

BRITISH STANDARD 4576 : Part 1 : 1970

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METRIC UNITS

SPECIFICATION FOR
**UNPLASTICIZED PVC
RAINWATER GOODS**

**Part 1. Half-round gutters
and circular pipe**

BRITISH STANDARDS INSTITUTION

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**Part 1. Half-round gutters
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BS 4576 : Part 1 : 1970

Incorporating amendment issued February 1971 (AMD 688)



BRITISH STANDARDS INSTITUTION

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THIS BRITISH STANDARD, having been approved by the Plastics Industry Standards Committee, was published under the authority of the Executive Board on 31 March, 1970.

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The Institution desires to call attention to the fact that this British Standard does not purport to include all the necessary provisions of a contract.

In order to keep abreast of progress in the industries concerned, British Standards are subject to periodical review. Suggestions for improvements will be recorded and in due course brought to the notice of the committees charged with the revision of the standards to which they refer.

A complete list of British Standards, numbering over 5000, fully indexed and with a note of the contents of each, will be found in the British Standards Yearbook, price £1. The BS Yearbook may be consulted in many public libraries and similar institutions.

This standard makes reference to the following British Standards:

BS 2494. Materials for elastomeric joint rings for pipework and pipelines.

BS 4800. Paint colours for building purposes.

BS 2782. Methods of testing plastics.

Methods 120A to 120E. Determination of the Vicat softening temperature of thermoplastics.

Methods 320A to 320F. Tensile strength, elongation and elastic modulus.

Method 540A. Determination of resistance to change upon exposure under glass to daylight.

BS 4514. Unplasticized PVC soil and ventilating pipe, fittings and accessories.

CP 308. Drainage of roofs and paved areas.

CP 312. Plastics pipework (thermoplastics materials)

Part 1. General principles and choice of material.

Part 2. Unplasticized PVC pipework for the conveyance of liquids under pressure.

British Standards are revised, when necessary, by the issue either of amendment slips 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.

The following BSI references relate to the work on this standard:
Committee references PLC/9 and PLC/9/4
Draft for comment 68/11483

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CO-OPERATING ORGANIZATIONS

The Plastics Industry Standards Committee, under whose supervision this British Standard was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:

- Board of Trade
- British Electrical and Allied Manufacturers' Association
- *British Plastics Federation
- Electrical Research Association
- *Engineering Equipment Users' Association
- *Ministry of Defence, Army Department
- *Ministry of Defence, Navy Department
- *Ministry of Public Building and Works, Building Research Station
- Ministry of Technology
- *Oil Companies Materials Association
- Plastics Institute
- Post Office
- *Royal Institute of British Architects
- Royal Institute of Public Health and Hygiene
- Rubber and Plastics Research Association of Great Britain
- Society of Motor Manufacturers and Traders Ltd.
- Surface Coating Synthetic Resin Manufacturers' Association

The Government departments and scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard:

- Associated Master Plumbers and Domestic Engineers
- Association of Public Health Inspectors
- British Chemical Plant Manufacturers' Association
- British Mechanical Rubber Manufacturers Association
- British Precast Concrete Federation
- British Rubber Manufacturers' Association
- British Waterworks Association
- Chemical Industries Association
- Copper Tube Fittings Manufacturers' Association
- Department of Health and Social Security
- Flushing Cistern Makers' Association
- Food Manufacturers' Federation (Inc.)
- Gas Council
- Gas List Tube Association
- Greater London Council
- Institute of Brewing
- Institute of Plumbing
- Institution of Civil Engineers
- Institution of Municipal Engineers
- Institution of Public Health Engineers
- Institution of Water Engineers
- Lloyd's Register of Shipping
- Ministry of Agriculture, Fisheries and Food
- Ministry of Housing and Local Government
- Ministry of Public Building and Works
- National Coal Board
- National Federation of Builders' and Plumbers' Merchants
- National Federation of Plumbers and Domestic Heating Engineers
- Plastic Pipe Manufacturers Society
- Royal Institution of Chartered Surveyors
- Royal Society for the Promotion of Health
- Society of Builders' Merchants
- Water Companies' Association
- Water Research Association

BRITISH STANDARD SPECIFICATION FOR UNPLASTICIZED PVC RAINWATER GOODS

Part 1. Half-round gutters and circular pipe

FOREWORD

This British Standard has been prepared under the authority of the Plastics Industry Standards Committee. Requirements for composition of material, colour, dimensions, and for physical and mechanical properties are specified. Details such as methods of jointing and fixing will, however, differ from one system to another.

Appendix J, 'Notes on fixings for use with unplasticized PVC rainwater goods' has been included to give guidance to users on the minimum requirements for fixings.

Dimensions are expressed in metric units but it has been decided to continue to designate by nominal sizes in inches the series of gutters and one size of pipe, because it is thought that considerable confusion would be caused by a change to metric designations at this stage.

Attention is drawn to CP 312, 'Plastics pipework (thermoplastic material)', Part 1, 'General principles and choice of material', Part 2, 'Unplasticized PVC pipework for the conveyance of liquids under pressure', which has been prepared to assist users in assessing the suitability of plastics pipes for particular purposes and to ensure their proper application, and to CP 308, 'Drainage of roofs and paved areas'.

NOTE. PVC rainwater goods have been available commercially for several years and the committee responsible for drafting this standard recognizes that rainwater goods will continue to be ordered by systems. It has not yet been possible to provide a standard that would permit complete interchangeability of one manufacturer's products with those of another.

SPECIFICATION

1. SCOPE

This British Standard provides a specification for half-round eaves gutters and circular rainwater pipe for external use, together with their associated fittings, made from unplasticized PVC.

The pipe specified in this standard is not suitable for soil, waste and ventilating applications.

2. MATERIAL

2.1 The material from which the gutters, pipe and fittings are produced shall consist substantially of polyvinyl chloride, to which may be added only those additives that are needed for the manufacture of the polymer and for its subsequent conversion into sound durable extrusions or mouldings of good surface finish and mechanical strength, and such pigments as are needed to ensure compliance with the requirements of Clause 3.

2.2 The use of the manufacturer's own clean rework material conforming to the requirements of this standard is permissible; no other rework material shall be used.

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2.3 When tested by Method 120B of BS 2782 : Part 1 : Methods 120A to 120E : 1976* on pressed sheet moulded at 180 °C the vicat softening point of the material with 5 kg weight shall be not lower than 75 °C.

2.4 Resistance to acid and alkali. When three samples of gutter, pipe or fitting are tested by the method described in Appendix A, their average mass shall not change by more than 0.032g

*As altered
Feb. 1971*

3. COLOUR AND COLOUR FASTNESS

3.1 The colour of the rainwater goods shall be one of the following:

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- (1) Black.
- (2) Grey conforming to colour 00 A 01 of BS 4800†
- (3) Grey conforming to colour 10 A 07 of BS 4800†
- (4) Grey conforming to the sample held by BSI of colour 'I.C.I. 952'.
- (5) Grey conforming to the sample held by BSI of colour 'RAL 7032'.
- (6) Another colour agreed between the purchaser and the vendor.

3

3.2 The colour fastness of the rainwater goods when tested by the method described in BS 2782 : Part 5 : Method 540A* shall be not less than standard No. 5.

4. FREEDOM FROM DEFECTS

4.1 The internal and external surfaces of the gutters, pipe and fittings shall be clean, smooth, and reasonably free from grooving and other defects that would impair their performance in service.

4.2 The ends of the gutters, pipe and fittings shall be cleanly cut and square with the axis of the component. The gutters and pipe shall be reasonably straight.

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* BS 2782, 'Methods of testing plastics'.

Part 1, 'Thermal properties', Methods 120A to 120E, 'Determination of the Vicat softening temperature of thermoplastics'.

Part 5, 'Optical and colour properties', Method 540A, 'Determination of resistance to change upon exposure under glass to daylight'.

† BS 4800, 'Paint colours for building purposes'.

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5. DIMENSIONS

True half-round and nominal half-round gutters (see Fig. 3), gutter fittings, pipe and pipe fittings shall conform to the dimensions given in Tables 1 to 3, except that the bore of fittings for use with non-sealed rainwater systems may be 5.56 mm less than the specified nominal dimension at the spigot areas only. The effective sealed cross-sectional areas of gutters shall be not less than 80 % of the minimum cross-sectional area specified in Tables 2 and 3. The dimensions of standard fittings shall be as specified in Tables 4 and 5, and Figs. 1, 2 and 4.



As altered
Feb. 1971



6. LENGTHS OF GUTTER AND PIPE

Standard lengths of pipe shall be 2 m and 4 m effective length. Standard lengths of gutter shall be 1.8 m and 3.6 m effective length. The effective length of socketed gutters and pipes shall be the overall length exclusive of insertion depth(s) (see Fig. 5). A tolerance of ± 6 mm is permissible.

7. MARKING

Each length of gutter and pipe, and each fitting, shall be clearly and durably marked to show, in the order stated, the manufacturer's identification, the number of this British Standard (i.e. BS 4576) and the nominal size as shown in the appropriate table or figure.

NOTE. It is strongly recommended that in view of the nature of this standard manufacturers and purchasers should make use of the certification scheme whereby the product may bear the registered certification mark of BSI. For further information see the back cover of this standard.

8. TENSILE PROPERTIES OF GUTTER AND PIPE

When tested by the method described in Appendix B the tensile strength of the gutter or pipe shall be not less than 45 MN/m² and the elongation at break shall be not less than 80 %.



TABLE 1. PIPE DIMENSIONS

Nominal size	Minimum outside diameter	Maximum outside diameter	Minimum wall thickness	Minimum bore
mm	mm	mm	mm	mm
63	63.00	63.30	1.8	58.4
68	68.30	68.70	1.8	63.5
75	75.00	75.40	1.8	70

As altered
Feb. 1971

NOTE. Three further sizes of pipe (82 mm, 110 mm and 160 mm) are not specified in this standard but are included in BS 4514, 'Unplasticized PVC soil and ventilating pipe, fittings and accessories' and are suitable for sealed systems for internal or external use.

TABLE 2. DIMENSIONS OF TRUE HALF-ROUND* GUTTERS

Nominal size	Minimum wall thickness	Minimum cross-sectional area	Minimum effective sealed cross-sectional area
mm	mm	mm ²	mm ²
100	2.2	4000	3200
112	2.2	5100	4080
125	2.3	6300	5040
150	2.5	9100	7280

TABLE 3. DIMENSIONS OF NOMINAL HALF-ROUND* GUTTERS

Nominal size	Minimum wall thickness	Minimum cross-sectional area	Minimum effective sealed cross-sectional area
mm	mm	mm ²	mm ²
100	2.2	3200	2560
112	2.2	4000	3200
125	2.3	4900	3920
150	2.5	7200	5760

The minimum cross-sectional areas given in Tables 2 and 3 are calculated cross-sectional areas and no cutting allowance has been made.

* See Fig. 3.