BRITISH STANDARD

BS 2051-1: 1973

Incorporating Amendment Nos. 1 and 2

Specification for

Tube and pipe fittings for engineering purposes —

Part 1: Copper and copper alloys capillary and compression tube fittings for engineering purposes

UDC 621.643.41:669.3-462

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:

Associated Offices Technical Committee
Association of Consulting Engineers
Association of Hydraulic Equipment Manufacturers Ltd*
Association of Mining Electrical and Mechanical Engineers
British Compressed Air Society*
British Electrical and Allied Manufacturers' Association
British Gear Manufacturers' Association
British Internal Combustion Engine Manufacturers' Association*
British Mechanical Engineering Confederation*
British Pump Manufacturers' Association
British Steel Industry*
Crown Agents for Oversea Governments and Administrations
Department of Employment (H.M. Factory Inspectorate)
Department of the Environment
Department of Trade and Industry
Department of Trade and Industry — National Engineering Laboratory
Electricity Council, the Central Electricity Generating Board and the Area Boards in England and Wales
Engineering Equipment Users' Association
Gas Council*
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Institution of Gas Engineers
Institution of Heating and Ventilating Engineers
Institution of Mechanical Engineers*
Institution of Mechanical Engineers (Automobile Division)
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Process Plant Association
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The Government department 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 Malleable Tube Fittings Association
British Non-ferrous Metals Federation
British Plastics Federation
British Refrigeration and Air Conditioning Association
British Ship Research Association
British Valve Manufacturers' Association
British Waterworks Association
Catering Equipment Manufacturers' Association
Copper Development Association
Copper Tube Fittings Manufacturers' Association
Dept. of Health & Social Security
Heating Ventilating and Air Conditioning . Manufacturers' Association Ltd.
Metropolitan Water Board
Ministry of Housing & Local Government
National Brassfoundry Association
Society of British Gas Industries
Society of British Aerospace Companies
Society of Motor Manufacturers and Traders
Tube Investments

This British Standard, having been approved by the Mechanical Engineering Industry Standards Committee was published under the authority of the Executive Board on 20 October 1973

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The following BSI references relate to the work on this standard:
Committee reference MEE/118 and MEE/118/2
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Amendments issued since publication

Amd. No.	Date of issue	Comments
1888	February 1976	
2277	May 1977	Indicated by a sideline in the margin

Contents

Foreword

This Part of this British Standard, first published in 1953, has been prepared in this first revision under the authority of the Mechanical Engineering Industry Standards Committee, and originally formed one of four parts:

— *Part 1: Copper and copper alloy capillary and compression tube fittings (for use with fractional o.d. sizes of tubes)*;

— *Part 2: Olive. soldered nipple and flared types of copper and copper alloy tube fittings (for use with fractional o.d. sizes of tubes) (under revision)*;

— *Part 3: Steel compression pipe fittings (withdrawn, superseded by BS 4368. "Carbon and stainless steel compression couplings for tubes")*;

— *Part 4: Steel nipple pipe fittings for brazing (Unified threads and Unified hexagons) (withdrawn).*

This Part of this standard relates to three types of tube fittings for engineering purposes for use in conjunction with copper, copper alloy and other suitable tubing.

1) *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.

2) *Compression fittings, Type A*, in which the joint is made by the compression of a loose ring or sleeve to the outside surface of the tube.

3) *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 the face of the body of the fitting or against a loose ring or sleeve within the fitting.

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

Type B fittings are not normally suitable for tubes in hard temper but, if required, reference should be made to the manufacturer.

This standard does not attempt the complete dimensional standardization of any of the types of fittings, since the variety of 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 millimetres such diameters being equal (subject to appropriate tolerances) to the sizes of fitting stated in Table 4 and Table 6, and primarily with copper and copper alloy tubes of the sizes given in BS 2871, *"Copper and copper alloys.* Tubes: Part 2: *"Tubes for general purposes"*.

A complementary British Standard has been published as BS 864-2, *"Capillary and compression tube fittings of copper and copper alloy"* for use with copper and copper alloy tube conforming to the requirements of BS 2871-1, *"Copper tubes for water, gas and sanitation"*. The fittings covered by BS 864 are intended primarily for use in water and gas piping systems and also engineering purposes where suitable.

Two appendices are included, giving methods of specifying fittings and the sizes of copper and copper alloy tubes as contained in BS 2871-2.

NOTE All dimensions are in millimetres unless otherwise stated, and all pressures are gauge pressures.

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.

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

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 12, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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1 General requirements

1.1 Scope

1.1.1 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.

1.1.2 It applies to capillary fittings and to compression fittings, Types A and B, in sizes ranging from 4 mm to 42 mm inclusive.

1.1.3 These fittings are intended primarily for use with tubes of the outside diameters given in BS 2871-2.

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

1.2 Design

1.2.1 The fittings shall be proportioned consistent with the strength required.

1.2.2 The fittings shall be free from internal fins or other irregularities which might restrict the free flow or cause turbulence of the fluid and shall be so designed that the resistance to the flow through the fittings shall be reduced to a minimum.

1.2.3 Where appropriate the across flats dimensions for nuts and on the coupling body shall be in accordance with Table 5.

1.2.4 All straight fittings with screwed stud ends shall have provision for tightening.

1.3 Workmanship

The fittings shall be clean and neatly finished, free from burrs, fins, sharp edges and other defects.

1.4 Designation of sizes of fittings

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 fittings with unequal or screwed stud ends shall be in accordance with Appendix A, together with the letters mm.

1.5 Screw threads

1.5.1 Fittings. The screw threads used in the fittings, except those on stud ends (connector ends), shall be at the option of the manufacturer.

The external and internal threads shall be chamfered at the face of the fittings to an included angle of 90°. The diameter of the chamfer shall be equal to the minor or major diameter of the thread as appropriate.

1.5.2 Stud-ends (connector ends). The stud 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 stud ends this shall be specifically stated on the enquiry and order.

1) *Series G threads*. Where Series G threads are specified the stud ends of fittings shall be screwed to Series G threads, external or internal, in accordance with the requirements of BS 2779 (see Table 1 of this standard).

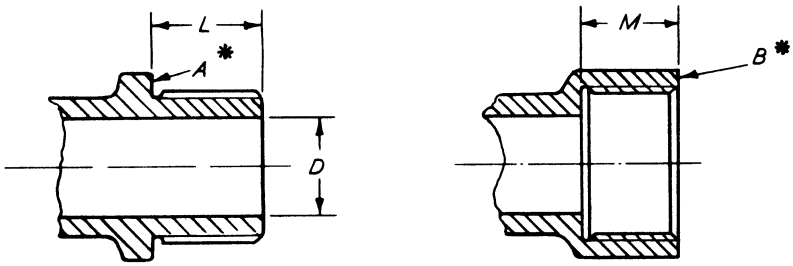
2) *Series R threads*. Where Series R threads are specified, the stud ends of fittings shall be screwed to Series R threads in accordance with the requirements of BS 21 (see Table 2 of this standard).

3) *Other threads*. Where other types of threads are required, these shall be subject to agreement between manufacturer and purchaser.

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

1.5.4 Thread undercuts and recesses. Thread undercuts shall comply with the requirements of BS 1936-1 & BS 1936-2.

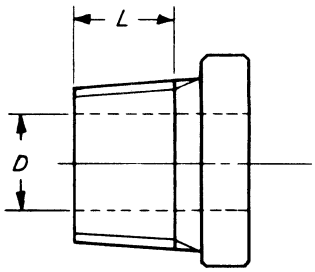
Table 1 — Standard threaded ends (parallel threads)



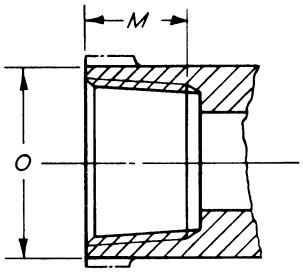
NOTE These illustrations are diagrammatic only; they do not purport to indicate standard forms or shapes and are solely for the purpose of indicating where the specified dimensions are to be measured.

1	2	3	4	5
Series G thread size (BS 2779)	**Usual size of fitting (for guidance only)**	**Bore diameter *D* (max.)**	***L* length of external thread max. *M* length of internal thread min.**	**Min. sealing faces A/c flats of dia. *A* and *B***
	mm	mm	mm	mm
⅛	4 & 5	4.5	7.4	14
¼	6, 8 & 10	7.5	11.0	18
⅜	10 & 12	10.0	11.4	22
½	15, 16 & 18	13.5	15.0	26
¾	20 & 22	19.5	16.3	32
1	25 & 28	24.5	19.1	39
1¼	30 & 35	32.0	21.4	49
1½	38 & 42	38.0	21.4	55
2	42	51.0	25.7	68
* See Clause **1.5.3**, regarding faces designated A and B.				

Table 2 — Standard threaded ends (taper threads)



a. Taper thread, external



Dimension '*O*' is diameter of end with internal threads, or minimum width across flats of hexagon where used

b. Taper thread, internal

NOTE 1 These illustrations are diagrammatic only: they do not purport to indicate standard forms or shapes and are solely for the purpose of indicating where the specified dimensions are to be measured.

NOTE 2 For across flat sizes see **1.9**.

1	2	3	4	5
Series R thread size (BS 21)	**Usual size of fitting (for guidance only)**	**Bore *D* (max.)**	***L* useful length of external thread (max.)** ***M* useful length of internal thread (min.)**	**—** ***O* (min.)**
	mm	mm	mm	mm
⅛	4 & 5	4.5	7.4	16.6
¼	6, 8 & 10	7.5	11.0	19.5
⅜	10 & 12	10.0	11.4	24.0
½	15,16 & 18	13.5	15.0	28.0
¾	20 & 22	19.5	16.3	38.0
1	25 & 28	24.5	19.1	44.5
1¼	30 & 35	32.0	21.4	51.5
1½	38 & 42	38.0	21.4	60.0
2	42	51.0	25.7	71.0

1.6 Maximum permissible working pressure

1.6.1 The maximum permissible working pressures are dependent upon the working conditions, e.g. operating temperature, temperature variations, vibration, etc. and upon a suitable diameter, wall thickness and temper of tube being used. Fittings when assembled with correct tubing in accordance with the manufacturer's instructions shall, however, be suitable for use at the maximum permissible working pressures given in Table 3.

1.6.2 Compression fittings. Compression fittings specified in this standard are suitable for use at pressures in accordance with Table 3 of this standard up to a temperature of 65 °C.

1.6.3 Capillary fittings. Capillary fittings specified in this standard are suitable for use at pressures in accordance with Table 3 up to a temperature of 30 °C. For capillary fittings using soft solder and operating in the temperature range of 30 to 65 °C, then the maximum permissible working pressure given in Table 3 should be reduced by 40 %.

Capillary fittings, if assembled with high melting point solders, and certain designs and sizes of compression fittings are suitable for use at higher temperatures and pressures and for low pressure steam services. For such applications the manufacturer of the fitting should be consulted.

Table 3 — Maximum permissible working pressures

1	2	3	4	5
Size of fittings	Maximum working pressure (bar[a])			
	Pressings, stampings & rods		Drawn tube and castings	
	hydraulic	pneumatic	hydraulic	pneumatic
mm				
4	210	105	115	55
5	210	105	115	55
6	210	105	80	40
8	210	105	60	30
10	140	70	50	25
12	105	50	40	20
15	105	50	40	20
16	105	50	40	20
18	70	35	40	20
20	70	35	40	20
22	70	35	35	18
25	70	35	30	15
28	30	15	30	15
30	30	15	30	15
35	30	15	30	15
38	30	15	30	15
42	30	15	30	15

[a] 1 bar = 10^5 N/m^2 = 100 kPa

1.7 Materials

The materials used in the manufacture of the fittings shall be of copper or a suitable corrosion resistant copper alloy which will provide at least the minimum requirements for maximum working pressures given in Table 3. They shall have characteristics which make them suitable for use with the fluid to be contained and to provide an effective joint.

1) Extruded bars or hollow rods shall be of an alloy at least equivalent to alloy DD18 or CZ121.

2) Castings shall be made from an alloy at least equivalent to LG2 in BS 1400. Castings shall be in all respects, sound, free from laps, blow holes and pitting, and both the external and internal surfaces shall be clean, smooth and free from sand. They shall be neatly dressed and no casting shall be burned, plugged, stopped or patched.

3) Hot pressings shall be made from an alloy at least equivalent to the requirements of CZ122 in BS 2872.

4) Copper shall comply with BS 1172 or BS 1174.

5) The solder or brazing filler metal for making capillary joints shall be that recommended by the manufacturer unless otherwise specified by the purchaser.

NOTE Where there is an appropriate application standard it is the responsibility of the purchaser to ensure compliance with the requirements of that standard. In this respect attention is drawn to BS 1306-1 and BS MA 18

1.8 Dimensions

1.8.1 The thickness and length of engagement of nut of compression fittings Type A, and compression fittings Type B, shall be in accordance with the dimensions given in Table 4.

1.8.2 The dimensions of capillary fittings shall be in accordance with those given in Table 6.

Table 4 — Dimensions of compression fittings

1	2	3	4	5	6
Size of fitting (in mm)	Min. wall thickness between body and machined or unmachined bore		Min. wall thickness between root of thread and machined bore	Min. wall thickness from major thread diameter to across flats dimension	Min. length of engagement of nut in fully tightened position, excluding thread chamfers
	Hot pressings	Castings	Hot pressings and castings		
	mm	mm	mm	mm	mm
4	1.0	1.0	0.8	0.8	3.0
5	1.0	1.0	0.9	0.9	3.0
6	1.0	1.0	0.9	0.9	3.0
8	1.0	1.0	0.9	0.9	4.0
10	1.1	1.1	1.0	1.0	4.0
12	1.1	1.1	1.0	1.0	4.0
15	1.2	1.4	1.3	1.3	7.0
16	1.3	1.5	1.4	1.4	7.0
18	1.4	1.5	1.4	1.4	7.0
20	1.4	1.6	1.5	1.5	7.0
22	1.4	1.6	1.5	1.5	9.0
25	1.5	1.8	1.6	1.6	9.0
28	1.5	1.8	1.6	1.6	9.0
30	1.6	1.9	1.8	1.8	9.0
35	1.6	1.9	1.8	1.8	9.0
38	1.8	2.2	2.0	2.0	9.0
42	1.9	2.2	2.0	2.0	9.0

1.9 Across flat sizes

The across flats sizes of fittings in millimetres shall be at the option of the manufacturer but shall be chosen from the sizes given in Table 5.

Table 5 — Across flats sizes

Width across flats	
	mm
10	24
11	27
12	28[a]
13	30
14	32
15[a]	36
16[a]	41
17	46
18[a]	50
19	55
20[a]	60
22	65

[a] Non-preferred

1.10 Hydraulic "type" test for assembled joint, Type A and B

The fittings and their component parts when assembled with short lengths of copper and copper alloy tube of correct diameter, wall thickness and temper, shall be capable of withstanding an internal hydraulic pressure of **1.5** times the maximum permissible working pressure shown in Table 3 at normal atmospheric temperature, without showing signs of leakage or other defect in the fittings or joint. The pressure shall be maintained for fifteen minutes. The tubes shall be fixed at one end only during the test. The test shall be carried out on a fitting after all machining and screwing operations have been completed but before any protective coating has been applied.

1.11 Test for porosity

1.11.1 The body of every fitting made from a casting shall be tested by the manufacturer for porosity by a pressure test which may be, at the manufacturer's option, either:

1) the application of an internal hydraulic pressure of not less than 20 bar[1)], or

2) the application of an internal pneumatic pressure of not less than 5 bar, while the fitting is completely immersed in water.

1.11.2 The fitting, when so tested, shall show no signs of leakage.

1.11.3 The test shall be carried out after all machining and screwing operations have been completed and before any protective coating has been applied.

1.12 Marking

When so specified by the purchaser, the bodies of the fittings and the nuts shall be marked with the symbol "ENG".

NOTE Attention is drawn to certification facilities offered by BSI. See the inside back cover of this standard.

1.13 Certificate of compliance

At the request of the purchaser or his representative a certificate shall be supplied certifying that the fittings comply in all respects with this standard.

2 Capillary fittings

2.1 Type of fittings

For the purpose of this standard, capillary fittings shall be those 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.

2.2 Design and construction

The fittings may be of the manufacturer's own designs but shall comply with the following conditions. These fittings are intended for use with copper or copper alloy tubes that satisfy the requirements of BS 2871-2.

1) Fittings shall comply with the requirements of this section and Section 1 and be in accordance with the dimensions given in the tables in this standard.

2) The internal diameter of the sockets of the fittings (dimension *D* in Table 6) over the length which is designed to make close contact with the tube shall be within the limits given in Columns 2 and 3 of Table 6.

3) Each socket shall be provided with an internal shoulder or stop against which the inserted tube, cut square with its axis, shall abut; except that, when so ordered, capillary fittings shall be supplied without an internal shoulder or stop but shall comply in all other respects with the requirements of this standard.

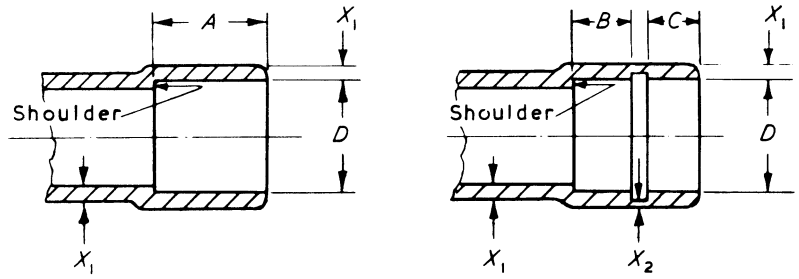
4) The length of that surface of the socket which is designed to make close contact with the tube shall not be less than the dimension given in Column 4 of Table 6.

For plain sockets without grooves this dimension shall be the length from the face of the fitting to that point on the shoulder or stop against which the inserted tubes abut (dimension *A*, in diagram *a* of Table 6).

For sockets having an internal groove or grooves, this length shall be exclusive of the widths of such grooves and shall be the sum of the lengths of those surfaces which are designed to make close contact with the tube (e.g. the sum of dimensions *B* and *C* in diagram *b* of Table 6).

[1)] 1 bar = 10^5 N/m^2 = 100 kPa

Table 6 — Dimensions of capillary fittings



a. *b.*

NOTE These illustrations are diagrammatic only; they do not purport to indicate standard forms of sockets or shapes of shoulder, and are solely for the purpose of indicating where the specified dimensions are to be measured.

1	2	3	4	5	6	7	8	9	10
Size of fitting (in mm)	Internal diameter of socket *D*		Min. length of socket in close contact with tube [see 2.2 4)] *A* or *(B + C)*	Min. wall thickness					
				Pressings etc.		Castings		Drawn tube	
	Max.	Min.		X_1	X_2	X_1	X_2	X_1	X_2
	mm	mm	mm	mm	mm	mm	mm	mm	mm
4	4.145	4.065	3.8	1.0	0.6	1.0	0.7	0.6	0.54
5	5.145	5.065	4.8	1.0	0.6	1.0	0.7	0.6	0.54
6	6.145	6.065	5.8	1.0	0.6	1.0	0.7	0.6	0.54
8	8.145	8.065	6.8	1.0	0.6	1.0	0.7	0.6	0.54
10	10.145	10.065	7.8	1.1	0.6	1.1	0.8	0.6	0.54
12	12.145	12.065	8.6	1.1	0.6	1.1	0.8	0.6	0.54
15	15.145	15.065	10.6	1.2	0.7	1.4	0.9	0.7	0.63
16	16.145	16.065	11.6	1.3	0.8	1.5	1.0	0.8	0.72
18	18.145	18.065	12.6	1.4	0.8	1.5	1.0	0.8	0.72
20	20.155	20.075	14.4	1.4	0.9	1.5	1.0	0.9	0.81
22	22.155	22.075	15.4	1.4	0.9	1.6	1.2	0.9	0.81
25	25.155	25.075	16.4	1.5	0.9	1.8	1.2	0.9	0.81
28	28.155	28.075	18.4	1.5	0.9	1.8	1.2	0.9	0.81
30	30.155	30.075	20.4	1.6	1.0	1.9	1.3	1.0	0.9
35	35.17	35.09	23.0	1.6	1.2	1.9	1.4	1.2	1.08
38	38.17	38.09	25.0	1.8	1.2	2.2	1.5	1.2	1.08
42	42.17	42.09	27.0	1.9	1.3	2.2	1.6	1.2	1.08

3 Type A compression fittings

3.1 Type of fittings

For the purposes of this standard, Type A compression fittings shall be those which require no preparation of the ends of the tube other than that they are cut square and deburred, and in which the joint is made by the compression of a loose ring or sleeve on to the outside surface of the tube.

3.2 Design and construction

The fittings may be of the manufacturer's own design but shall comply with the following conditions:

1) The fittings shall comply with the requirements of this section and Section 1 and be in accordance with the dimensions given in the tables of this standard.

2) Each compression end shall be provided with an internal stop against which the inserted tube, cut square with its axis, shall abut: except that, when so ordered, compression fittings of Type A may be supplied without the internal stop but shall comply in all other respects with the requirements of this standard.

3) The minimum wall thicknesses specified shall not apply to the thickness of the loose ring or sleeve where such a ring or sleeve must be deformed to form a seal.

3.3 Repeatability of jointing

The fittings shall be capable of having the joint broken and remade three times and shall provide a sound joint on each occasion.

4 Type B compression fittings

4.1 Type of fittings

For the purpose of this standard, compression fittings, Type B shall be those which require a manipulation of the tube at or near its end and in which the joint is made by compressing the manipulated portion of the tube against the face of the body of the fitting or against a loose ring or sleeve within the fitting.

4.2 Design and construction

The fittings may be of the manufacturer's own design but shall comply with the following conditions:

1) The fittings shall comply with the requirements of this Section and Section 1 and be in accordance with the dimensions given in the tables in this standard.

2) All cones and seatings against which the tube abuts shall be accurately machined to ensure a good fit.

4.3 Repeatability of jointing

The fittings shall be capable of having the joint broken and remade three times and shall provide a sound joint on each occasion.

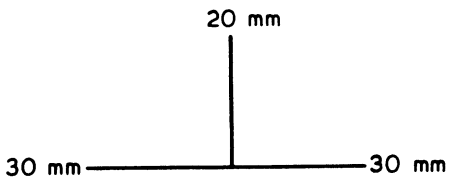
Appendix A Methods of designating unequal fittings

Methods of specifying fittings should be as follows:

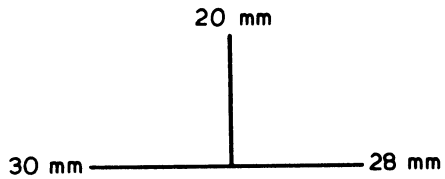
1) *Straight fittings, elbows and bends.* In the case of fittings with ends for joining unequal sizes of pipe the larger should be given first. Fittings where only one end is for joining pipe are designated by the pipe end first, followed by the stud end.

2) *Right angle tees.* Right angle fittings having three ends should be designated first by the ends on the "run", i.e. two ends (the larger of the two ends being specified first) in the same straight line, and then by the remaining end.

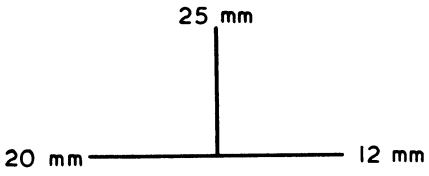
Examples



30 mm x 30 mm x 20 mm
TEE



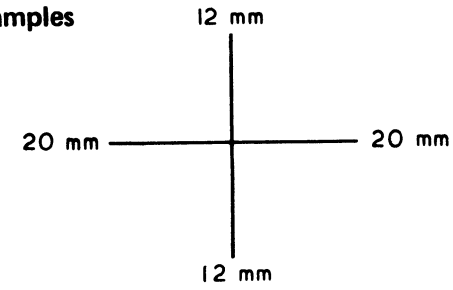
30 mm x 28 mm x 20 mm
TEE



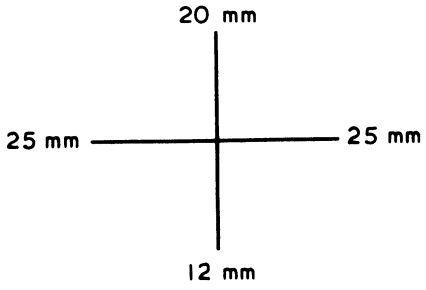
20 mm x 12 mm x 25 mm
TEE

3) *Right angle crosses.* Right angle fittings having four ends should be designated by the larger end on the "run", and then by the second end on the "run" followed by the remaining ends (the larger of the two remaining ends being specified first).

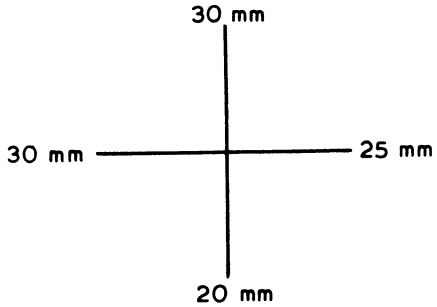
Examples



20 mm x 20 mm x 12 mm x 12 mm
CROSS



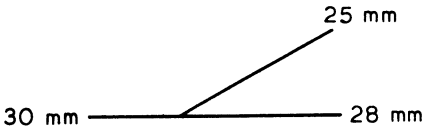
25 mm x 25 mm x 20 mm x 12 mm
CROSS



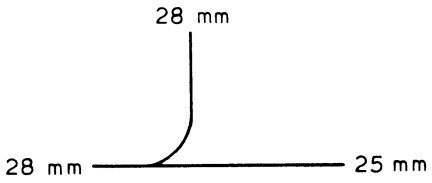
30 mm x 25 mm x 30 mm x 20 mm
CROSS

4) *Angle or sweep tees.* Angle or sweep fitting having three ends should be designated first by the end to which the angle or sweep runs, irrespective of size; the branch should be specified last.

Examples



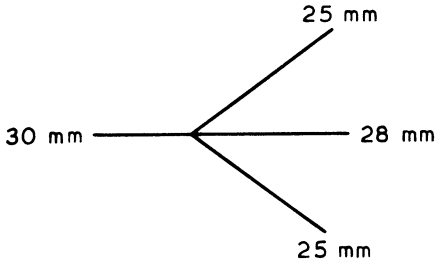
30 mm x 28 mm x 25 mm
ANGLE TEE



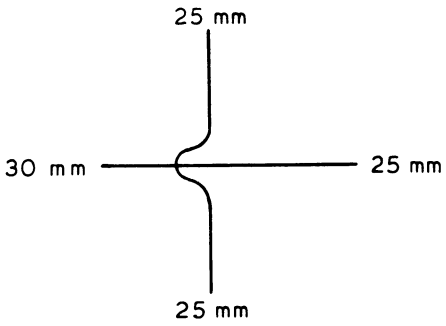
28 mm x 25 mm x 28 mm
SWEEP TEE

5) *Angle or sweep crosses.* Angle or sweep fittings having four ends should be designated first by the end to which the angle or sweep runs, irrespective of size; the branch sizes should be specified last.

Examples



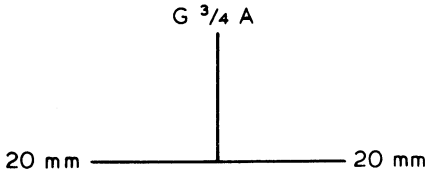
30 mm x 28 mm x 25 mm x 25 mm
ANGLE CROSS



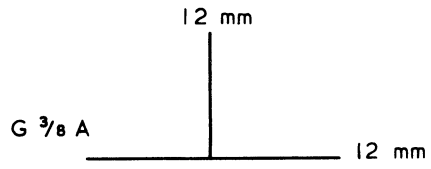
30 mm x 25 mm x 25 mm x 25 mm
SWEEP CROSS

6) *Screwed ends.* Designations given without qualifications should be understood to relate to ends for joining copper tubes. When it is desired to designate a screwed end, the size and type of thread, and whether external or internal, should be stated after the size designation of that end. The words "external" and "internal" should relate to the thread of the fitting.

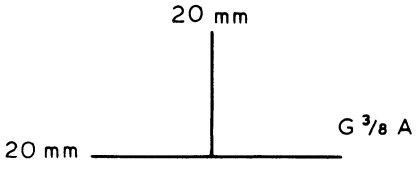
Examples



20 mm x 20 mm x G¾A Thread
TEE



$G^{3}/_{8}$ A x 12 mm x 12 mm
TEE



20 mm x $G^{3}/_{8}$ A x 20 mm
TEE

Appendix B Sizes of copper and copper alloy tubes

Tube size	O.D. max.	O.D. min.
	mm	mm
4	4.045	3.965
5	5.045	4.965
6	6.045	5.965
8	8.045	7.965
10	10.045	9.965
12	12.045	11.965
15	15.045	14.965
16	16.045	15.965
18	18.045	17.965
20	20.055	19.975
22	22.055	21.975
25	25.055	24.975
28	28.055	27.975
30	30.055	29.975
35	35.07	34.99
38	38.07	37.99
42	42.07	41.99

blank

Publications referred to

This standard makes reference to the following British Standards:

BS 21, *Pipe threads for tubes and fittings where pressure-tight joints are made on the threads.*

BS 864, *Capillary and compression tube fittings of copper and copper alloy.*

BS 864-2, *Metric units.*

BS 1035-40, *(incorporating BS 1172 Phosphorus deoxydized non-arsenical copper for general purposes, and BS 1174 Phosphorus deoxydized arsenical copper).*

BS 1306, *Non-ferrous pipes and tubes for steam services.*

BS 1306-1, *Non-ferrous pipes and piping installations for and in connection with land boilers.*

BS 1400, *Copper alloy ingots and copper and copper alloy castings.*

BS 1936, *Undercuts and runouts for screw threads.*

BS 2779, *Pipe threads where pressure-tight joints are not made on the threads.*

BS 2871, *Copper and copper alloys, tubes.*

BS 2871-1, *Copper tubes for water, gas and sanitation.*

BS 2871-2, *Tubes for general purposes.*

BS 2872, *Copper and copper alloys. Forging stock and forgings.*

BS 2874, *Copper and copper alloys. Rods and sections (other than forging stock).*

BS 4229, *Recommendations for sizes of non-ferrous and ferrous bars.*

BS 4229-1, *Non-ferrous bars.*

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