BRITISH STANDARD

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Incorporating Corrigenda Nos. 1 and 2

Cast iron rainwater goods — Specification

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Confirmed
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British Standards

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee PSE/10, Iron pipes and fittings, upon which the following bodies were represented:

British Compressed Gases Association
Cast Metals Federation
Ductile Iron Pipe Committee
Galvanizers Association
Institution of Mechanical Engineers

Amendments issued since publication

Amd. No.	Date	Comments
15095	29 November 2004	Data changed in Table A.1 Ogee gutter Data changed in Table B.1 Dimensions of pipes, socket and ears Data changed in Table E.1 Half round gutter Data changed in Table F.1 Half round beaded gutter
16890	31 July 2007	Annex A – was Annex B – key added to figure; Annex B – was Annex C – Table headings altered; Annex C – was Annex E – Table and figure amended; Annex D – was Annex F – Table and figure amended; Annex E – was Annex A – Nominal size 125, internal width changed; Annex F – was Annex D – Now informative with some amendments to the figures.
17425 Corrigendum No.1	28 September 2007	See foreword
Corrigendum No. 2	30 November 2009	See foreword

This British Standard, having been preparedunder the direction of the Engineering Sector Policy and Strategy Committee, was published under the authority of the Standards Policy and Strategy Committee on 9 September 2002

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Third revision September 2002

The following BSI references relate to the work on this BritishStandard:
Committee reference PSE/10
Draft for comment 99/713250 DC

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Contents

Foreword

This British Standard was prepared by Technical Committee PSE/10. It supersedes BS 460:1964, which is withdrawn.

Text introduced or altered by Amendments No. 1 and No. 2 is described in the amendment table (see inside front cover). Text introduced or altered by Corrigenda Nos. 1 and 2 is indicated by tag ⟦C1⟩ ⟨C1⟧ and ⟦C2⟩ ⟨C2⟧.

Although BS 460:1964 has been deemed out of date for some time, work on this standard was delayed due to related work being carried out by CEN TC 203 and CEN TC 165. Following completion of those parts of the committees' work programmes relating to pressure and non-pressure systems, it became clear that the scope of BS 460 did not interfere with any part of the work of either of these two CEN committees and subsequently could be revised.

This revision takes account of changes to the foundry practice concerned with the making of cast iron rainwater goods and the use of metrication for the specification of dimensions.

It introduces alternative gutter and socket profiles which permit interchangeability and/or alternative gutter jointing methods including socketless systems.

Coatings specifications have also been reviewed and improved to take account of newer technology and have been more clearly defined.

To achieve economy in cutting to length, the option of using double spigoted pipes and gutters which are connected with separate sockets/joints has been included.

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

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

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 15 and a back cover.

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1 Scope

This British Standard specifies the requirements for cast iron rainwater systems for use on buildings. The sizes of the rainwater system extend from DN 50 to DN 150.

This standard specifies the requirements for the materials, dimensions, tolerances, mechanical properties, surface condition, primary coatings, jointing methods and marking for the following components of the rainwater system:

— rainwater pipes, fittings and components used for assembly or support;

— gutters, including half-round, ogee and beaded, fittings and components used for assembly or support.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this British Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. For undated references, the latest edition of the publication referred to applies.

BS 3900-H2:1983, *Methods of test for paints — Part H2: Designation of degree of blistering.* [ISO 4628-2:1982]

BS 3900-H3:1983, *Methods of test for paints — Part H3: Designation of degree of rusting.* [ISO 4628-3:1982]

BS EN 1561:1997, *Founding — Grey cast irons.*

BS EN 10088-1, *Stainless steels — Part 1: List of stainless steels.*

BS EN 10088-2, *Stainless steels — Part 2: Technical delivery conditions for sheet/plate and strip for general purposes.*

BS EN 10088-3, *Stainless steels — Part 3: Technical delivery conditions for semi-finished products, bars, rods and sections for general purposes.*

BS EN ISO 7253, *Paints and varnishes — Determination of resistance to neutral salt spray (fog).*

3 Terms and definitions

For the purposes of this British Standard the following terms and definitions apply.

3.1
rainwater system
above ground system external to a building for the conveyance of rainwater from the building, excluding any pipework that has either entered the building or the ground

3.2
nominal size (DN)
alphanumeric designation of size for components of a pipework system, which is used for reference purposes

NOTE The nominal size 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

[BS EN ISO 6708:1996, **2.1**]

3.3
cast iron
alloy of iron and carbon, in which graphite can be present in different forms

3.4
pipe
casting of uniform bore, straight in axis, normally having plain ends but which can also be socketed

3.5
ear
projection on pipes or fittings which allows attachment of the rainwater system to the building

3.6
fitting
cast iron component, other than a pipe or gutter, which allows a deviation, a change in direction, diameter or profile

3.7
gutter
open channel casting of defined profile which is designed to evacuate rainwater from the roof area

NOTE 1 The profile of gutters may be socketed or socketless.

NOTE 2 Ogee is a particular shape of gutter profile (see Annex E).

3.8
joint
connection between the ends of pipes, gutters and/or fittings, by either clamping components or integrally cast sockets incorporating either mastic or elastomeric seals

3.9
effective length
overall length minus the socket depth

4 Technical requirements

4.1 Dimensions

4.1.1 *Nominal size*

The nominal size (DN) of pipes and fittings shall be one of the following:

DN 50; DN 65; DN 75; DN 100; DN 150.

4.1.2 *Pipes and fittings*

Pipes and pipe fittings shall conform to the dimensions given in Annex A.

All other dimensions shall be as specified by the manufacturer.

NOTE Typical examples of types of fitting are given in Annex B for pipes and Annex F for gutters.

4.1.3 *Gutters and fittings*

Gutters and gutter fittings shall conform to the dimensions and tolerances given in [C1⟩ Annex C ⟨C1], [C1⟩ Annex D ⟨C1] and [C1⟩ Annex E ⟨C1].

4.1.4 *Manufacturer's declared length*

The declared length and effective length of pipe and gutter shall be as specified by the manufacturer.

Lengths of all pipes and gutters shall have a tolerance of ±20 mm when measured with equipment accurate to 1.0 mm.

The declared length and effective length of fittings shall be as specified by the manufacturer.

Lengths of fittings shall have a tolerance of ±5 mm when measured with equipment accurate to 1.0 mm.

4.1.5 *Angles of fittings*

Angles of fittings shall be as specified by the manufacturer and shall have a tolerance of ±2°.

4.1.6 *Wall thickness*

The wall thickness of pipes, fittings and gutters shall be as specified in [C2⟩Annex A,⟨C2] [C1⟩ Annex C ⟨C1], [C1⟩ Annex D ⟨C1] and [C1⟩ Annex E ⟨C1] when measured with equipment accurate to 0.1 mm.

4.1.7 *Straightness*

When measured in accordance with **5.1.3**, pipes and gutters shall be straight with a maximum deviation of 1.5 mm per metre length for pipes and 2.5 mm per metre length for gutters.

NOTE Typical methods of measuring straightness are given in Annex [C2⟩ G ⟨C2].

4.2 Mass

The nominal masses of finished products (pipes, gutters and fittings) shall be stated in manufacturers' catalogues. The actual mass shall be not less than 85 % of the nominal mass.

4.3 Materials

4.3.1 Metal for the manufacture of cast iron rainwater pipes, gutters and fittings shall conform to BS EN 1561:1997 Grade EN-GJL-150 or BS EN 1561:1997 Grade EN-JL1020.

4.3.2 Jointing components shall be manufactured in one of the following materials:

a) cast iron conforming to **4.3.1**;

b) stainless steel conforming to BS EN 10088-1, BS EN 10088-2 or BS EN 10088-3. In order to ensure resistance to corrosion and stabilization against the effects of intergranular corrosion, only the following types shall be used:

1) austenitic steels – all grades;

2) ferritic and martensitic steels ⟦C1⟩ X3CrTi17 ⟨C1⟧ or ⟦C1⟩ X3CrNb17 ⟨C1⟧;

c) any other material providing that it is suitably coated to withstand a salt spray test of at least 350 h in accordance with BS EN ISO 7253, the acceptable levels of blistering being dimension 3, class 3 in accordance with BS 3900-H2:1983 and rusting being Ri not greater than 2 in accordance with BS 3900-H3:1983.

4.4 As-cast surface conditions

4.4.1 Pipes, gutters and fittings shall be free from defects and surface imperfections that could lead to non-conformance with **4.1** or **4.2**.

4.4.2 Internal surfaces shall be smooth and free from sharp protrusions so as to prevent blockage. External surfaces shall be uniform and free from protrusions that are detrimental to installation and handling.

4.5 Primary coatings

Unless otherwise agreed, pipes, gutters and fittings shall be supplied coated on the interior and on the exterior with a primary coating with a minimum thickness of 40 μm.

NOTE 1 Such primary coatings should not be readily flammable and should be free from toxic heavy metals. It is the responsibility of the installer to examine and repair any primary coating damage prior to further protective coatings being applied. The application of any further protective coatings is the responsibility of the installer/purchaser who needs to take account of local conditions, e.g. climate.

NOTE 2 Factory application of further coatings may be subject to special order arrangements.

4.6 Ears

Pipes and fittings can be supplied with or without ears. When ears are specified they shall be cast integrally to the socket or bolted on using non-corrosive fastenings (e.g. galvanized).

5 Test methods

5.1 Dimensions

5.1.1 *External diameter (DE)*

The external diameter of pipes and fittings shall be measured, to an accuracy of 0.2 mm, at a distance of at least 20 mm from the end faces of the casting concerned. Two measurements shall be taken at right angles at each cross-section and each measurement shall be within the dimensions given in Table A.1.

5.1.2 *Internal diameter*

The internal diameter shall be determined by taking the average of two measurements at 90° to each other across the diameter. The average shall be in accordance with Table A.1.

5.1.3 *Straightness*

Pipes shall be rolled on two gantries or rotated around its axis on rollers. The gantries or rollers shall be separated by not less than two-thirds of the pipe length. The point of maximum deviation from the straight axis shall be determined and the deviation measured at that point shall not exceed the limit given in **4.1.7**.

Gutters shall be placed with their open side on a flat surface (see Figure G.1). Any gap along the length of the gutter, determined along either side of the gutter, shall not exceed the limits given in **4.1.7**. The gutter shall then be rotated through 90º on a level surface (see Figure G.2) and the test shall be repeated for each edge of the gutter.

NOTE The socket should not be included in this test.

5.2 As-cast surface condition

The as-cast surface condition shall be inspected visually.

5.3 Primary coating thickness

Primary coating thickness shall be verified during manufacture.

6 Marking

Pipes, gutters and fittings shall be legibly marked with the following information:

a) the number and date of this British Standard[1)];

b) the nominal size;

c) if applicable, the angle of the fittings;

d) a mark to identify the manufacturer, coded or not.

[1)] Marking BS 460:2002 on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirements of the standard. The accuracy of the claim is therefore solely the responsibility of the person making the claim. Such a declaration is not to be confused with third party certification of conformity, which may also be desirable.

Annex A (normative)
Dimensions of pipes, sockets and ears

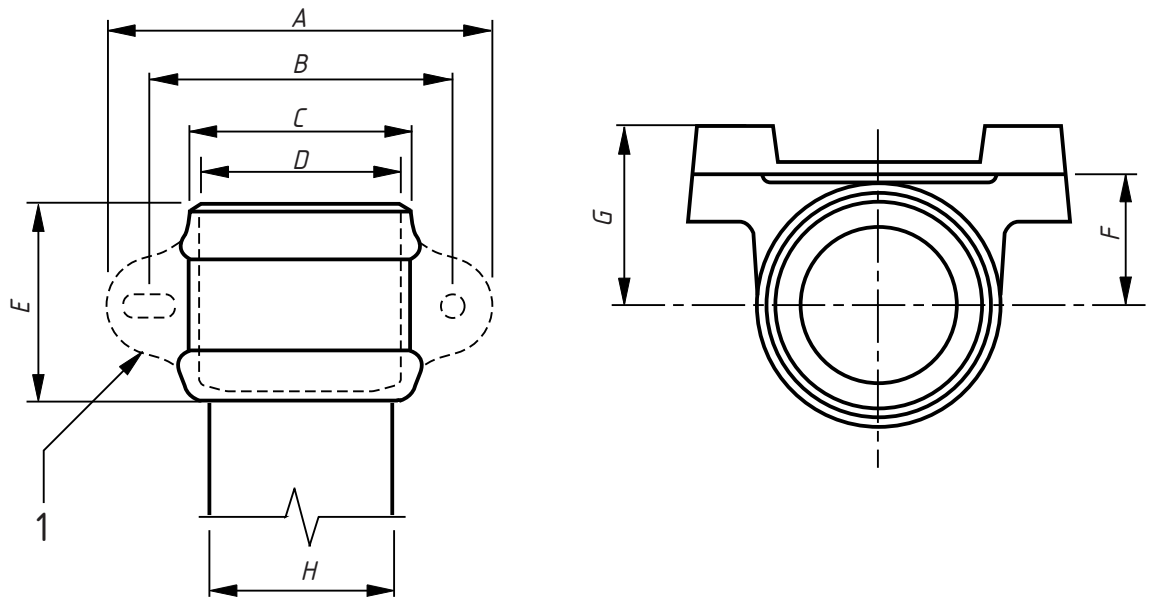
Dimensions of pipes, sockets and ears shall be as specified in Table A.1 and Figure A.1, [c2] Text deleted [c2].

Table A.1 — Dimensions of pipes, sockets and ears

Dimensions in millimetres

		Nominal size (DN)				
		50	65	75	100	150
Pipe						
Internal pipe diameter (min.)		45	55	[c1] 68 [c1]	95	145
External diameter (max.)	[c1] H [c1]	[c1] 59 [c1]	69	82	[c1] 109	159 [c1]
Wall thickness (min.)		3	3	3	3	3
Socket						
Internal diameter (min.)	*D*	[c1] 63 [c1]	71	85	[c2]111[c2]	164
External diameter (max.)	*C*	[c1] 74	84	98	124 [c1]	176
Wall thickness (min.)		3	3	3	3	3
Spigot insertion depth (min.)	*E*	58	64	64	64	75
Ears						
Overall length (nom.)	*A*	130	150	162	191	255
Hole centres (±4 mm)	*B*	100	111	130	158	215
Projecting ear (min.)	*G*	60	67	73	86	117
Standard ear (min.)	*F*	40	47	53	66	94
Bolt hole size (min.)		10	10	10	10	10

〈C1〉



Key

1 Ears and slots are optional

Figure A.1 — Dimensions

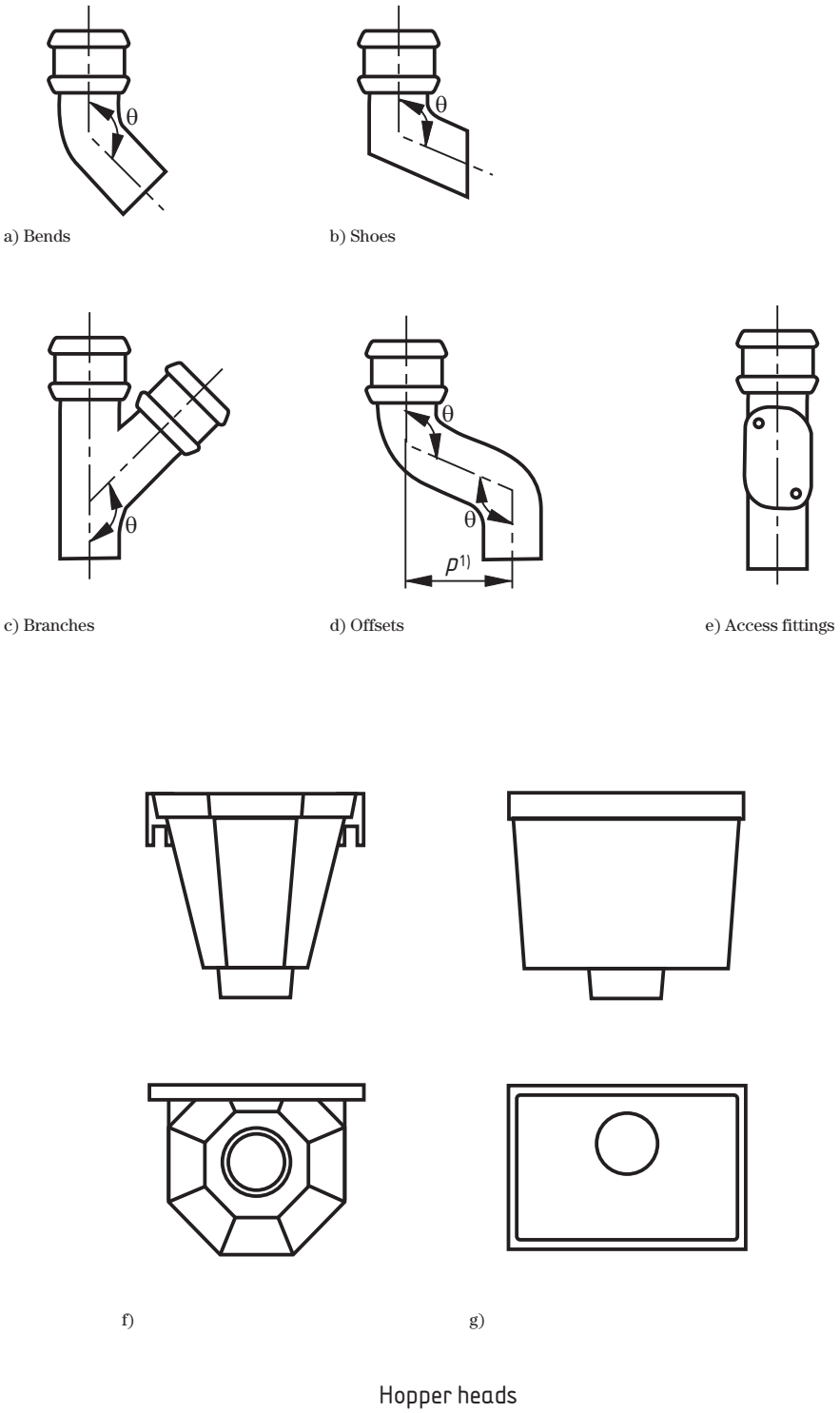
〈C1〉

Annex B (informative)
Typical examples of fittings for pipes

Typical examples of fittings for pipes are shown in Table B.1 and Figure B.1.

Table B.1 — Some typical examples of fittings for pipes

Nominal spigot sizes (DN)	a Bends			b [C1] Shoes [C1]	c Branches			d Offsets	e Access	f and g	
	θ			θ	θ			θ		[C1] Hoppers [C1]	
	92.5°	112.5°	135°	112.5°	92.5°	112.5°	135°	115°			
50	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
65	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
75	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
150	✓	✓	✓	✓	—	—	—	✓	—	✓	✓



a) Bends b) Shoes

c) Branches d) Offsets e) Access fittings

f) g)

Hopper heads

1) Refer to manufacturer's catalogue for range of offsets.

Figure B.1 — Illustrations of fittings for pipes

Annex C (normative)
Dimensions of half round gutter and fitting spigots

Dimensions of half round [C1⟩ *Text deleted* ⟨C1] gutter and fitting spigots shall be as specified in Table C.1 and Figure C.1.

Table C.1 — Half round gutter and fitting spigot dimensions

Dimensions in millimetres

Nominal size	Internal width A	Radius B	Depth C	Thickness E
75	[C1⟩ 75 ± 3	38 ± 3	35 ± 3 ⟨C1]	≥ 3
100	[C1⟩ 100 ± 3	51 ± 3	45 ± 3 ⟨C1]	≥ 3
115	[C1⟩ 112 ± 4	58 ± 3	50 ± 3 ⟨C1]	≥ 3
125	[C1⟩ 125 ± 4	64 ± 3	56 ± 3 ⟨C1]	≥ 3
150	[C1⟩ 150 ± 4 ⟨C1]	76 ± 3	[C1⟩ 66 ± 3 ⟨C1]	≥ 3

[C1⟩

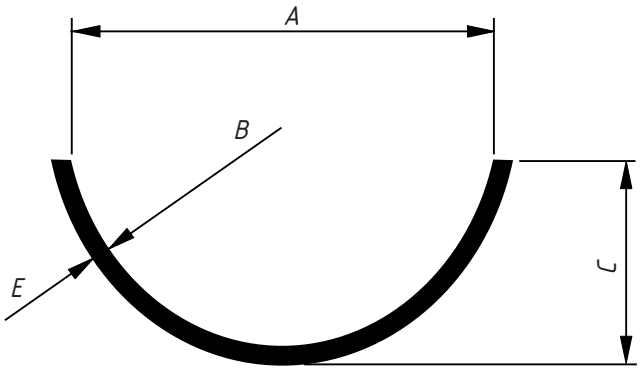


Figure C.1 — Half round gutter profile

⟨C1]

Annex D (informative)
Dimensions of half round beaded gutter and fitting spigots

Dimensions of half round [C1⟩ beaded ⟨C1] gutter and fitting spigots shall be as specified in Table D.1 and Figure D.1.

Table D.1 — Half round beaded gutter and fitting spigot dimensions

Dimensions in millimetres

Nominal size	Internal width A	Radius B	Depth C	Bead width D	Thickness E
100	[C1⟩ 100 ± 3	50 ± 3	45 ± 3	8.5 ± 1.5 ⟨C1]	≥ 3
115	[C1⟩ 112 ± 4	57 ± 3	[C2⟩ 53 ± 3 ⟨C2]	8.5 ± 1.5 ⟨C1]	≥ 3
125	[C1⟩ 125 ± 4	64 ± 3	57 ± 3	8.5 ± 1.5 ⟨C1]	≥ 3

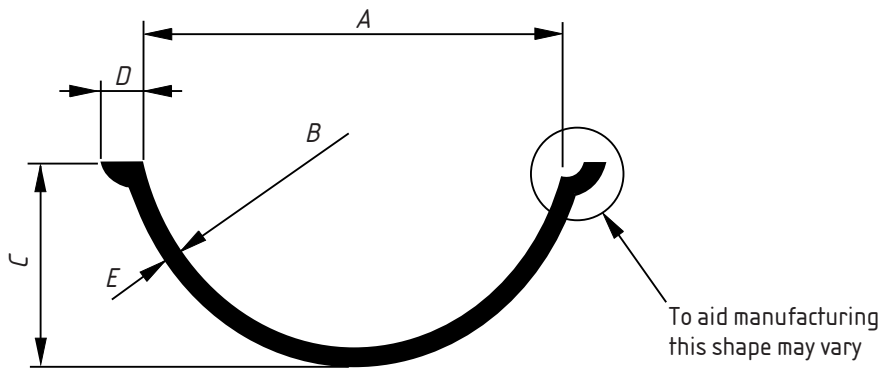


Figure D.1 — Half round beaded profile

[A1] Annex E (normative)
Dimensions of ogee gutters and fittings

Dimensions of ogee gutters and fitting spigots shall be specified in Table E.1 and Figure E.1.

Table E.1 — Ogee gutter and fitting spigot dimensions

Dimensions in millimetres

Nominal size	Internal width A	Depth B	Thickness E
100	[C1] 102 ± 3 〈C1〉	54 ± 2	≥ 3
115	[C1] 114 ± 3 〈C1〉	60 ± 2	≥ 3
125	[C1] 126 ± 3 〈C1〉	67 ± 2	≥ 3

[C1]

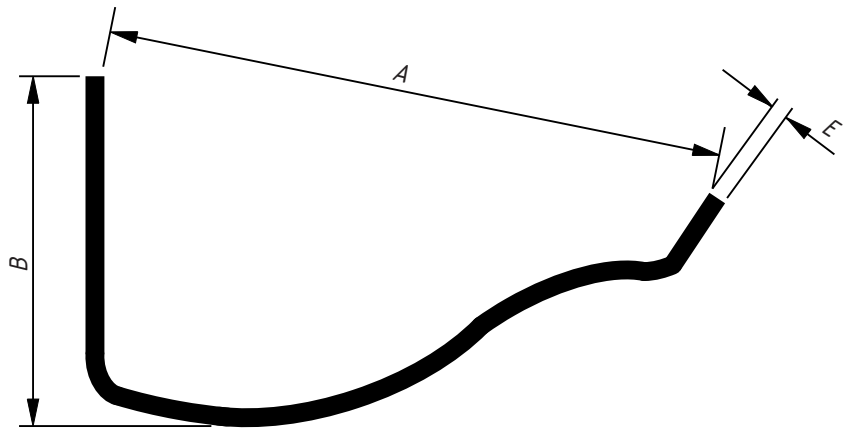


Figure E.1 — Typical ogee profile

〈C1〉

Annex F (informative)
Typical types of fittings for gutters

Typical types of fittings for gutters are shown in Table F.1 and Figure F.1.

Table F.1 — Some typical types of fittings for gutters

Range of sizes of gutters	100 A	115 B	125 E	150
Half round (see Figure C.1)	✓	✓	✓	✓
Half round beaded (see Figure D.1)	✓	✓	✓	—
Ogee (see Figure E.1)	✓	✓	✓	—

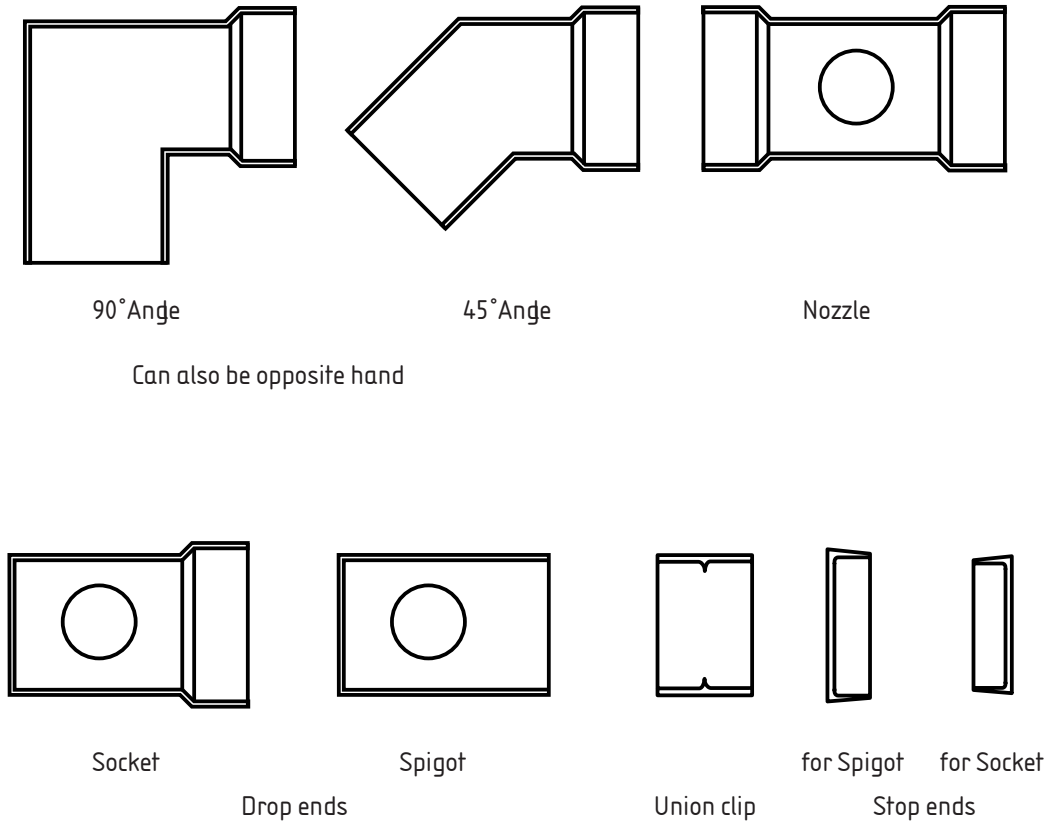


Figure F.1 — Illustrations of fittings for gutters

Annex G (informative)
Straightness

Typical methods of measuring the straightness are illustrated in Figure G.1 and Figure G.2.

C1

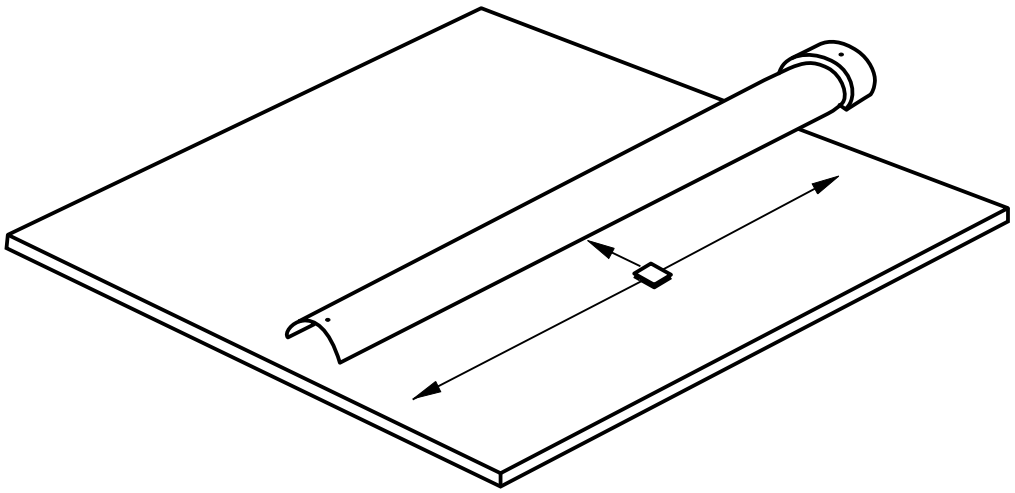


Figure G.1 — Open sided straightness

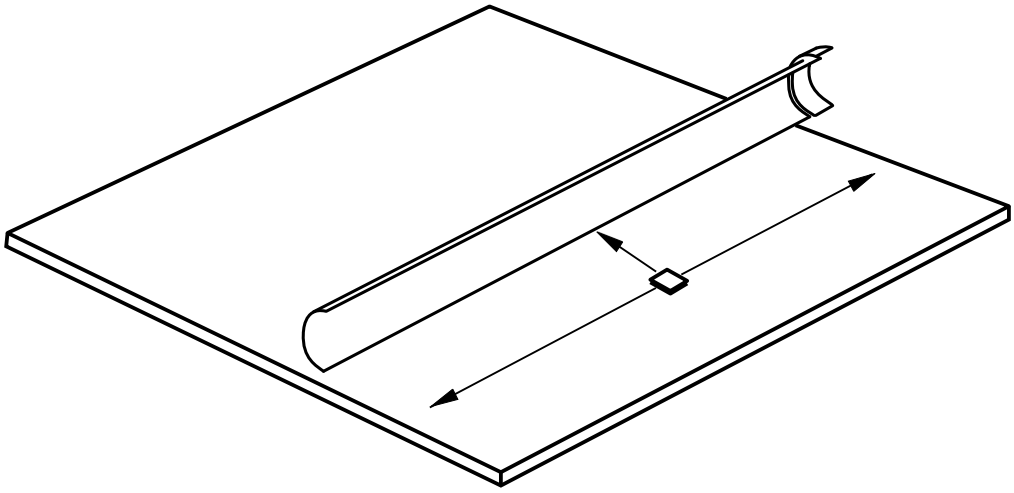


Figure G.2 — Closed sided straightness

C1

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Bibliography

BS EN ISO 6708:1996, *Pipework components — Definition and selection of DN (nominal size).*

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