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Full document details: BS 2051-1:1953

W/b + 5/5 by 1973 issue of Watkins + 3 Amd

BRITISH STANDARD 2051 : Part 1 : 1953

COPPER AND COPPER ALLOY CAPILLARY & COMPRESSION TUBE FITTINGS

(FOR USE WITH FRACTIONAL O.D. SIZES OF TUBES)

FOR ENGINEERING PURPOSES

BRITISH STANDARDS INSTITUTION

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BRITISH STANDARD SPECIFICATION

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B.S. 2051 : Part 1 : 1953

Price 3/- net

BRITISH STANDARDS INSTITUTION

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THIS BRITISH STANDARD, having been approved by the Mechanical Engineering Industry Standards Committee and endorsed by the Chairman of the Engineering Divisional Council, was published under the authority of the General Council on 17th December, 1953.

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 2000, indexed and cross-indexed for reference, together with an abstract of each standard, will be found in the Institution's Yearbook, price 12s. 6d.

This standard makes reference to the following British Standards:—

B.S. 21. Pipe threads.
B.S. 84. Screw threads of Whitworth form.
B.S. 218. Brass bars and sections (suitable for forgings) and drop forgings.
B.S. 249. Free machining brass rods and sections.
B.S. 1172–1174. Deoxidized and arsenical coppers.
B.S. 1400. Copper alloy ingots and castings.
B.S. 1580. Unified screw threads.
B.S. 1768. Unified precision hexagon bolts, screws, nuts (UNC and UNF threads) and plain washers—normal series.

and to the following American Standards:—

ASA. B2. 1. Pipe threads.
API. STD. 5L. Specification for line pipe.
API. STD. 6A. Specification for threads in valves, fittings and flanges.

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.

MEE/118/2

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CO-OPERATING ORGANIZATIONS

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

Admiralty
Air Ministry
Associated Offices Technical Committee
Association of Consulting Engineers (Incorporated)
British Chemical Plant Manufacturers' Association
British Compressed Air Society
British Electrical and Allied Manufacturers' Association
British Electricity Authority and Area Boards
*British Engineers' Association
British Internal Combustion Engine Manufacturers' Association
British Iron and Steel Federation
British Railways
*Crown Agents for the Colonies
D.S.I.R.—Mechanical Engineering Research Laboratory
Engineering Equipment Users' Association
Gas Council
High Commission of India
Institute of Marine Engineers
Institute of Petroleum
Institution of Civil Engineers
Institution of Gas Engineers
Institution of Heating and Ventilating Engineers
*Institution of Mechanical Engineers
Institution of Mechanical Engineers (Automobile Division)
*Institution of Production Engineers
*Locomotive Manufacturers' Association
Machine Tool Trades' Association
Ministry of Fuel and Power
Ministry of Labour and National Service (Factory Department)
*Ministry of Supply
Ministry of Transport
Ministry of Works
National Physical Laboratory
Radio Industry Council
War Office

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:—

British Industrial Measuring and Control Apparatus Manufacturers' Association
British Refrigeration Association
Copper Development Association
Copper Tube Fittings Manufacturers' Association
Hydraulic Association
London Transport Executive
Marine Engineers' Association
National Brassfoundry Association
Society of British Aircraft Constructors
Society of Motor Manufacturers and Traders

BRITISH STANDARD SPECIFICATION FOR

COPPER AND COPPER ALLOY CAPILLARY AND COMPRESSION TUBE FITTINGS

(FOR USE WITH FRACTIONAL O.D. SIZES OF TUBES)

FOR ENGINEERING PURPOSES

FOREWORD

This British Standard has been prepared under the authority of the Mechanical Engineering Industry Standards Committee. It relates to three types of tube fittings for engineering purposes for use in conjunction with copper, copper alloy and other suitable tubing, viz.:

a. Capillary fittings in which the joint is made by the flow of solder by capillarity along the annular space between the outside of the tube and the inside of the socket of the fitting, the size of this annular space being dimensionally accurate within close limits.

b. Compression fittings, Type 'A', in which the joint is made by the compression of a ring or sleeve or part of the fitting, on to the outside wall of the tube.

c. Compression fittings, Type 'B', in which the joint is made by the compression of a manipulated portion of the tube at or near its end against true faces of the body of the fitting or against a loose ring or sleeve within the fitting.

Where Type 'A' compression fittings are to be used with tubes in soft temper, reference should be made to the manufacturer to ensure that the make of fitting is suitable for this application.

This standard does not attempt the complete dimensional standardization of any of the types of fittings, since the variety in the designs and methods of production already established by the various manufacturers makes any such attempt impracticable. Without seeking to limit the individual refinements of design, which are the distinctive feature of the proprietary product, this standard does, however, lay down such dimensions and requirements as are essential to ensure satisfactory installation and performance.

The fittings covered by this standard are for use with tubes designated by their outside diameters in inches and fractions of an inch, such diameters being equal (subject to appropriate tolerances) to the nominal sizes of fitting stated in the various tables, and primarily with copper tubes of the sizes given in Appendix A of B.S. 2017, 'Copper tubes for general purposes'.

A complementary British Standard has been published as B.S. 864, 'Capillary and compression fittings of copper and copper alloy for use

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with copper tube to B.S. 659 and/or B.S. 1386'. The fittings covered by B.S. 864 are intended primarily for use in water and gas piping systems and are designed to fit copper tubes complying with the dimensional requirements of the tables in B.S. 659* and B.S. 1386†.

Other types of copper tube fittings known as olive, soldered nipple, and flared fittings are covered in B.S. 2051 : Part 2. Steel compression fittings are covered in Part 3‡ of this standard and steel nipple fittings (for brazing) (unified threads and unified hexagons) are covered in Part 4‡.

Two appendices have been included: one describes methods of specifying fittings, and the other gives the preferred sizes of copper tubes for general purposes, as contained in Appendix A of B.S. 2017, 'Copper tubes for general purposes'.

SPECIFICATION

SECTION ONE: GENERAL REQUIREMENTS

SCOPE

1. This British Standard covers copper and copper alloy tube fittings for use with copper, copper alloy and other suitable tubing for a wide range of engineering purposes.

It applies to capillary fittings and to compression fittings, Types 'A' and 'B', of sizes ranging from ⅛ in. to 1 in. inclusive.

These fittings are intended primarily for use with tubes of the outside diameters given in Appendix A to B.S. 2017, 'Copper tubes for general purposes' (reproduced in Appendix B of this standard).

DESIGNATION OF SIZES OF FITTINGS

2. The size by which the fitting is designated shall be the outside diameter of the tube with which it is to be used. The method of specifying the ends of unequal fittings shall be in accordance with Appendix A.

SCREW THREADS

3. *a. Fittings.* The screw threads used on the fittings, except those on connector-ends, shall be at the option of the manufacturer.

The external and internal threads shall be chamfered at the face of the fitting to an included angle of 90° not less than one thread deep.

b. Connector-ends. The connector-ends of fittings may be screwed to any one of the following standard threads as agreed between the purchaser and the manufacturer. Where a particular type of thread is required on connector-ends, this shall be specifically stated on the enquiry and order.

(i) *B.S.P. (parallel) threads.* Where B.S.P. (parallel) threads are specified, the connector-ends of fittings shall be screwed B.S.P. (parallel) threads, external or internal, in accordance with B.S. 84,* Tables 18 and 19, *medium fit.*

(ii) *B.S. pipe (taper) threads.* Where B.S. pipe (taper) threads are specified, the connector-ends of fittings shall be screwed B.S. pipe (taper) threads, in accordance with B.S. 21†.

(iii) *Unified threads.* Where unified threads are specified, the connector-ends of fittings shall be screwed with unified fine threads in accordance with B.S. 1580‡, Class 2A for external threads and Class 2B for internal threads.

(iv) *API threads.* Where API threads are specified, the connector-ends of fittings shall be screwed in accordance with API STD. 5L for external threads and API STD. 6A for internal threads.

(v) *A.S.A. threads.* Where A.S.A. threads are specified, the connector-ends of fittings shall be screwed with taper threads in accordance with A.S.A. B2. 1.

The dimensions of threaded ends shall comply with Table 1 for parallel threads and Table 2 for taper threads respectively.

In fittings with parallel threads, the faces designated A and B in Figs. 1 and 2, shall be smoothly machined at right angles to the axis of the thread.

* B.S. 659, 'Light gauge copper tubes for water, gas and sanitation'.
† B.S. 1386, 'Copper tubes to be buried underground'.
‡ In course of preparation.

* B.S. 84, 'Screw threads of Whitworth form'.
† B.S. 21, 'Pipe threads'.
‡ B.S. 1580, 'Unified screw threads'.

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