

BRITISH STANDARD 4368 : Part 1 : 1972
CONFIRMED NOVEMBER 1984

COMPRESSION COUPLINGS FOR TUBES

Part 1. Specification for heavy series couplings (metric)

COMPRESSION COUPLINGS FOR TUBES

Raccords de tuyauterie à compression
Partie 1. Raccords de série lourde (métrique) — Spécifications

Druckkupplungen für Rohre
Teil 1. Schwere Kupplungen (metrisch)

Part 1. Specification for heavy series couplings (metric)

BS 4368 : Part 1 : 1972

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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.

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 1706. Electroplated coatings of cadmium and zinc on iron and steel.
- BS 1936. Undercuts and runouts for screw threads.
- BS 2051. Tube and pipe fittings for engineering purposes.
- BS 2779. Pipe threads where pressure-tight joints are not made on the threads.
- BS 2871. Copper and copper alloys. Tubes.
Part 2. Tubes for general purposes.
- BS 2874. Copper and copper alloys. Rods and sections (other than forging stock).
- BS 3189. Phosphate treatment of iron and steel.
- BS 3382. Electroplated coatings on threaded components.
Parts 1 and 2. Cadmium on steel components.
and zinc on steel components.
Part 3. Nickel or nickel plus chromium on steel components.
- BS 3601. Steel pipes and tubes for pressure purposes: carbon steel with specified room temperature properties.
- BS 3602. Specification for steel pipes and tubes for pressure purposes: carbon and carbon manganese steel with specified elevated temperature properties.

*As amended
July, 1978 and
May, 1984*

BS 3605. Seamless and welded austenitic stainless steel pipes and tubes for pressure purposes.

BS 3643. ISO metric screw threads.

Part 2. Specification for selected limits of size.

BS 4368. Compression couplings for tubes.

Part 4. Specification for type test requirements.

*As amended
May, 1984*

This standard also makes reference to the following standards:

DIN 2353 (Germany) Non-soldered, taper bush type unions.

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 reference MEE/118/1 MEE/118 Draft for approval 71/31548

CONTENTS

Co-operating organizations	Page 6
Foreword	7

SPECIFICATION

1. GENERAL REQUIREMENTS

1.1 Scope	9
1.2 Materials	9
1.3 Pressure/temperature ratings	9
1.4 Designation of couplings	10
1.5 Tubes	11
1.6 Across flats dimensions	11
1.7 Design	12
1.8 Screw threads	12
1.9 Workmanship	12
1.10 Protective treatment	12
1.11 Type testing.	12
1.12 Text deleted.	14
1.13 Text deleted.	14
1.14 Marking	14
1.15 Certificate of compliance	14

*As amended
July, 1978*

2. DETAILED DIMENSIONS OF COMPRESSION COUPLINGS TYPE A

2.1 Introduction	14
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APPENDICES

A. Method of describing compression couplings (metric sizes)	40
B. Information to be agreed between the purchaser and the manufacturer	42
C. Text deleted.	43

*As amended
July, 1978*

TABLES

1. Nominal working pressure ratings of Type A carbon and stainless steel couplings in accordance with Section 2.	10
1A. Nominal working pressure ratings of Type A copper alloy couplings in accordance with Section 2.	10
2. Tube sizes	11
3. Across flats dimensions	11
4. Standard threaded stud ends (connector ends)	13

*As amended
May, 1984*

	Page
5. Coupling nut	15
6. Ring, ferrule and cove details	16
7. Straight coupling—assembly	18
8. Straight coupling—body	19
9. Male stud coupling—assembly	20
10. Male stud coupling—body	21
11. Equal elbow—assembly	22
12. Equal elbow—body	23
13. Male stud elbow—assembly	24
14. Male stud elbow—body	25
15. Equal tee—assembly	26
16. Equal tee—body	27
17. Male stud tee (stud branch)—assembly	28
18. Male stud tee (stud branch)—body	29
19. Male stud tee (stud run)—assembly	30
20. Male stud tee (stud run)—body	31
21. Equal cross—assembly	32
22. Equal cross—body	33
23. Taper male stud elbow—body	34
24. Taper male stud tee (stud branch)—body	35
25. Taper male stud tee (stud run)—body	36
26. Reducing adaptors (tube to tube)	37
27. Bulkhead assembly	38
28. Bulkhead body and nut	39
29. Table deleted.	43
30. Table deleted.	44

FIGURES

1. Compression couplings	8
2. Male stud coupling 20 mm $\times$ $\frac{3}{4}$ in BSPF, Ext G $\frac{3}{4}$ A.	41
3. Male stud elbow 20 mm $\times$ $\frac{3}{4}$ in BSPF, Ext G $\frac{3}{4}$ A.	41
4. Male stud tee 20 mm $\times$ $\frac{3}{4}$ in BSPF, Ext $\times$ 20 mm G $\frac{3}{4}$ A.	41

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:

- *Association of Hydraulic Equipment Manufacturers Ltd.
 - 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 Federation
 - British Pump Manufacturers' Association
- *British Steel Industry
 - Crown Agents for Oversea Governments and Administrations
 - Department of Employment and Productivity (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
 - 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 Plant Engineers
- *Institution of Production Engineers
 - Locomotive and Allied Manufacturers' Association of Great Britain
 - London Transport Executive
- *Machine Tool Trades Association
 - Ministry of Defence
- *Ministry of Defence, Army Department
 - National Coal Board
 - National Physical Laboratory (Department of Trade and Industry)
 - Royal Institute of British Architects
 - Telecommunications Engineering Manufacturing Association
 - Water Tube Boilermakers Association

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 Refrigeration and Air Conditioning Association
- British Ship Research Association
- Copper Development Association
- Copper Tube Fittings Manufacturers' Association
- HEVAC Association
- Hydraulic Association
- National Brass Foundry Association
- Railway Industry and Locomotive Manufacturers' Association of Great Britain
- Society of British Aerospace Co. Ltd.
- Society of Motor Manufacturers and Traders Ltd.
- Stainless Steel Fabricators Association of Great Britain

BRITISH STANDARD

COMPRESSION COUPLINGS FOR TUBES

Part 1. Specification for heavy series couplings (metric)

*As amended
May, 1984*

FOREWORD

This Part of this British Standard has been prepared under the authority of the Mechanical Engineering Industry Standards Committee and forms a revision of BS 4368 : Part 1 : 1968. BS 4368 has been revised in three Parts to reflect current national and international requirements.

Part 1. Specification for heavy series couplings (metric).

Part 3. Specification for light series couplings (metric).

Part 4. Specification for type test requirements.

*As amended
July, 1978 and
May, 1984*

It is substantially in conformity with the ISO Recommendations for pipe connections for industrial applications. SI units have been used throughout and, therefore, the standard may be used for the manufacture of couplings when adopting the metric system.

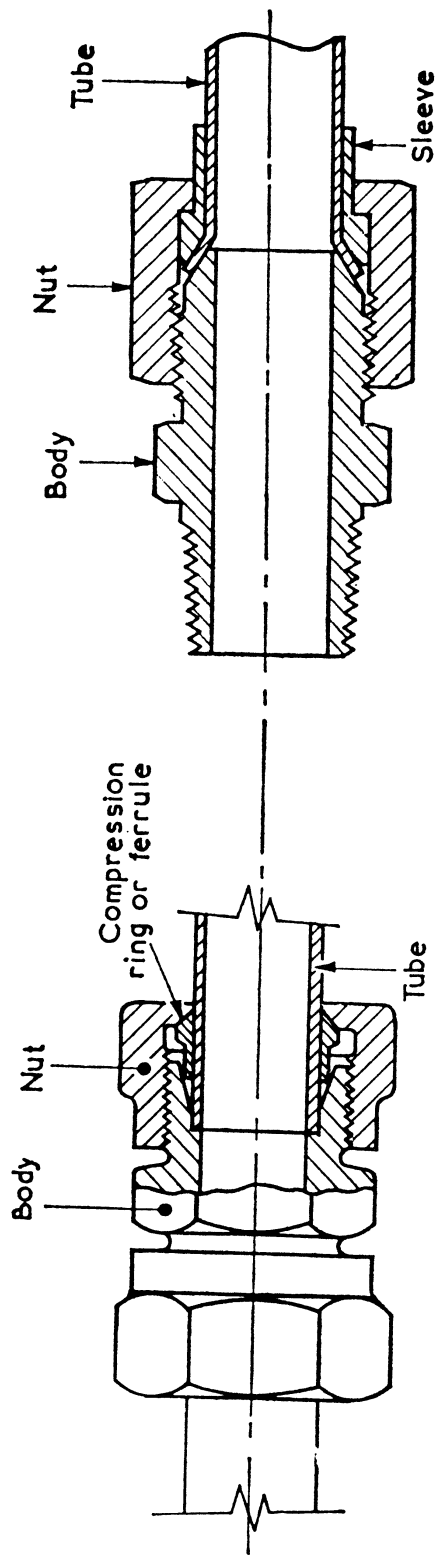
Section 1 gives the general requirements relating to three types of compression couplings for tubes for general engineering purposes (see Fig. 1).

a. Compression couplings, Type A, in which the joint is made and the tube is held by the compression of a ring or ferrule, or part of the coupling on the outside surface of the tube.

b. Compression couplings, Type B, in which the joint is made and the tube is held by the compression of a manipulated portion of the tube at or near its end against the face of the coupling body, or against a loose ring or sleeve within the coupling.

c. Compression couplings, Type C, in which the joint is made by means of a sealing ring (and retaining washer if required) which does not hold the tube. A second ring is included to hold the tube.

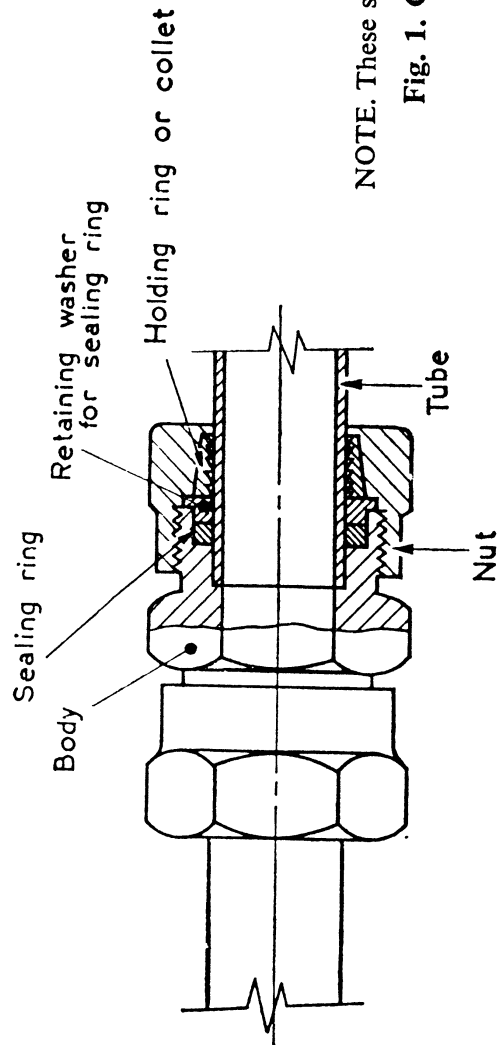
Section 2 specifies detailed dimensions of a range of Type A couplings which, whilst complying with the requirements of Section 1, are also, in general, dimensionally interchangeable with couplings manufactured to DIN 2353* and related German Standards.



Type A

Type B

(This type of coupling may also be constructed without a separate sleeve)



Type C

NOTE. These sketches are diagrammatic only
Fig. 1. Compression couplings

Appendix A describes the method of specifying metric compression couplings. This differs from that normally used in the United Kingdom when using imperial units. The subject of designation of couplings is to be considered by ISO/TC5 - Metal pipes and fittings.

Appendix B lists the information to be agreed between the purchaser and the manufacturer.

NOTE 1. Information on SI units is given in the following standards: BS 3763, 'International System of units (SI)' and BS 350, 'Conversion factors and tables', Supplement No. 1, 'Additional tables for SI conversions'.

NOTE 2. All dimensions in this standard are in millimetres unless otherwise stated.

SPECIFICATION

1. GENERAL REQUIREMENTS

1.1 Scope. This Part of this British Standard specifies the requirements for a heavy series of carbon steel, stainless steel and copper alloy compression couplings, as described in the Foreword, for tubes with outside diameters from 6 mm to 50 mm inclusive.

NOTE 1. This standard does not cover installation of couplings. Strict compliance with the fitting instructions of the manufacturer is necessary.

NOTE 2. The titles of the British Standards referred to in this standard are listed on page 2.

1.2 Materials

1.2.1 Bodies. Bodies shall be manufactured from carbon steel, stainless steel or copper alloy which will provide at least the minimum requirements for the pressure/temperature ratings specified in 1.3. The material used shall have characteristics which make it suitable for use with the fluid to be contained and to provide an effective joint. See also note 2 to Table 26.

Materials for Type C copper alloy couplings shall be selected from the following:

- (1) BS 2874 CZ 121;
- (2) MOD (N) standard DGS 357;
- (3) MOD (N) standard NES 749 : Part 2.

1.2.2 Nuts. Nuts to be used with carbon or stainless steel bodies shall be made of carbon steel unless otherwise agreed between the purchaser and the manufacturer. It may be desirable in corrosive conditions to use stainless steel nuts. When stainless steel nuts are required, the purchaser should consult the manufacturer so that thread seizure (pick-up) can be avoided.

Nuts to be used with copper alloy bodies shall be of a similar based material.

1.2.3 Compression rings or ferrules, sealing rings, retaining washers and holding rings or collets. The material for compression rings or ferrules, sealing rings retaining washers and holding rings or collets shall be selected by the manufacturer to suit his own design and method of manufacture. They shall have characteristics which make them suitable for use with the fluid to be contained and to provide an effective joint.

1.3 Pressure/temperature ratings

1.3.1 Pressure/temperature ratings of Type B and Type C carbon or stainless steel couplings in accordance with Section 1 shall be subject to agreement between the purchaser and the manufacturer.

*As amended
July, 1978,
May, 1984*

*As amended
July, 1978,
May, 1984*

1.3.2 Type A carbon or stainless steel couplings in accordance with Section 2 shall however be suitable for use at the working pressures given in Table 1 when used at temperatures between -10°C and $+120^{\circ}\text{C}$. Type A copper alloy couplings shall be suitable for use at the working pressures given in Table 1A when used at temperatures between -10°C and $+60^{\circ}\text{C}$.

1.3.3 For applications involving other working temperatures, the working pressures shall be subject to agreement between the purchaser and the manufacturer.

**TABLE 1. NOMINAL WORKING PRESSURE RATINGS OF
TYPE A CARBON AND STAINLESS STEEL COUPLINGS
IN ACCORDANCE WITH SECTION 2**

Designation (tube o.d.)	Working pressure
mm	bar *
6 up to and including 12	640
16 up to and including 25	400
30 up to and including 38	250

* 1 bar = 10^5 N/m^2 .

**TABLE 1A. NOMINAL WORKING PRESSURE RATINGS OF
TYPE A COPPER ALLOY COUPLINGS IN ACCORDANCE
WITH SECTION 2**

Designation (tube o.d.)	Working pressure
mm	bar *
6 up to and including 12	400
16 up to and including 25	250
30 up to and including 38	160

* 1 bar = 10^5 N/m^2 .

1.4 Designation of couplings. Couplings shall be designated by the outside diameter of the tube with which they are to be used, together with the letters 'mm' e.g. 12 mm. For stud ends (connector ends) the thread designation of the stud end shall be added, e.g. 12 mm $\times$ G $\frac{3}{8}$ A. (BS 2779).

The method of describing couplings shall be in accordance with Appendix A

1.5 Tubes. The couplings shall be suitable for use with tubes of the sizes given in Table 2. The limits of size include ovality.

Carbon steel tubes complying with BS 3601 or BS 3602 and stainless steel tubes complying with BS 3605 are suitable, provided the outside diameter tolerances comply with Table 2. Copper tubes in accordance with BS 2871 : Part 2 : 1972 with outside diameters to Tables 3 and 4 of that standard are suitable, as their outside diameter tolerances fall within Table 2 of this standard.

NOTE. The couplings may not provide an effective joint if they are used with tubes which have outside diameters outside the limits of size given in Table 2 or with tubes which are too hard or too soft. The purchaser should therefore ensure with the manufacturer that the tubes selected are of the correct dimensions and material for use with the chosen coupling.

TABLE 2. TUBE SIZES

Outside diameter	Limits of size	
	Maximum	Minimum
6	6.1	5.9
8	8.1	7.9
10	10.1	9.9
12	12.1	11.9
16	16.1	15.9
20	20.1	19.9
25	25.1	24.9
30	30.1	29.9
38	38.15	37.85
50*	50.2	49.8

* Couplings for this size are not yet included in Section 2 of this standard.

1.6 Across flats dimensions. The dimensions across flats for nuts and on the body of the coupling shall be selected from Table 3.

TABLE 3. ACROSS FLATS DIMENSIONS

Maximum	Tolerance* (minus)	Maximum	Tolerance* (minus)
12	0.08	36	0.13
14	0.10	41	0.13
17	0.10	46	0.13
19	0.10	50	0.13
22	0.10	55	0.15
24	0.13	60	0.15
27	0.13	65	0.15
30	0.13	70	0.15
32	0.13	75	0.15
		80	0.15

* All tolerances ± 0.00 mm.

1.7 Design. The couplings may be of the manufacturer's own design but shall comply with the following conditions:

- (1) The couplings shall be in accordance with the general requirements of this standard and shall conform to such dimensions as are given in the tables in Section 1, and in addition Type A couplings covered in Section 2 shall comply with the dimensions specified in that section.
- (2) The coupling bodies shall be free from internal fins or other irregularities which might reduce the free flow of liquid and shall be so designed that resistance to flow through the coupling shall be reduced to a minimum.
- (3) Provision for tightening shall be made on all couplings with screwed ends.
- (4) Union nuts shall be in accordance with the requirements specified in 1.6.

1.8 Screw threads

*As amended
May, 1984*

1.8.1 Compression ends. The screw threads on the compression ends of the couplings shall be ISO metric threads in accordance with BS 3643, Part 2, and for Type A couplings the actual threads and the lengths of thread shall be in accordance with the details specified in the tables in Section 2.

1.8.2 External and internal threads shall be chamfered at the face of the coupling 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.

1.8.3 Stud ends (connector ends). The preferred thread for stud ends (connector ends) of couplings shall be Series G Class A, in accordance with BS 2779. The dimensions of the stud ends shall comply with the requirements in Table 4.

Other threads shall be by agreement between the purchaser and the manufacturer.

The faces designated A and B in Table 4 shall have a smooth finish at right angles to the threads.

1.8.4 Thread undercuts and recesses. Thread undercuts shall be in accordance with BS 1936.

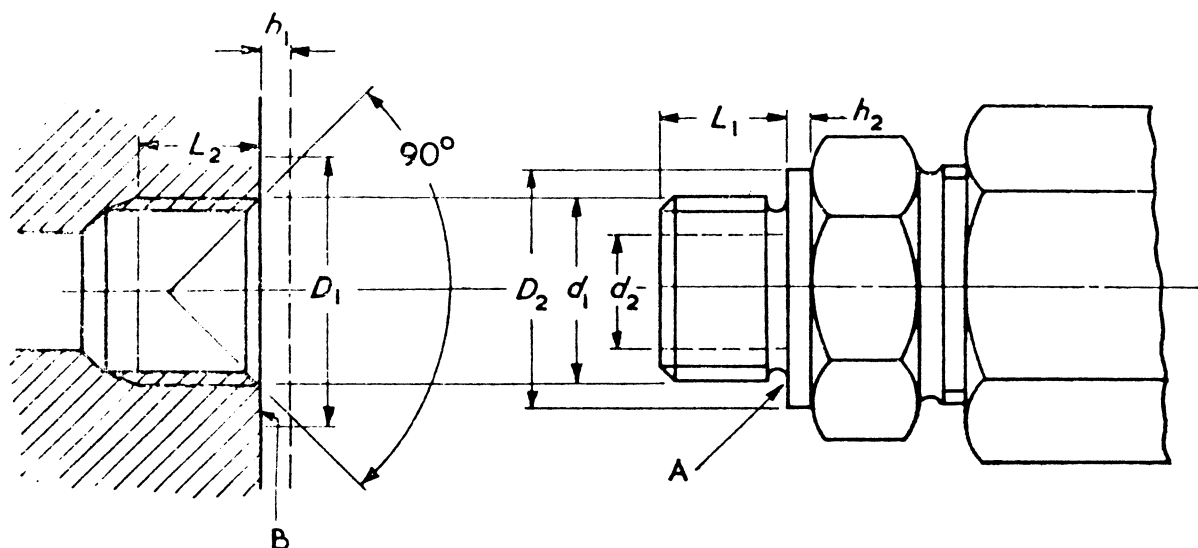
NOTE. Recesses for 'O'-rings are under consideration and details will be published later.

1.9 Workmanship. The couplings shall be cleanly and neatly finished, free from burrs, fins, sharp edges and other defects.

1.10 Protective treatment. All carbon steel bodies and nuts shall be given a protective coating in accordance with BS 3382, BS 3189 or BS 1706, e.g. cadmium, phosphate or zinc as specified by the manufacturer, unless otherwise agreed between the purchaser and the manufacturer.

*As amended
July, 1978*

1.11 Type testing. Testing shall be in accordance with BS 4368:Part 4. If during the tests a coupling leaks, the couplings represented shall be deemed not to comply with the requirements of this standard.

TABLE 4. STANDARD THREADED STUD ENDS (CONNECTOR ENDS)

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

amended iv, 1978	Thread size Series G. (BS 2779 Class A) d_1	Max. bore d_2	Thread length L_1 Male max. L_2 Female min.	D_1 *Min.	h_1 Max. h_2 Min.	Spigot D_2 max.
	in					
amended iv, 1978	$\frac{1}{8}$	4	7.4	15	1	14
	$\frac{1}{4}$	5	11.0	19	1.5	18
	$\frac{3}{8}$	8	11.4	23	2	22
	$\frac{1}{2}$	12	15.0	27	2.5	26
	$\frac{3}{4}$	16	16.3	33	2.5	32
	1	20	19.1	40	2.5	39
	$1\frac{1}{4}$	25	21.4	50	2.5	49
	$1\frac{1}{2}$	32	21.4	56	2.5	55
	2	40	25.7	69	3	68

* Where a recess is provided the dimensions should be as given unless otherwise stated.