

B.S. 1431 : 1960

**SPECIFICATION FOR
WROUGHT COPPER AND
WROUGHT ZINC
RAINWATER GOODS**

THIS BRITISH STANDARD, having been approved by the Hardware and Ironmongery Industry Standards Committee and endorsed by the Chairman of the Building Divisional Council, was published under the authority of the General Council on 21st September, 1960.

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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 3000, indexed and cross-indexed for reference, together with an abstract of each standard, will be found in the Institution's Yearbook, price 15s.

This standard makes reference to the following British Standards:

- B.S. 219 Soft solders.
- B.S. 729 Copper sulphate test and visual examination of hot dip galvanized and sherardized coatings.
- B.S. 849 Plain sheet zinc roofing.
- B.S. 899 Rolled copper sheet and strip for general purposes.
- B.S. 1172 Phosphorus deoxidized non-arsenical copper for general purposes.
- B.S. 1174 Phosphorus deoxidized arsenical copper.
- B.S. 2997 Aluminium rainwater goods.

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 B.S.I. references relate to the work on this standard:
Committee reference HIB/20 Draft for comment CZ(HIB) 9380

CO-OPERATING ORGANIZATIONS

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

- British Ironfounders' Association
- British Lock and Latch Manufacturers' Association
- British Plastics Federation
- *Building Industry Distributors
- Cast Butt Hinge Manufacturers' Association
- *D.S.I.R.—Building Research Station
- *Institution of Municipal Engineers
- *London County Council
- Metal Window Association
- *Ministry of Housing and Local Government
- *Ministry of Works
- National Brassfoundry Association
- National Federation of Building Trades Employers
- National Federation of Ironmongers
- *Royal Institute of British Architects
- *Royal Institution of Chartered Surveyors

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 standard:

- Aluminium Development Association
- Aluminium Industry Council
- Associated Master Plumbers and Domestic Engineers
- British Federation of Plumbers' Merchants
- Copper Development Association
- Gutter Bracket Manufacturers' Association
- Light Metal Founders' Association
- Royal Society for the Promotion of Health
- Zinc Development Association

BRITISH STANDARD SPECIFICATION FOR WROUGHT COPPER AND WROUGHT ZINC RAINWATER GOODS

FOREWORD

This British Standard was prepared in order to co-ordinate the general features of rainwater goods made from wrought copper and wrought zinc. It has been revised so that as far as possible it is similar in form to B.S. 2997, 'Aluminium rainwater goods'.

In view of the importance of correctly fixing and jointing the types of rainwater goods described, recommendations covering these matters have been given, for reference, in Appendix A.

Factors to assist in conversions to metric units may be found in Appendix B.

SPECIFICATION

PART 1. GENERAL REQUIREMENTS

SCOPE

1. This British Standard covers the materials, workmanship, design, construction, dimensions and tolerances on dimensions of rainwater goods, comprising eaves gutter, gutter fittings, rainwater pipe and pipe fittings, made from copper and zinc.

Accessories such as gutter brackets are not dealt with in the specification but recommendations concerning their selection, design and use are given in Appendix A.

DEFINITION

2. For the purpose of this British Standard, the following definition applies:

Obtuse angle. An angle of $135 \pm 2^\circ$ unless otherwise specified by the purchaser.

MATERIALS

3. *a. Copper goods.* (i) *Gutter.* The gutter shall be made from material complying with the requirements of B.S. 899*, in the half-hard condition.

(ii) *Gutter fittings.* Gutter fittings shall be made from material complying with the requirements of B.S. 899*, in the half-hard condition.

* B.S. 899, 'Rolled copper sheet and strip for general purposes'.

(iii) *Rainwater pipe*. A. Rainwater pipe made from sheet or strip shall be made from material complying with the requirements of B.S. 899*, in the annealed condition.

B. Rainwater pipe which is solid-drawn shall be made from material which complies with the requirements of either B.S. 1172† or B.S. 1174‡ at the option of the manufacturer.

(iv) *Rainwater pipe fittings*. Rainwater pipe fittings shall be made from material complying with the requirements of B.S. 899*, in the annealed condition.

b. **Zinc goods**. All zinc rainwater goods shall be made from zinc sheet complying with the requirements of Part 1 of B.S. 849§.

c. **Solder**. Solder, if used, shall conform to Grade F of B.S. 219||.

WORKMANSHIP

4. a. **General**. The rainwater goods shall be free from deleterious defects such as holes, twist, burrs, laminations, surface cracks and drawing fractures.

b. **Joints**. Joints shall be soundly and solidly made and all surplus flux and superfluous jointing material shall be carefully removed.

c. **Finish**. There shall be no pronounced tool or drawing marks on the rainwater goods, which shall be finished 'as rolled' or 'as drawn'.

CONSTRUCTION

5. The rainwater goods shall be soundly constructed in accordance with the specific requirements of the appropriate clauses in this British Standard.

DIMENSIONS AND TOLERANCES

6. a. **Dimensions**. The dimensions of the rainwater goods shall conform to those given in the appropriate clauses, tables and drawings in Part 2 of this British Standard.

b. **Tolerances**. Unless otherwise specified in this British Standard, the dimensions (except decimal dimensions) given in Part 2 below shall be subject to a tolerance of $\pm \frac{1}{16}$ in, except that the extreme range of variation, from the specified dimensions, between articles supplied to any one order shall not exceed $\frac{1}{16}$ in.

* B.S. 899, 'Rolled copper sheet and strip for general purposes'.

† B.S. 1172, 'Phosphorus deoxidized non-arsenical copper for general purposes'.

‡ B.S. 1174, 'Phosphorus deoxidized arsenical copper'.

§ B.S. 849, 'Plain sheet zinc roofing'.

|| B.S. 219, 'Soft solder'.

MANUFACTURER'S CERTIFICATE AND MARKING

7. Articles shall be either marked indelibly with the manufacturer's name or identification mark and the number of this British Standard, or the manufacturer shall certify that the goods comply with this British Standard.

FACILITIES FOR INSPECTION

8. The purchaser or his representative shall, if he so requires, be given facilities at the works of the manufacturer at all reasonable times for the purpose of carrying out inspection during manufacture of the goods being supplied to his order.

The manufacturer shall, at his own cost, supply labour and any apparatus for such inspection as may be carried out on his premises.

PART 2. SPECIFIC REQUIREMENTS

SECTION ONE: RAINWATER GUTTERS AND GUTTER FITTINGS

TYPES OF GUTTERS

9. Gutters shall be of one of the cross sections shown in the following drawings:

Fig. 1, half-round, with a double bead.

Fig. 2, rectangular, with a bead on the exposed face.

Fig. 3, ogee, with a bead on the moulded face.

CONSTRUCTION OF GUTTERS

10. *a. General.* Gutters shall be cold formed from sheet or strip material.

b. Stays. The purchaser shall state with his order if he does not require the gutter to be strengthened by the affixing of stiffening stays, otherwise the manufacturer shall supply gutter having distance pieces, formed of tubes, soldered in the positions shown in Figs. 1–3, at centres not exceeding 15 in.

For copper gutters, fixed stays shall be of copper or a suitable copper alloy.

For zinc gutters, fixed stays shall be of zinc.

NOTE. For recommendations concerning stays which form part of the supporting brackets, see the Appendix.

c. Beaded edges. Gutters shall be provided with beaded edges of the types shown in Figs. 1, 2, 3 and 4*a* below, except that, if specially ordered by the purchaser, the bead shall have one of the alternative profiles shown in Figs. 4*b* or 4*c*.

DIMENSIONS OF GUTTERS

11. a. General. Gutters shall conform to the dimensions given in Sub-clauses *b*, *c*, *d* and *e* below.

b. Nominal sizes. The range of nominal sizes, which shall be measured internally as indicated by the letter A on Figs. 1, 2 and 3 below, shall be 3 in, 4 in, 4½ in and 5 in.

c. Lengths. Gutters shall be provided in overall* lengths of 6 ft 0 in, 7 ft 0 in and 8 ft 0 in or shorter lengths when specially ordered.

d. Thicknesses. The thickness of gutters and fittings shall be not less than the following:

(i) *Copper gutters:*

Nominal sizes less than 5 in	24 S.W.G. (0·022 in)
5 in nominal size	22 S.W.G. (0·028 in)

(ii) *Zinc gutters:*

Nominal sizes less than 5 in	23 S.W.G. (0·024 in) (i.e. 12 zinc gauge)
5 in nominal size	21 S.W.G. (0·032 in) (i.e. 14 zinc gauge)

e. Profiles. The profiles of gutters shall conform to Figs. 1, 2 and 3 and Table 1.

* It is impracticable to give 'effective lengths', as in other British Standards for gutters and pipes, because the types covered by this standard are not provided with sockets and it is customary, therefore, to refer only to overall lengths.

TABLE 1. DIMENSIONS OF GUTTER PROFILES

Type	Dimension	Nominal size (A)			
		3 in	4 in	4½ in	5 in
		in	in	in	in
Half-round	Depth at B	1⅞	2½	2¾	3
	Depth at C	1½	2	2¼	2⅜
	Diameter of bead E	¾	½	½	⅝
	Alternative width of flange E ₁	½	¾	¾	1
Rectangular	Depth at B	2⅜	3⅝	3⅞	4¼
	Depth at C	2	3	3¼	3½
	Diameter of bead E	¾	⅝	⅝	¾
	Alternative width of flange E ₁	½	¾	¾	1
Ogee	Depth at B	2¾	3⅝	3⅞	4¼
	Depth at C	2⅜	3	3¼	3½
	Depth at D	¾	1	1	1⅞
	Diameter of bead E	¾	⅝	⅝	¾
	Radius F	1⅞	1⅜	1½	1⅝
	Bed of gutter G	1⅜	2⅞	2⅜	2⅞
	Alternative width of flange E ₁	½	¾	¾	1
	Location of centre for external radius {	X	¾	¾	¾
		Y	1¾	2⅞	2⅞