

Specification for

Valve fittings —

for compressed gas cylinders —

**Part 2: Valves with taper stems for use
with breathing apparatus (excluding
medical gas cylinders to BS 1319)**

Confirmed December 2009

Co-operating organizations

The Chemical 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 British Chemical Manufacturers*
- Association of Consulting Engineers (Incorporated)
- Board of Trade
- British Chemical Plant Manufacturers' Association
- Coke Oven Managers' Association
- Engineering Equipment Users' Association*
- Gas Council
- Glass Manufacturers' Federation
- Institute of Petroleum
- Institution of Chemical Engineers
- Institution of Gas Engineers
- Institution of Structural Engineers
- Ministry of Transport*
- Society of Chemical Industry (Chemical Engineering Group)
- United Kingdom Atomic Energy Authority

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 standard:

- Admiralty
- Air Ministry
- Associated Offices' Technical Committee
- British Acetylene Association
- British Iron and Steel Federation
- Council of British Manufacturers of Petroleum Equipment
- D.S.I.R. — National Engineers' Laboratory
- Federation of British Industries
- Home Office
- Institute of Refrigeration
- Liquified Petroleum for Industry
- Lloyd's Register of Shipping
- Ministry of Aviation
- Ministry of Labour (H.M. Factory Inspectorate)
- Ministry of Power
- War Office
- Individual manufacturers and users of valves and gases

This British Standard, having been approved by the Chemical Engineering Industry Standards Committee and endorsed by the Chairman of the Engineering Divisional Council, was published under the authority of the General Council on 19 March 1963

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Foreword

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 4 000, 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:

BS 18, *Tensile testing of metals*.

BS 84, *Parallel screw threads of Whitworth form*.

BS 131, *Notched bar tests*.

BS 131-1, *The Izod impact test on metals*.

BS 919, *Screw gauge limits and tolerances*.

BS 1806, *Dimensions of toroidal sealing rings and their recommended housings*.

BS 2779, *Fastening threads of BSP. sizes*.

This standard has been prepared under the authority of the Chemical Engineering Industry Standards Committee.

BS 341, "Valve fittings for compressed gas cylinders", was first issued in 1931 and later revised in 1945. Under the present revision, it has been decided to form this standard in different parts, Part 1 covering valves with taper stems for cylinders used for industrial purposes (other than in connection with breathing and medical purposes) and Part 2 to cover valves with taper stems for cylinders used in connection with breathing purposes other than medical. A specification for valves with parallel stems is under consideration and will form the subject of Part 3 of this standard.

Cylinders in service may have oversize threads on the valve stems provided the minimum length of engagement of thread as specified in Table 1 is maintained.

NOTE 1 In place of the customary, but incorrect, use of the pound as a unit of force, the unit called a pound force (abbreviation lbf) has been used in this standard. It is that force which, when acting on a body of mass one pound, gives it an acceleration equal to that of standard gravity. The unit called the ton-force (abbreviation tonf) has also been used where appropriate.

NOTE 2 When it is required to convert the figures in this standard from British units into metric units it is recommended that the conversion and the tables of conversion contained in BS 350, "Conversion factors and tables", be used.

The following British Standards refer to gas cylinders relevant to this specification:

BS 399, *"High carbon" steel cylinders for "permanent" gases*.

BS 400, *"Low carbon" steel cylinders for the storage and transport of "permanent" gases*.

BS 401, *Steel cylinders for the storage and transport of "liquefiable" gases*.

BS 1045, *Manganese steel gas cylinders for atmospheric gases*.

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.

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 and ii, pages 1 to 20 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 British Standard covers:

- a) The material and dimensions of valve fittings for compressed gas cylinders used for breathing apparatus other than for medical purposes.
- b) Dimensions of valving capsules.
- c) An appendix containing recommendations for inspection gauges for the taper threads on the valve stems and in the necks of gas cylinders.

2 Materials

a) *Valve bodies.* Valves bodies shall comply with the mechanical tests given in b ii) below. Among the suitable materials for valve bodies are the following:

- (i) Bronze or brass for pressures not exceeding 4 000 lbf/in² or

The valve body shall not be a casting.

b) Tests.

i) *Test samples for mechanical tests.* The test samples for the tensile test specified in ii) shall, where practicable, be taken from a valve blank. Where this is not practicable, the test piece shall be treated in the same manner as the valve so as to be representative of the material in the condition in which it is to be used.

ii) *Tensile test.* A tensile test carried out on a proportional round test piece, in accordance with BS 18 “Methods for tensile testing of metals” shall show the following properties:

Minimum tensile strength	28 tonf/in ² (62720 lbf/in ²)
Minimum elongation	20 per cent

iii) *Impact test.* An impact test carried out in accordance with BS 131, BS 131-1¹⁾ should show the following properties:

Minimum Izod value	a. bronze or brass: 40 ft/lbf
	b. aluminium bronze: 20 ft/lbf

3 Screw threads on valve stems and in cylinder necks

Four standard sizes of taper screw thread connections between valve stems and cylinders are provided. These are designated by the sizes 0.60, 0.715, 1.00 and 1.250 in which represent the maximum major diameter at the small end of the valve stem.

The principal dimensions of these screw threads shall be as given in Table 1 and Figure 1.

¹⁾ BS 131, “Methods for notched bar tests”, Part 1, “The Izod impact test on metals”.

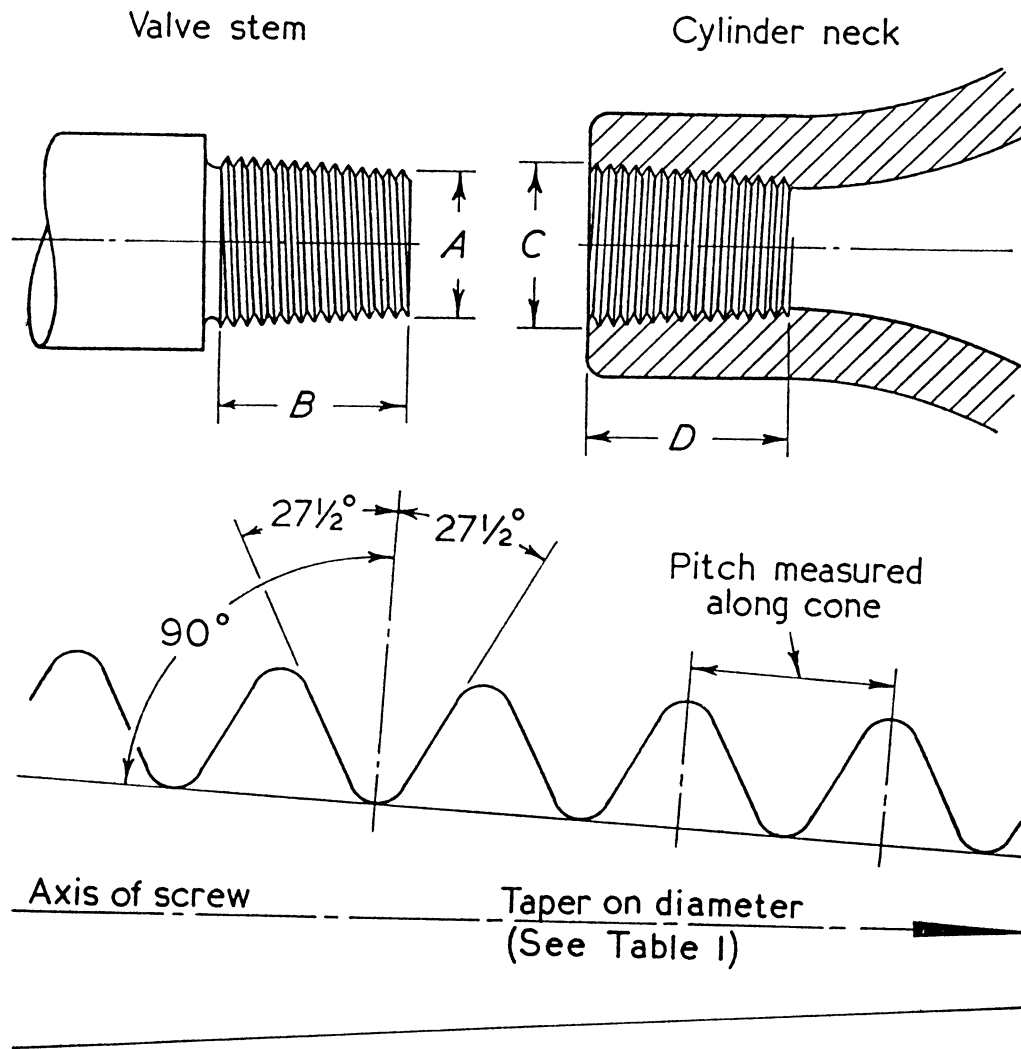


Figure 1 — Whitworth form thread, right hand, normal to surface of cone

Table 1 — Principal dimensions of standard taper screw threads in valve stems and in cylinder necks (See Figure 1)

1	2	3	4	5	6	7	8
Nominal size of valve	Taper on diameter	Threads per inch measured along cone	“Stem” Maximum major diameter (stem) <i>A</i>	Length of thread <i>B</i>	“Cylinder” Minimum major diameter (cylinder) <i>C</i>	Minimum length of engagement (when valve is screwed down tight)	Minimum length of thread in cylinder neck <i>D</i>
in			in	in	in	in	in
0.6	1 : 5.625	14	0.600	$1\frac{1}{8} \begin{smallmatrix} +\frac{1}{8} \\ -0 \end{smallmatrix}$	0.756	$\frac{5}{8}$	$\frac{7}{8}$
0.715 ^a	1 : 8	14	0.715	$\frac{7}{8} \begin{smallmatrix} +\frac{1}{8} \\ -0 \end{smallmatrix}$	0.793	$\frac{5}{8}$	$\frac{7}{8}$
1	1 : 8	14	1.000	$1 \begin{smallmatrix} +\frac{1}{8} \\ -0 \end{smallmatrix}$	1.094	$\frac{3}{4}$	1
1.25	1 : 8	11	1.250	$1\frac{1}{4} \begin{smallmatrix} +\frac{1}{8} \\ -0 \end{smallmatrix}$	1.375	1	$1\frac{1}{4}$

^a Preferred size.

The screw threads on standard valve stems and in cylinder necks shall lie between the diametral limits stated in Table 2. Recommended limit gauges for controlling the screw threads between these limits are given in the appendix.

Table 2 — Limits for standard taper screw threads on valve stems and in cylinder necks

1	2	3	4	5	6
Nominal size of valve	Element	Diameter of thread on stem at small end (see Figure 1) <i>A</i>		Diameter of thread at mouth of cylinder (see Figure 1) <i>C</i>	
		max.	min.	max.	min.
in		in	in	in	in
0.6	Major diameter	0.600 0	0.592 0	0.766 6	0.755 6
	Effective diameter	0.554 3	0.549 3	0.714 9	0.709 9
	Minor diameter	0.508 6	0.498 6	0.672 2	0.664 2
0.715	Major diameter	0.715 0	0.707 0	0.803 7	0.793 0
	Effective diameter	0.669 2	0.663 9	0.752 5	0.747 2
	Minor diameter	0.623 4	0.612 7	0.709 4	0.701 4
1	Major diameter	1.000 0	0.992 0	1.104 7	1.094 0
	Effective diameter	0.954 2	0.948 9	1.053 5	1.048 2
	Minor diameter	0.908 4	0.897 7	1.010 4	1.002 4
1.25	Major diameter	1.250 0	1.239 5	1.389 0	1.375 0
	Effective diameter	1.191 7	1.184 7	1.323 7	1.316 7
	Minor diameter	1.133 4	1.119 4	1.268 9	1.258 4

4 Valve outlets and connectors

The dimensions and tolerances of the valve outlets shall be in accordance with the details given in Table 3 and outlet types A to E. Other dimensions for connectors, washers and nuts are given for guidance purposes. Screw threads shall be right hand only.

Table 3 — Details of valve outlets

1	2	3	4	5
Outlet type	Screw thread of outlet (Parallel threads)			
	Nominal size	Thread Series	Internal or external	Threads per inch
A ^a	in 5/8	B.S.P.	Internal	14
B	11/16	B.S.F.	Internal	14
C	1/4	B.S.P.	External	19
D	5/8	B.S.P.	External	14
E	Yoke type			
^a Preferred size.				

5 Testing

Representative sample valve bodies from the production batch shall be submitted to a proof test at a pressure consistent with their maximum permissible working pressure.

6 Marking

Valves shall be permanently marked with their maximum permissible working pressure.

7 Valving capsules

a) *General.* Valving capsules of suitable soft material for fitting between the taper threaded portion of cylinder valves and the internally threaded portion of cylinder necks, may be used to ensure a gas-tight joint when the valves are screwed home. A torque-limiting device should be used.

b) *Dimensions.* The capsules shall consist of a tapered sleeve and shall conform to the dimensions given in Table 4.

Table 4 — Valving capsules

Nominal size of valve	Inside diameter at large end	Inside diameter at small end	Length	Approximate thickness
in	in	in	in	in
0.60	0.756	0.60	$\frac{7}{8}$	0.005
0.715	0.824	0.715	$\frac{7}{8}$	0.005
1.0	1.109	1.000	$\frac{7}{8}$	0.005
1.25	1.375	1.250	1	0.005