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Specification for

Wrought steel pipe fittings —

(Screwed BSP thread)

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 Mining Electrical and Mechanical Engineers
 British Chemical Plant Manufacturers' Association
 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 and Productivity
 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
 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 and Allied Manufacturers' Association of Great Britain
 London Transport Executive
 Machine Tool Trades Association
 Ministry of Defence
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 National Coal Board
 National Physical Laboratory (Department of Trade and Industry)
 Royal Institute of British Architects
 Water-tube Boilermakers' Association

The 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:

This British Standard, having been approved by the Mechanical Engineering Industry Standards Committee, was published under the authority of the Executive Board on
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Institution of Municipal Engineers
 Metropolitan Water Board
 Welding Institute
 Wrought Fittings Makers' Association
 Individual manufacturers

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Foreword

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 1387, *Steel tubes and tubulars suitable for screwing to BS 21 pipe threads.*

BS 3894, *Method for converting elongation values for steel — Part 1: Carbon and low alloy steels.*

This British Standard for wrought pipe fittings, first published in 1951 and revised in 1965, has been prepared in this second revision under the authority of the Mechanical Engineering Industry Standards Committee.

The standard provides for a range of fittings, screwed British Standard pipe thread to BS 21, for use with steel tubes to BS 1387 and includes for the convenience of users particular of equal sockets and hexagon backnuts as specified in BS 1387. Based on experience and usage rates the range of fittings has been considerably reduced from that contained in the 1965 edition, and no reference is now made to side outlet fittings. Similarly, the range of sizes for some of the fittings retained in this standard has been reduced. Fittings of other types and sizes of outlet not covered by this standard can be made to special order. Experience has also shown that there is no requirement for wrought iron fittings and consequently all reference to wrought iron fittings has been deleted from this standard.

The metric nominal sizes are based upon international agreement. Other dimensions, except for the sizes of hexagons which have been selected from those in BS 4229, “*Sizes of non-ferrous and ferrous bars*”, Part 2, “*Ferrous bars*”, have been converted in accordance with BS 350, “*Conversion factors and tables*”, Part 2, “*Detailed conversion tables*”, and have been rounded to values which ensure practical interchangeability.

Pieces, long screws, barrel nipples, close taper nipples, running nipples, bends, springs and return bends are covered in BS 1387.

NOTE 1 In this standard all pressures are gauge pressures and are expressed in N/m² or agreed multiples thereof. 1 bar = 10⁵ N/m².

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 18, 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.

1 Scope

This Part of this British Standard specifies requirements for welded and seamless wrought pipe fittings of nominal size 6 mm to 150 mm inclusive, for use with steel tubes to BS 1387, screwed to BS 21 R-series thread.

NOTE The titles of the British Standards referred to in this standard are listed on page iii.

2 Materials

2.1 The steel from which the fittings are made shall show on test a tensile strength of from 330 N/mm² to 470 N/mm²¹⁾ and a percentage elongation on a gauge length of $5.65 \sqrt{S_o}$ of not less than 20 %, where S_o is the original cross-sectional area of the test piece. Where other gauge lengths are used the corresponding elongation on $5.65 \sqrt{S_o}$ can be obtained as shown in BS 3894-1.

2.2 Where fittings are welded during manufacture, the steel shall show on analysis not more than 0.06 % of sulphur and not more than 0.06 % of phosphorus.

2.3 If cold worked bar is used for the manufacture of fittings, the effects of the cold working shall be removed, so that the material of the final product shall show the mechanical properties specified above.

3 Screwed ends of fittings

3.1 General dimensions. All dimensions for the screwed ends of fittings shall be in accordance with Table 1.

NOTE While fittings may be specified in metric dimensions, the thread designations of these fittings are specified in fractional form, in accordance with BS 21, e.g. BS 1740, hexagon bush, 15×10 , screwed $R\frac{1}{2} \times R_p\frac{3}{8}$.

3.2 Internal and external threads. Internal threads on the ends of fittings shall be parallel (R_p) and external threads shall be taper (R), and both threads shall comply with the appropriate requirements of BS 21.

NOTE For pressure duty, fittings complying with the requirements of this standard are not suitable for use with G series threads to BS 2779 since no machined face exists upon which a sealing device may act.

3.3 Alignment. The axes of screw threads shall be coincident with the true axes of the fittings within 1 in 200 on the run and 1 in 125 on the branch.

4 Method of specifying outlets

4.1 Equal fittings. Where all outlets are of the same size, they shall be specified by that one size irrespective of the number of outlets.

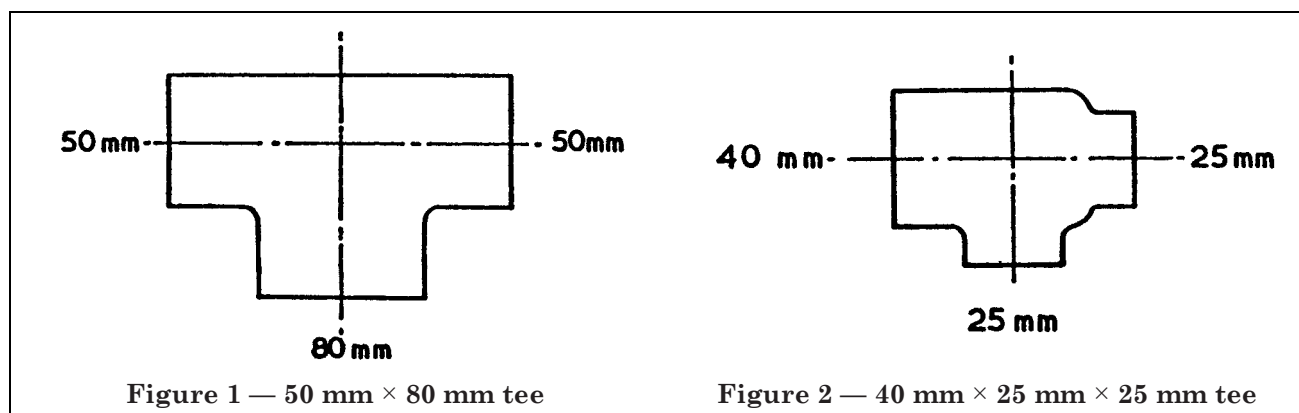
4.2 Unequal fittings. When outlets are of differing sizes they shall be specified as follows:

4.2.1 Fittings having two outlets. The larger outlet shall be specified first.

4.2.2 Tees. When two sizes are specified, the first shall apply to both ends of the run, the second to the branch, e.g. a 50 mm $\times$ 80 mm tee (Figure 1).

When three sizes are specified, the first two shall apply to the ends of the run, the larger end being specified first, and the third to the branch, e.g. a 40 mm $\times$ 25 mm $\times$ 25 mm tee (Figure 2).

¹⁾ 1 N/mm² = 1 MN/m².



5 Dimensions and tolerances

5.1 Dimensions. Fittings complying with this Part of this British Standard shall conform to the dimensions in Table 1 to Table 16 as appropriate.

5.2 Tolerances

5.2.1 The lengths of reducing sockets, caps, hexagon bushes and hexagon nipples, and the centre to face dimensions of elbows, tees and crosses are minima and the plus tolerance allowed shall be as follows:

Length or centre to face dimension (mm)	Up to and including 25	Over 25 to 40	Over 40 to 65	Over 65 to 75	Over 75 to 150	Over 150
Tolerance (mm)	1.5	3.0	4.5	6.0	8.0	10.0

5.2.2 The lengths of socket unions are minima and the plus tolerance allowed shall be as follows:

Length (mm)	Up to and including 40	Over 40 to 65	Over 65 to 75	Over 75 to 110
Tolerance (mm)	6	10	12	16

6 Tests

6.1 Pressure tests

6.1.1 By the manufacturer. Each fitting, after being screwed, and before any protective coating other than galvanizing has been applied, shall be capable of withstanding, without showing any signs of leakage, hydraulic and air tests as specified in 6.1.1.1 and 6.1.1.2.

6.1.1.1 Hydraulic test. The application of an internal hydraulic pressure of 5 MN/m² (50 bar).

6.1.1.2 Air test. The application of an internal air pressure of 0.7 MN/m² (7 bar) whilst the fitting is completely immersed in water or light oil.

6.1.2 Test requirements by the purchaser. If the purchaser requires either of the tests specified in 6.1.1.1 and 6.1.1.2 to be made on fittings supplied to his order, he shall state this in his enquiry and order, and indicate the test or tests required.

7 Hot dip galvanizing

7.1 Where fittings are to be galvanized, they shall first be thoroughly descaled, washed as required and dipped in a bath of molten zinc containing not less than 98.5 % by weight of zinc at a temperature suitable to produce a complete and uniformly adherent coating of zinc.

7.2 Galvanized screwed fittings shall be galvanized before screwing.

7.3 The galvanizing shall be capable of passing the test specified in Appendix A and the test shall preferably be made before any machining operation has been performed.

7.4 Should a test on the galvanizing be required, this shall be stated by the purchaser in his enquiry and order. One fitting in every 500, or part thereof, shall be sampled in accordance with Appendix A.