	C. J. Long
8467	12.9.95	Stanford - 1.1

British Standards Institution · 2 Park Street London W1A 2BS · Telephone 01-629 9000 · Telex 266933



Amendment No. 1
published and effective from 28 August 1987
to BS 143 & 1256 : 1986

**Specification for malleable cast iron
and cast copper alloy threaded
pipe fittings**

Revised text

AMD 5542
August 1987

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

In column 2 against types A, B, C, D, E, G, Kb, M and N, delete 'Pipe ends' and substitute 'Outlets'.

AMD 5542
August 1987

Table 2. Pressure/temperature ratings

In the heading to column 3 delete 'temperature' and substitute 'pressure'.

AMD 5542
August 1987

7.1 Fitting dimensions

Delete note 2 and substitute the following.

'NOTE 2. Dimensions are in agreement with ISO 49 for the majority of fittings specified. Fittings standardized and in regular production in the United Kingdom but which are not included in ISO 49 are indicated by bold type in tables 9 to 25.'

AMD 5542
August 1987

8.1 Jointing threads

In line 1 after 'be' insert 'in'.

AMD 5542
August 1987

9.1.1 Malleable cast iron

Delete the existing clause and substitute the following.

'9.1.1 *Malleable cast iron*. Fittings in accordance with BS 143 and BS 1256 designs shall be made of blackheart malleable cast iron or whiteheart malleable cast iron complying with BS 6681.'

AMD 5542
August 1987

10.7 Unions

Insert the following cautionary note at the end of the existing text.

'Caution. Unions should only be used as complete assemblies because component parts of unions made by different manufacturers, or component parts of different types of union made by the same manufacturer, are not necessarily interchangeable.'

AMD 5542
August 1987

Table 10. Elbows, reducing A1, male and female elbows, reducing A4

In column 1 of the tabular text, delete ' $2 \times 3/4$ ' and substitute ' $2 \times 3/4$ ' and delete ' 4×3 ' and substitute ' 4×3 '.

AMD 5542
August 1987

Table 12. Tees, reducing on the branch B1, tees, increasing on the branch B1

In column 1 of the right-hand tabular text headed 'Tees, reducing on the branch',

delete ' $3 \times 1/2$ ' and substitute ' $3 \times 1/2$ '

delete ' $3 \times 3/4$ ' and substitute ' $3 \times 3/4$ '

delete ' 4×1 ' and substitute ' 4×1 '

delete ' $4 \times 1 1/4$ ' and substitute ' $4 \times 1 1/4$ '

delete ' $4 \times 1 1/2$ ' and substitute ' $4 \times 1 1/2$ '

delete ' $4 \times 2 1/2$ ' and substitute ' $4 \times 2 1/2$ '

delete ' 6×3 ' and substitute ' 6×3 '

delete ' 6×4 ' and substitute ' 6×4 '.

In column 1 of the right-hand tabular text headed 'Tees, increasing on the branch', delete ' $2 \times 2 1/2$ ' and substitute ' $2 \times 2 1/2$ '.

AMD 5542
August 1987

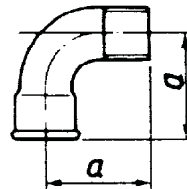
Table 13. Tees, reducing on the run and the branch B1, tees, reducing on the run and equal on the branch B1

In column 1 of the tabular text headed 'Tees, reducing on the run only', delete ' $3 \times 2 \times 3$ ' and substitute ' $3 \times 2 \times 3$ ' and delete ' $4 \times 3 \times 4$ ' and substitute ' $4 \times 3 \times 4$ '.

AMD 5542
August 1987

Table 14. Bends D1, Male and female bends D4, Male bends D8, Pitcher tees E1, twin elbows E2

Delete the figure entitled 'Male and female bends D4' and substitute the following figure.



In the last column of the tabular text delete subheading ' b ' and substitute ' c '.

AMD 5542
August 1987

Table 20. Bushes N4

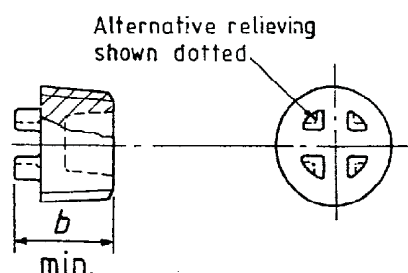
In column 1 of the left-hand tabular text, delete ' $1 1/2 \times 1/4$ ' and substitute ' $1 1/2 \times 1/4$ '.

In column 1 of the right-hand tabular text, delete ' $4 \times 1 1/2$ ' and substitute ' $4 \times 1 1/2$ '.

AMD 5542
August 1987

Table 23. Hexagon caps T1, round caps T2, plain plugs T8, beaded plugs T9, countersunk plugs T11 and alternative slotted head plugs for sizes 5 and 6

Delete the figure entitled 'Alternative slotted head plugs for sizes 5 and 6' and substitute the following figure.



AMD 5542
August 1987

Publications referred to

Delete 'BS 309 Whiteheart malleable iron castings' and 'BS 310 Blackheart malleable iron castings'.

Insert 'BS 6681 Specification for malleable cast iron' after the entry for BS 2779.



AMD 6632

Amendment No. 2
published and effective from 21 December 1990
to BS 143 & 1256 : 1986

Specification for malleable cast iron and cast
copper alloy threaded pipe fittings

Corrections

AMD 6632
December 1990

Clause 1 Scope

After paragraph 2, insert the following new paragraph:
'Fittings have dimensions that are not specified in this
standard and requirements for these are outside the scope
of this standard.'

AMD 6632
December 1990

Clause 7.1 Fitting dimensions (as amended by Amendment No. 1)

Delete note 1 and substitute the following:
'NOTE 1. Only basic dimensions are specified in this standard and
other dimensions are at the discretion of the manufacturer.'

Amendment No. 3
published and effective from 15 April 1993
to BS 143 & 1256 : 1986

**Specification for malleable cast iron and cast copper
alloy threaded pipe fittings**

Revised text

AMD 7692
April 1993

Contents

Delete the existing entry for appendix B and substitute the following.

**'B Relationship between fitting size and nominal
size (DN)'**

AMD 7692
April 1993

Clause 2.3 nominal size (DN)

Delete note 3 and substitute the following.

**'NOTE 3. The relationship between fitting size and nominal size
(DN) is given in appendix B for guidance only.'**

**NOTE 4. Nominal size (DN) should not be used for the
designation of fitting size.'**

AMD 7692
April 1993

Clause 13. Marking

Delete the existing text and substitute the following.

**'Unless it is not practicable because of casting method
space limitations, fittings shall be marked at least
with the following:**

- (a) the manufacturer's name or trade mark;
- (b) the fitting size (as defined in 2.2).

**Other markings shall not conflict with the markings
given in (a) and (b)*.**

**When it is not practicable to mark fittings because of
casting method space limitations, it is permissible to
omit either or both of the markings given in (a) and
(b), providing the omitted markings are given on the
packing material, but in this case the fittings shall not
be marked with any other markings.'**

AMD 7692
April 1993

Appendix B. Relationship between thread designation and nominal size (DN)

Delete the existing title and text (not including table 27) and substitute the following.

'Appendix B. Relationship between fitting size and nominal size (DN)

**The relationship between designation of thread size, which is the fitting size, and nominal size (DN) is given in table 27 for
guidance only.'**

Amendment No. 4
published and effective from 15 September 1995
to BS 143 & 1256 : 1986

Specification for malleable cast iron and cast copper
alloy threaded pipe fittings

NOTE. This amendment is being issued to delete from this standard the fittings covered by BS EN 10242 : 1995 *Threaded pipe fittings in malleable cast iron*.

Revised text

Foreword

After paragraph 3, insert the following new paragraph:

‘Not all fittings specified in this standard are in regular production in the United Kingdom. Reference should be made to the manufacturer for details of fittings available. A future revision of this standard will align the scope of the fittings sizes specified with those in regular production in the United Kingdom.’

AMD 8467/September 1995

Clause 1. Scope (as amended by Amendment No. 2)

Delete paragraph 1, excluding items a) and b), and substitute the following:

‘This British Standard specifies requirements for the design and performance of various fitting sizes and types which are not included in BS EN 10242. In addition, requirements for the design and performance of cast copper alloy pipe fittings are specified. Two basic designs of fittings are covered.’

Before the existing note, insert the following new note:

‘NOTE 1. Reference should be made to BS EN 10242 for those malleable cast iron pipe fittings not covered by this standard.’

Number the existing note ‘NOTE 2’.

AMD 8467/September 1995

Clause 5. Size range

Delete the existing clause entirely and substitute the following:

5. Size range

The fitting size shall be specified by the thread size(s) of the outlet(s) and shall be selected from the following range:

- (a) for malleable cast iron: 1/8, 1/4, 1/2, 3/4, 3/8, 1, 1 $\frac{1}{4}$, 1 $\frac{1}{2}$, 2, 2 $\frac{1}{2}$, 3, 4, 5, 6;
(b) for cast copper alloy: 1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 $\frac{1}{4}$, 1 $\frac{1}{2}$, 2.

NOTE 1. Malleable cast iron fittings conforming to BS 143 & BS 1256 designs having threads conforming to BS 21 (see 8.1), but which are not covered by BS EN 10242 and ISO 49 are printed in bold type in tables 9 to 25.

Malleable cast iron fittings conforming to BS 143 design having threads conforming to ANSI/ASME B1.201 (see 8.1) are printed in normal or bold type in tables 9 to 25.

Cast copper alloy fittings conforming to BS 143 design having threads conforming to BS 21 or ANSI/ASME B1.201 (see 8.1) are printed in normal or bold type in tables 9 to 25 within the range of fitting sizes indicated in 5.1b.

NOTE 2. Not all fittings specified in this standard are in regular production in the United Kingdom (see foreword). Reference should be made to the manufacturer for details of fittings available.'

AMD 8467/September 1995

Clause 7.1. Fitting dimensions (as amended by Amendment No. 1 and Amendment No. 2)

Delete note 2 entirely and substitute the following:

'NOTE 2. Malleable cast iron fittings standardized and in regular production in the United Kingdom but which are not included in BS EN 10242 and ISO 49 are printed in bold type in tables 9 to 25.'

AMD 8467/September 1995

Table 7. Jointing threads

Add the following new column 4:

Fitting sizes
applicable

See note 1

See note 2

See note 3

AMD 8467/September 1995

Insert the following new notes before the existing note:

'NOTE 1. Applicable to malleable cast iron fitting sizes printed in bold type in table 9 to 25 and to all fittings sizes of cast copper alloy fittings.'

NOTE 2. Applicable to all fitting sizes of malleable cast iron and cast copper alloy fittings.

NOTE 3. Applicable to malleable cast iron fittings having fittings sizes printed in bold type in tables 9 to 25.'

Number the existing note 'NOTE 4'.

AMD 8467/September 1995

Table 10. Elbows, reducing A1, male and female elbows, reducing A4

Delete the existing note and substitute:

'NOTE. Sizes not covered by BS EN 10242 and ISO 49 are printed in bold type.'

AMD 8467/September 1995

Table 11. 45° elbows A1/45° male and female elbows A4/45°

Delete the existing note and substitute:

'NOTE. Sizes not covered by BS EN 10242 and ISO 49 are printed in bold type.'

AMD 8467/September 1995

Table 12. Tees, reducing on the branch B1, tees, increasing on the branch B1

Delete the existing note and substitute:

'NOTE. Sizes not covered by BS EN 10242 and ISO 49 are printed in bold type.'

AMD 8467/September 1995

Table 13. Tees, reducing on the run and the branch B1, tees, reducing on the run and equal on the branch B1

Delete the existing note and substitute:

'NOTE. Sizes not covered by BS EN 10242 and ISO 49 are printed in bold type.'

AMD 8467/September 1995

Table 14. Bends D1, Male and female bends D4, Male bends D4, Male bends D8, Pitcher tees E1, twin elbows E2

Delete the existing note and substitute:

'NOTE. Sizes not covered by BS EN 10242 and ISO 49 are printed in bold type.'

AMD 8467/September 1995

Table 15. 45° Male and female bends D4/45°

Delete the existing note and substitute:

'NOTE. Sizes not covered by BS EN 10242 and ISO 49 are printed in bold type.'

AMD 8467/September 1995

Table 16. Pitcher tees, reducing on the branch E1, pitcher tees, reducing on the run E1, pitcher tees, reducing on the branch and run E1

Delete the existing note and substitute:

'NOTE. Sizes not covered by BS EN 10242 and ISO 49 are printed in bold type.'

AMD 8467/September 1995

Table 18. Return bends Kb1

Delete the existing note and substitute:

'NOTE. Sizes not covered by BS EN 10242 and ISO 49 are printed in bold type.'

AMD 8467/September 1995

Table 19. Sockets M2, sockets, reducing M2, sockets, eccentric, reducing M3, male and female sockets, reducing M4

Delete the existing note and substitute:

'NOTE. Sizes not covered by BS EN 10242 and ISO 49 are printed in bold type.'

AMD 8467/September 1995

Table 20. Bushes N4

Delete the existing part of the table and substitute the following:

Fitting sizes	Patterns	Dimensions	
		<i>a</i>	<i>b</i>
		mm	mm
$2 \times \frac{3}{8}$	II or III	35	48
$2 \times \frac{1}{2}$	II	35	48
$2 \times \frac{3}{4}$	II	35	48
2×1	II	35	—
$2 \times 1\frac{1}{4}$	II	35	—
$2 \times 1\frac{1}{2}$	II	35	—
$2\frac{1}{2} \times \frac{1}{2}$	II or III	40	54
$2\frac{1}{2} \times \frac{3}{4}$	II or III	40	54
$2\frac{1}{2} \times 1$	II	40	54
$2\frac{1}{2} \times 1\frac{1}{4}$	II	40	54
$2\frac{1}{2} \times 1\frac{1}{2}$	II	40	—
$2\frac{1}{2} \times 2$	II	40	—
$3 \times \frac{1}{2}$	II or III	44	59
$3 \times \frac{3}{4}$	II or III	44	59
3×1	II	44	59
$3 \times 1\frac{1}{4}$	II	44	59
$3 \times 1\frac{1}{2}$	II	44	59
3×2	II	44	—
$3 \times 2\frac{1}{2}$	II	44	—
4×1	II or III	51	69
$4 \times 1\frac{1}{4}$	II or III	51	69
$4 \times 1\frac{1}{2}$	II or III	51	69
4×2	II	51	69
$4 \times 2\frac{1}{2}$	II	51	69
4×3	II	51	—
5×4	II	59	—
6×2	II	62	—
6×3	II	62	—
6×4	II	62	—

Delete the existing note 2 and substitute:

‘NOTE. Sizes not covered by BS EN 10242 and ISO 49 are printed in bold type.’

AMD 8467/September 1995

Table 21. Hexagon nipples N8, Hexagon nipples, reducing N8

Delete the existing note and substitute:

‘NOTE. Sizes not covered by BS EN 10242 and ISO 49 are printed in bold type.’

AMD 8467/September 1995

Table 23. Hexagon caps T1, round caps T2, plain plugs T8, beaded plugs T9, countersunk plugs T11 and alternative slotted head plugs for sizes 5 and 6

Delete the existing note and substitute:

‘NOTE. Sizes not covered by BS EN 10242 and ISO 49 are printed in bold type.’

AMD 8467/September 1995

Publications referred to

Insert the following text:

‘BS EN 10242 : 1995 *Threaded pipe fitting in malleable cast iron*’

AMD 8467/September 1995
