AS 2473—1990

Australian Standard®

Valves for compressed gas cylinders (threaded outlet)

This Australian Standard was prepared by Committee ME/2, Gas Cylinders. It was approved on behalf of the Council of Standards Australia on 14 November 1989 and published on 7 May 1990.

The following interests are represented on Committee ME/2;

Aluminium Development Council
Australasian Steamship Owners Federation
Australian Chamber of Commerce
Australian Liquefied Petroleum Gas Association
Australian Underwater Federation
Australian Welding Institute
Board of Fire Commissioners, N.S.W.
Bureau of Steel Manufacturers of Australia
Confederation of Australian Industry
Department of Defence
Department of Employment and Industrial Affairs, Qld
Department of Industrial Affairs, W.A.
Department of Industrial Relations, N.S.W.
Department of Labour and Industry, Tas.
Department of Labour, S.A.
Department of Mines and Energy, N.T.
Department of Mines, Qld
Department of Territories and Local Government
Ministry of Employment and Training, Vic.
Railways of Australia Committee

This Standard was issued in draft form for comment as DR 87236.

Australian Standard®

Valves for compressed gas cylinders (threaded outlet)

First published in part as AS B240 — 1966.
AS CB4 Int 11 first published 1977.
AS B240 — 1966 and AS CB4 Int 11 — 1977 revised, amalgamated and redesignated AS 2473 — 1981.
Second edition 1985.
Third edition 1990.

PUBLISHED BY STANDARDS AUSTRALIA
(STANDARDS ASSOCIATION OF AUSTRALIA)
1 THE CRESCENT, HOMEBUSH, NSW 2140
ISBN 0 7262 6034 7

PREFACE

This Standard was prepared by the Standards Australia Committee as Gas Cylinders to supersede AS 2473—1981.

Two changes are introduced in this edition, viz the introduction of impact testing of the valve/valve protection in place of specified mechanical properties of the valve, and a further change to alternative outlet connections for inert gases.

The impact testing is based on work carried out by The Commonwealth Industrial Gases Limited, and reported to Committee ME/2 in 1983. Testing to prove the adequacy of valve strength or valve protection is intended to overcome unpractical material specifications and to allow the valve manufacturer to optimize the valve strength and port size.

A torque test is still to be finalized, and developmental work is required. Impact values for small LP gas cylinders and for specific applications are listed in Table D1.

The further change to alternative outlet connections for inert gases is necessary as experience has shown that truncated Type 12 and Type 13 connectors can make an unstable connection with a Type 10 connector. The truncated Type 12 and Type 13 connectors were introduced in the 1985 edition, but are to be revoked and replaced by the diameter-indexed connection specified for inert gases in AS 2474, *Valves for compressed gas cylinders (diameter-indexed outlets)*. As connections specified in AS 2474 are only of the self-sealing type, AS 2474 has also been revised to provide for other than self-sealing connections.

CONTENTS

STANDARDS AUSTRALIA

Australian Standard

Valves for compressed gas cylinders (threaded outlet)

1 SCOPE. This Standard specifies inlet and outlet connection threads, material, testing, valve spindle dimensions and operations, and marking requirements, for compressed gas cylinder valves with threaded outlet connections for a nominated range of gases. It also specifies dimensional details of the outlet connecting parts.

NOTES:

1. Requirements for compressed gas cylinder valves with a diameter-indexed system of outlet connections, or with a pin-indexed system of outlet connections (for medical application) are specified in AS 2472 and AS 2474.
2. For convenience the special valve (previously specified in Interpretation No 11 to AS CB4) for use on small seamless gas cylinders for carbon dioxide, is now specified in Appendix C.

This Standard does not apply to valves for portable gas cylinders of less than 11 kg capacity for self-contained breathing apparatus, or to valves for fire-extinguishers.

2 REFERENCED DOCUMENTS. The following documents are referred to in this Standard:

AS	
1391	Methods for tensile testing of metals
1544 1544.1	Methods for impact tests on metals Part 1: Izod
1596	SAA LP Gas Code
1677	Refrigerating systems
1722 1722.1 1722.2	Pipe threads of Whitworth form Part 1: Sealing pipe threads Part 2: Fastening pipe threads
2030 2030.1	SAA Gas Cylinders Code Part 1: Cylinders for compressed gases other than acetylene
2472	Valves for medical gas cylinders
2474	Valves for compressed gas cylinders (diameter-indexed outlets)
2613	Safety devices for gas cylinders
ANSI B57.1) CGA V—1) Compressed gas cylinder valve CSA B96) outlet and inlet connections	
B2.1	Pipe threads (except dryseal)

3 DEFINITIONS. For the purpose of this Standard, the definitions given in AS 2030.1 apply.

4 THREADS.

4.1 Valve stem (inlet) thread. The valve stem (inlet) thread shall be one of the following:

(a) Taper thread listed in Table 1.

(b) Parallel thread listed in Table 2.

(c) Thread compatible with one of the cylinder neck threads specified in AS 2030.1.

NOTE: Recommended limit gauges for checking the specified taper threads are detailed in Appendix A.

4.1 Valve outlet connection thread. The valve outlet connection thread shall be that shown in Column 4 of Table 3 as appropriate or, where not listed in Table 3, shall be that shown in Column 4 of Table 4.

NOTE: Thread designations in Table 3 are from various origins, and care is necessary in their interpretation. For example, in the designation GB 5/8 /16 LH, the values 5/8 and 16 both refer to a nominal bore (in imperial and metric units), and 16 does not indicate threads per inch. In the designation 0.825—14 NGO—LH—EXT, the value 0.825 refers to major diameter and 14 refers to threads per inch.

Where the gas is not listed in Table 3 or Table 4, or is a gas mixture, the valve outlet connection thread, and type of outlet connection, shall comply with Table 6 for the appropriate classification of gas or gas mixture.

5 DIMENSIONS.

5.1 Spindle. Valves operated by a spindle shall have a handwheel not separable from the spindle without the use of tools, or shall have a squared end to the spindle. The dimension of the squared end shall be that nominated in Column 6 of Table 3 or in Column 5 of Table 4 as appropriate, and as specified in Table 5.

5.2 Outlet connection. The outlet connection shall conform to the dimensions given in Table 7(a) to 7(o) as appropriate, applicable to the type of connection specified in Table 3 for the particular gas. If the particular gas is not listed in Table 3, the outlet connection shall conform to the dimensions given in Tables 7(a) to 7(o) as appropriate, applicable to the type of connection specified in Table 4 for the particular gas.

6 VALVE OPERATION. Spindles for valve operation shall close the valve when rotated clockwise (when viewed from the spindle end). The spindle gland and spindle-retaining nut shall not be loosened by operation of the spindle.

The spindle shall not be separable from the valve body without the prior removal of the spindle-retaining device by the use of tools.

NOTE: Locking compound is not considered to be an adequate means to ensure the retaining nut is not loosened by operation of the spindle.

7 MATERIALS. Materials used for valve components in contact with the contained gas shall be compatible with the contained gas.

NOTE: Some compatible materials are listed in Column 5 of Table 3 and in Column 4 of Table 4.

The copper content of the material of valve bodies for use with acetylene gas shall not exceed 70 percent.

8 MANUFACTURE. Valve bodies shall not be manufactured as castings.

9 PRESSURE RATING. The maximum service pressure at which the valve is rated shall be nominated by the valve manufacturer, and shall be verified by testing in accordance with the requirements of Clause 10.4.

NOTE: Appendix B provides a basis for selection of valves to be tested.

10 TESTING.

10.1 Tests. Mechanical strength of the valve or of the valve protection as appropriate shall be verified by the impact strength test in accordance with the requirements of Appendix D.

Pressure tests shall be in accordance with the requirements of Clause 10.2.

NOTE: Appendix B provides a basis for selection of test pieces.

10.2 Pressure tests.

10.2.1 Hydrostatic. An internal hydrostatic pressure of not less than 1.25 times the maximum developed pressure for which the valve is rated shall be applied to an assembled valve. No leakage shall occur. During this test, all pressure-relief devices shall be blanked off.

10.2.2 Pneumatic. An internal pneumatic pressure of not less than the following shall be applied to every assembled valve:

(a) For valves not fitted with a pressure-relief device—not less than the maximum developed pressure for the valve.

(b) For valves fitted with a spring-loaded relief device—not less than 85 percent of the minimum relief pressure.

NOTE: The maximum developed pressure is the highest pressure derived from the maximum service pressure rating nominated by the manufacturer and the gas(es) for which the valve is intended.

No leakage shall occur through the valve when the valve is closed, or through the spindle gland when the valve is both fully opened and fully closed.

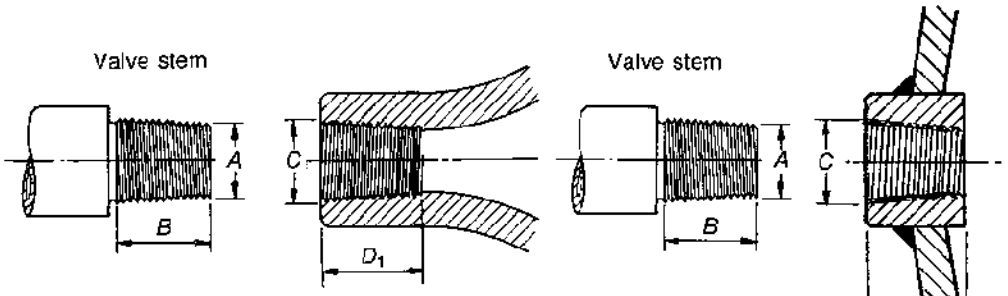
11 MARKING. Valves shall be permanently and legibly marked on the valve body with the following:

(a) The name, or identifying mark, of the manufacturer.

(b) The maximum service pressure, which may be in an abbreviated form or in a code provided that the manufacturer makes known to users and other interested persons the pressure denoted by these markings.

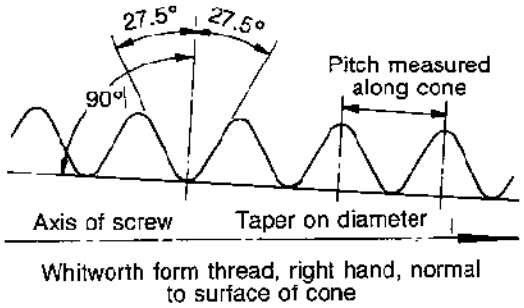
Left-hand threads should be identified by notches at the junctions of the flats of the nut hexagon.

TABLE 1
SPECIAL TAPER STEM THREAD PRINCIPAL THREAD DIMENSIONS AND LIMITS



(a) Cylinder neck (seamless)

(b) Cylinder neck (welded or brazed)

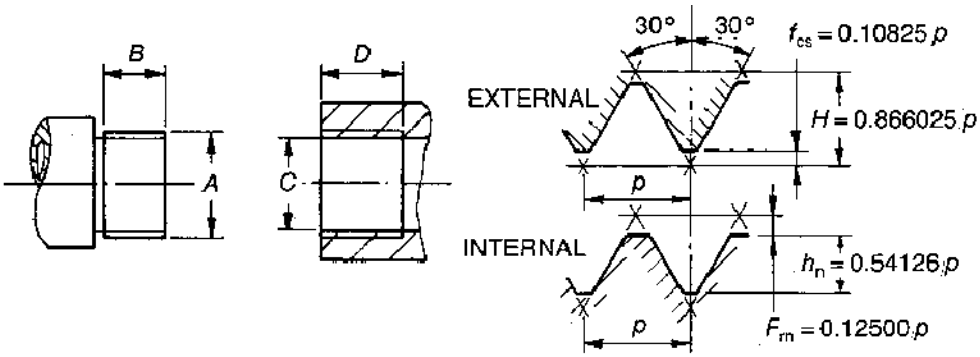


(c) Thread profile

Dimension		Nominal thread size		
		0.6 in	0.715 in	1 in
Taper on diameter		1 in 5.615	1 in 8	1 in 8
Threads per inch (along cone)		14	14	14
Pitch (along cone), mm		1.814	1.814	1.814
Major diameter *A*, mm	max.	15.240	18.161	25.400
	min.	15.037	17.958	25.197
Effective diameter (*A*), mm	max.	14.079	16.998	24.237
	min.	13.952	16.863	24.102
Minor diameter (*A*), mm	max.	12.918	15.834	23.073
	min.	12.664	15.563	22.802
Major diameter (*C*), mm	max.	19.472	20.414	28.059
	min.	19.192	20.142	27.788
Effective diameter (*C*), mm	max.	18.158	19.114	26.759
	min.	18.031	18.979	26.624
Minor diameter (*C*), mm	max.	17.074	18.019	25.664
	min.	16.871	17.816	25.461
Length of valve thread (*B*), mm		29 +3, –0	22 +3, –0	25 +3, –0
Length of cylinder neck thread full form				
D_1 min., mm		22	22	25
D min., mm		16	16	19
Length of thread engagement*, min., mm		16	16	19

* Valve stem screwed tight into cylinder neck.

TABLE 2
SPECIAL PARALLEL STEM THREAD PRINCIPAL THREAD DIMENSIONS AND LIMITS



(a) Valve stem (b) Cylinder neck (c) Thread profile

Dimension*		Nominal thread size 3/4 NGS
Threads per inch		14
Pitch *p*, mm		1.814
Major diameter (*A*) (Class 2A), mm	max.	26.264
	min.	26.010
Pitch diameter (*A*) (Class 2A), mm	max.	24.950
	min.	24.943
Minor diameter (*C*) (Class 2B), mm	max.	24.638
	min.	24.333
Pitch diameter (*C*) (Class 2B), mm	max.	24.391
	min.	25.118
Length of valve thread *B*, mm		29 +3, –0
Length of cylinder neck thread full form (*D*), min., mm		24
Length of thread engagement†, min., mm		14

* Dimensions taken from ANSI B57.1, CGA V-1, CSA B96, and soft-metricated.
† Valve stem screwed tight into cylinder neck.

TABLE 3
VALVE DETAILS FOR SPECIFIC GASES AT STANDARD PRESSURES (UP TO 20 000 kPa)

1	2	3	4	5	6
Gas		**Outlet**		**Compatible valve materials (see Note 1)**	**Spindle size (A/F)**
Name	**Refrigerant No (see AS 1677)**	**Type No**	**Thread (nominal) (see Note 13)**		**mm**
Acetylene	—	20	G 5/8 /16 LH	B	7.2
Air	—	10	G 5/8 /16 RH	B	7.2
		33 (Note 9)	GB 1/4 /19 RH	B	7.2
Ammonia (anhydrous)	717	32	GB 1/2 /15 RH	S	7.2
Argon	—	10	G 5/8 /16 RH	B	7.2
		(Note 7)		B	7.2
Boron trifluoride	—	43	0.825-14NGO -LH-EXT (Note 3)	Note 4	9.5
Bromotrifluoromethane	13B1	34	GB 3/4 /20 RH	B	7.2
Butadiene	—	20	G 5/8 /16 LH	B	7.2
		21	0.885-14NGO -LH-INT (Note 2)	B	7.2
Butane (n-Butane)	600	20	G 5/8 /16 LH	B	7.2
(commercial) (see also LPG) (Note 12)		21	0.885-14NGO -LH-INT	B	7.2
		41 (Note 9)	GB 3/8 /10 LH	B	7.2
Butane (n-Butane) (pure)	600	20	G 5/8 /16 LH	S or B	7.2
		21	0.885-14NGO -LH-INT (Note 2)	S or B	7.2
Butylene (commercial)	—	20	G 5/8 /16 LH	B	7.2
(see also LPG) (Note 12)		21	0.885-14NGO -LH-INT	B	7.2
		41 (Note 9)	GB 3/8 /10 LH	B	7.2
Butylene (pure)	—	20	G 5/8 /16 LH	B	7.2
		21	0.886-14NGO -LH-INT (Note 2)	B	7.2
Carbon dioxide	744	30	0.860 in-14 BSW RH	B	7.2
Carbon monoxide	—	20	G 5/8 /16 LH	B	7.2
Chlorine	—	34	GB 3/4 /20 RH	S	9.5
Chlorodifluoroethane	142B	34	GB 3/4 /20 RH	B or S	7.2
Chlorodifluoromethane	22	34	GB 3/4 /20 RH	B or S	7.2
Chloropentafluoroethane	115	34	GB 3/4 /20 RH	B	7.2
Chlorotetrafluoroethane	124	34	GB 3/4 /20 RH	S or B	7.2
Chlorotrifluoroethylene	1113	34	GB 3/4 /20 RH	S or B	7.2
Chlorotrifluoromethane	13	34	GB 3/4 /20 RH	B	7.2
CNG (for automotive use) (see also NGV)	—	—	1/4-18NPT (Note 14)	B	7.2
Coal gas	—	20	G 5/8 /16 LH	S or B	7.2
Cyanogen	—	40	GB 5/8 /16 LH	St.S	9.5
Cyanogen chloride	—	43	0.825-14NGO -LH-EXT (Note 3)	St.S	9.5
Deuterium	—	20	G 5/8 /16 LH	S or B	9.5
Diborane	—	43	0.825-14NGO -LH-EXT	S or B	9.5
Dibromodifluoromethane	12B2	34	GB 3/4 /20 RH	B	7.2
Dichlorodifluoromethane	12	34	GB 3/4 /20 RH	S or B	7.2
Dichlorofluoromethane	21	34	GH 3/4 /20 RH	S or B	7.2
Dichlorodiflоromethane/ Dichlorofluoromethane	500	34	GB 3/4 /20 RH	S or B	7.2
Dichlorotetrafluoroethane	—	34	GB 3/4 /20 RH	S or B	—
Difluoroethane	—	34	GB 3/4 /20 RH	S or B	9.5
1, 1-Difluoroethylene	—	40	GB 5/8 /16 LH	S or B	7.2
Dimethylamine	—	40	GB 5/8 /16 LH	S or B	7.2
Dimethyl ether	—	20	G 5/8 /16 LH	B	7.2
Ethane	170	20	G 5/8 /16 LH	B	7.2
Ethyl chloride	—	40	GB 5/8 /16 LH	S or B	7.2
Ethyl methyl ether	—	20	G 5/8 /16 LH	—	—
Ethylene	1150	20	G 5/8 /16 LH	B	7.2
Ethylene oxide	—	40	GB 5/8 /16 LH	S or B	7.2

(continued)

TABLE 3 *(continued)*

1	2	3	4	5	6
Gas		**Outlet**		**Compatible valve materials (see Note 1)**	**Spindle size (A/F)**
Name	**Refrigerant No (see AS 1677)**	**Type No**	**Thread (nominal) (see Note 13)**		**mm**
Ethylene oxide/ Dichlorodifluoromethane	—	42	GB 5/8 /16 LH	B	9.5
Ethylamine	631	42	GB 1/2 /15 LH	S	9.5
Fluorine	—	(Note 5)	(Note 5)	ASB or M	9.5
Fluorodichloromethane	21	34	GB 3/4 /20 RH	S or B	7.2
Helium	—	10	G 5/8 /16 RH	B	7.2
		(Note 7)		B	7.2
Hexafluoropropylene	—	32	GB 1/2 /15 RH	—	—
Hydrogen	—	20	G 5/8 /16 LH	B	7.2
Hydrogen bromide (anhydrous)	—	43	0.825-14NGO -LH-EXT	M	9.5
Hydrogen chloride	—	43	0.825-14NGO -LH-EXT (Note 3)	S	9.5
Hydrogen cyanide (stabilized)	—	40	GB 5/8 /16 LH	St.S	9.5
Hydrogen fluoride	—	31	GB 5/8 /16 RH	S or B	9.5
Hydrogen sulphide	—	43	0.825-14NGO -LH-EXT (Note 3)	S or B	9.5
Isobutane (commercial)	—	20	G 5/8 /16 LH	B	7.2
(see also LPG) (Note 12)		21	0.885-14NGO -LH-INT	B	7.2
		41 (Note 9)	GB 3/8 /10 LH	B	7.2
Isobutane (pure)	—	20	G 5/8 /16 LH	S or B	7.2
Isobutylene (commercial)		20	G 5/8 /16 LH	B	7.2
(see also LPG) (Note 12)		21	0.885-14NGO -LH-INT	B	7.2
		41 (Note 9)	GB 3/8 /10 LH	B	7.2
Isobutylene (isobutane) (pure)	—	21	0.885-14NGO -LH-INT	S or B	7.2
		41	GB 3/8 /10 LH	S or B	7.2
Krypton	—	10	G 5/8 /16 RH	S or B	7.2
		(Note 7)		B	7.2
LPG (Note 8)	—	20	G 5/8 /16 LH	B	7.2
	—	21	0.885-14NGO -LH-INT	B	7.2
		41 (Note 9)	GB 3/8 /10 LH	B	7.2
Methane	50	20	G 5/8 /16 LH	B	7.2
Methylamine	630	42	GB 1/2 /15 LH	S	9.5
Methyl bromide	—	31	GB 5/8 /16 RH	S or B	9.5
Methyl chloride	40	40	GB 5/8 /16 RH	B	9.5
Methyl mercaptan	—	43	0.825-14NGO -LH-EXT (Note 3)	B	9.5
Monobromo-monochlorodi-fluoromethane	12B1	34	GB 3/4 /20 RH	S or B	7.2
Monobromo-monochlorodi-fluoromethane/Nitrogen	—	34	GB 3/4 /20 RH	S or B	7.2
Neon	—	10	G 5/8 /16 RH	B	7.2
		(Note 7)		B	7.2
NGV (Natural Gas for vehicles)	—		1/4-18NPT	B	7.2
Nitric oxide	—	(Note 6)	(Note 7)	St.S	9.5
Nitrogen		10	G 5/8 /16 RH	B	7.2
		(Note 7)		B	7.2
Nitrogen peroxide	—	32	GB 1/2 /15 RH	B	9.5
Nitrosyl chloride	—	32	GB 1/2 /15 RH	B	9.5
Nitrous oxide (Note 10)	744a	30	0.860 in -14 BSW RH	B	7.2 (Note 11)
Octafluorocyclobutane	318	34	GB 3/4 /20 RH	St.S	7.2
Oxygen (Note 10)	—	10	GB 5/8 /16 RH	B	7.2 (Note 11)
		33 (Note 9)	GB 1/4 /19 RH	B	7.2
Phosgene	—	31	GB 5/8 /16 RH	S	9.5
Propane (commercial)	290	20	G 5/8 /16 LH	B	7.2
(see also LPG) (Note 12)		21	0.885-14NGO -LH-INT	B	7.2
		41 (Note 9)	GB 3/8 /10 LH	B	7.2

(continued)

TABLE 3 *(continued)*

1	2	3	4	5	6
Gas		**Outlet**		**Compatible valve materials (see Note 1)**	**Spindle size (A/F)**
Name	**Refrigerant No (see AS 1677)**	**Type No**	**Thread (nominal) (see Note 13)**		**mm**
Propane (pure)	290	20	G 5/8 /16 LH	B	7.2
		21	0.885-14NGO -LH-INT (Note 2)	B	7.2
Propylene (commercial)	1270	20	G 5/8 /16 LH	B	7.2
(see also LPG) (Note 12)		21	0.885-14NGO -LH-INT	B	7.2
		41 (Note 9)	GB 3/8 /10 LH	B	7.2
Propylene (pure)	1270	20	G 5/8 /16 LH	B	7.2
		21	0.885-14NGO -LH-INT (Note 2)	B	7.2
Silicon tetrafluoride	—	31	GB 5/8 /16 RH	S or AIB	9.5
Sulphur dioxide	764	32	GB 1/2 /15 RH	S or B	9.5
Sulphur hexafluoride	—	31	GB 5/8 /16 RH	S or B	9.5
Tetrafluoromethane	14	34	G 3/4 /20 RH	B	7.2
Tetrafluoroethylene (inhibited)	—	40	GB 5/8 /16 LH	B	7.2
Trifluoroethane	1439	34	G 3/4 /20 RH	S or B	7.2
Trifluoromethane	23	34	G 3/4 /20 RH	S or B	7.2
Trimethylamine	—	40	GB 5/8 /16 LH	S or B	7.2
Vinly bromide	—	31	GB 5/8 /16 LH	St.S	7.2
Vinyl chloride	1140	40	GB 5/8 /16 LH	S or B	9.5
Vinyl fluoride (inhibited)	—	20	G 5/8 /16 LH	B or St.S	7.2
Vinyl methyl ether	—	40	GB 5/8 /16 LH	S or B	9.5
Water gases	—	20	GB 5/8 /16 RH	B	7.2
Xenon	—	10	G 5/8 /16 RH	S or B	7.2
		11 (Note 7)	G 5/8 /16 RH	S or B	7.2
				B	7.2

NOTES:

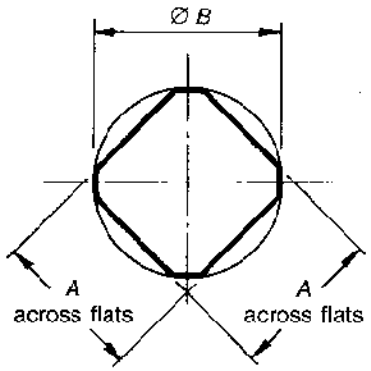
1. Materials are indicated as follows:
   AIB — Aluminium-iron-bronze
   ASB — Aluminium-silicon-bronze
   B — Bronze
   M — Monel
   S — Steel
   St.S — Stainless steel.
2. This is valve outlet Connection No 510 or ANSI B57.1, CGA V-1, CSA B96.
3. This valve outlet Connection No 330 of ANSI B57.1, CGA V-1, CSA B96.
4. Steel body, stainless steel spindle, silver seat; or aluminium-iron-bronze body, monel spindle, Kel-F seat.
5. Outlet type and thread not yet specified. ANSI B57.1, CGA V-1, CSA B96 specifies Connection No 679 or No 670 both of which have thread 1.030-14NGO-LH-EXT.
6. Outlet type and thread not yet specified. ANSI B57.1, CGA V-1, CSA B96 specifies Connection No 755 or No 660, which have threads 1.125-14UNS-2A-LH-EXT and 1.030-14NGO-RH-EXT respectively.
7. The alternative outlet is Connection E, specified in As 2474, or self-sealing or other than self-sealing type.
8. For the purposes of this Standard, LPG means a hydrocarbon fluid composed predominantly of any of the following hydrocarbons or mixtures of all or any of them; propane, propylene, butanes, butylenes.
9. Valve outlet thread or alternative valve outlet thread for use on cylinders of 11 kg water capacity or less.
10. Also applies for medical cylinders exceeding 11 kg water capacity. For medical cylinders of 11 kg water capacity or less, the connection specified in AS 2472 is applicable.
11. See AS 2472 for the spindle size of valves for medical cylinders.
12. 'Commercial' means this fluid is in a mixture of other hydrocarbon fluids as provided for in LP Gas (See Note 8). For information of the composition of certain 'commercial' hydrocarbons, see AS 1596 and the specifications and test methods for liquefied petroleum gas published by the Australian Liquefied Petroleum Gas Association.
13. For specification of nominated thread, see AS 1722.1, or ANSI B57.1, CGA V-1, CSA B96, as appropriate.
14. For thread specifications, see ANSI B2.1.

TABLE 4
VALVE DETAILS FOR SPECIFIC GASES AT EXTRA HIGH PRESSURES (EHP) (20 000 kPa AND GREATER)

1	2	3	4	5
Gases	**Outlet**		**Compatible valve materials**	**Spindle size (A/f)**
	Type No	**Thread (nominal) (see Note 13)**	**(see Note 1)**	**mm**
Air	11	G 5/8 /16 RH	B	7.2
Argon Helium Krypton Neon Nitrogen Xenon	11	G 5/8 /16 RH 0.965-14NGO -RH-INT	B B	7.2 7.2
Oxygen	11	G 5/8 /16 RH	B	7.2 (Note 11)

NOTE: See Notes to Table 3.

TABLE 5
DIMENSIONS OF SPINDLE EXTENSION END



millimetres

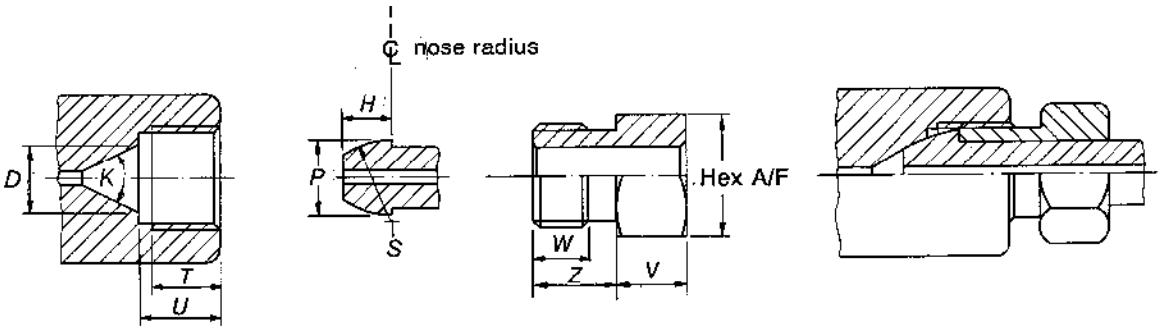
Nominal size (A/F)	**Across flats *(A)***		**Diameter *(B)***
	Min.	**Max.**	**Max.**
7.2	7.03	7.18	9.52
9.5	9.45	9.50	14.62

TABLE 6
RECOMMENDED OUTLET DETAILS FOR GASES AND GAS MIXTURES NOT SPECIFICALLY LISTED IN TABLE 3 OR TABLE 4

Gas classification (see Note 1)	**Outlet**	
	Type No	**Thread (see AS 1722.2)**
Corrosive and flammable	Note 2	GB 3/8 /16 LH
Corrosive and non-flammable	Note 2	GB 3/8 /19 RH
Flammable and non-poisonous	20	G 5/8 /16 LH
Flammable and poisonous	20	G 5/8 /16 LH
Inert (non-flammable)	10	G 5/8 /16 RH
Oxidizing	10	G 5/8 /16 RH

NOTES:
1. A flammable, poisonous, oxidizing, or corrosive mixture is defined as one with a component that has been intentionally added that is itself respectively flammable, poisonous, oxidizing, or corrosive.
2. Outlet type not specified.

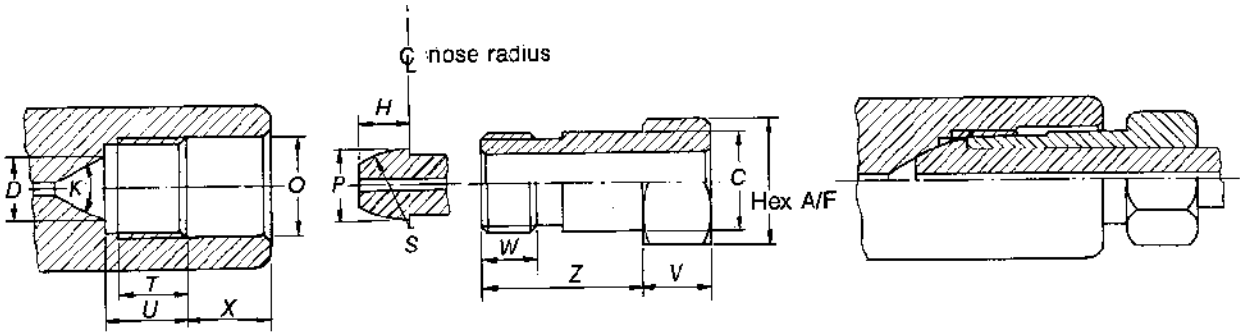
TABLE 7(a) FOR TYPE 10 CONNECTION



Detail	Dimension
VALVE OUTLET	
Thread	G 5/8 /16 RH* (see AS 1722.2)
Seat diameter *(D)*, mm	16.5 to 17.0
Angle *(K)*, degrees	60
Full thread length *(T)*, min., mm	16
Bore depth *(U)*, mm	19.5 to 20.0
NUT	
Thread	GB 5/8 /16 RH† (see AS 1722.2)
Full thread length *(W)*, min., mm	12.5
Shank length *(Z)*, min., mm	17.0
Hexagon length *(V)*, min., mm	11
Hexagon size, A/F, mm	27.68 to 27.94 or 23.16 to 23.37‡
NIPPLE	
Nose diameter *(P)*, mm	18.5 to 19.0
Nose length *(H)*, mm	11.5 to 12.0
Nose radius *(S)*, mm	19.0 to 19.5

* Formerly 5/8 BSP.F.
† Formerly 5/8 BSP.F. This thread is modified by reduction of major, pitch, and minor diameters by 0.10 mm to 0.15 mm on diameter, to provide ease of assembly in service.
‡ Formerly 11/16 Whit. Hex. or 9/16 Whit. Hex.

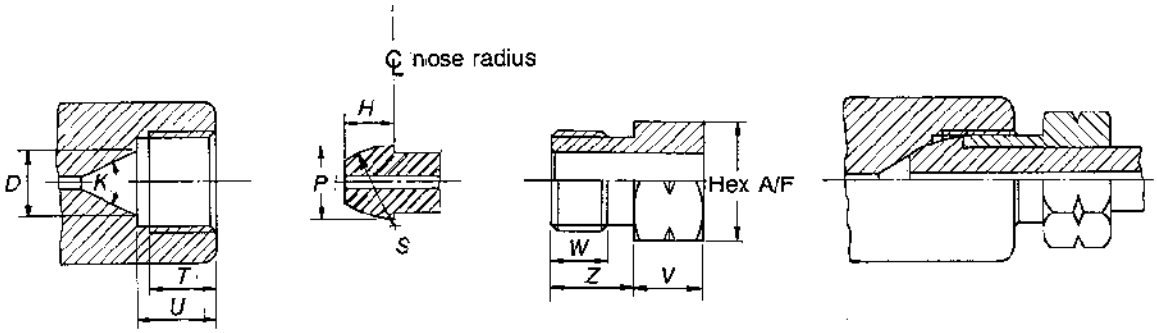
TABLE 7(b) FOR TYPE 11 CONNECTION



Detail	Dimension
VALVE OUTLET	
Thread	G 5/8 /16 RH* (see AS 1722.2)
Seat diameter *(D)*, mm	16.5 to 17.0
Angle *(K)*, degrees	60
Full thread length *(T)*, min., mm	16
Bore depth *(U)*, mm	19.5 to 20.0
Centrebore diameter *(O)*, mm	23.5 to 24.0
Centrebore, length *(X)*, mm	18.5 to 19.5
NUT	
Thread	GB 5/8 /16 RH† (see AS 1722.2)
Full thread length *(W)*, min., mm	12.5
Shank length *(Z)*, min., mm	38.0
Hexagon length *(V)*, min., mm	11
Shank diameter *(C)*, min., mm	22.5 to 23.0
Hexagon size, A/F, mm	27.68 to 27.94‡
NIPPLE	
Nose diameter *(P)*, mm	18.5 to 19.0
Nose length *(H)*, mm	11.5 to 12.0
Nose radius *(S)*, mm	19.0 to 19.5

* Formerly 5/8 BSP.F.
† Formerly 5/8 BSP.F. This thread is modified by reduction of major, pitch, and minor diameters by 0.10 mm to 0.15 mm on diameter, to provide ease of assembly in service.
‡ Formerly 11/16 Whit. Hex.

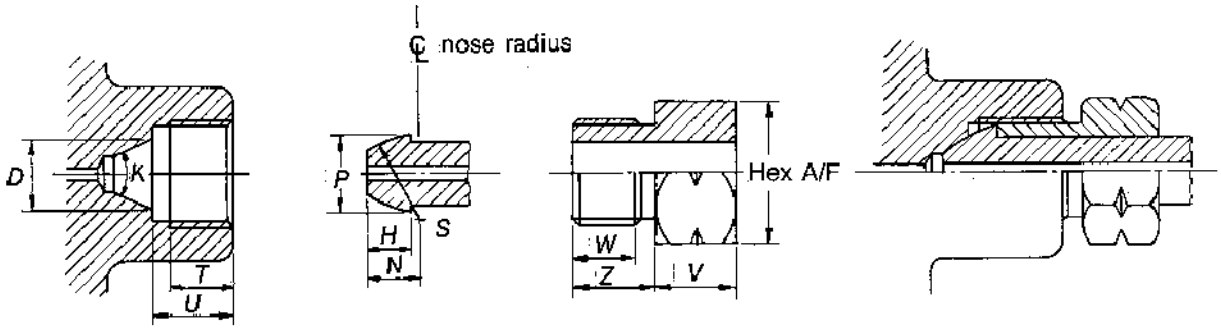
TABLE 7(c) FOR TYPE 20 CONNECTION



Detail	Dimension
VALVE OUTLET	
Thread	G 5/8 /16 LH* (see AS 1722.2)
Seat diameter *(D)*, mm	16.5 to 17.0
Angle *(K)*, degrees	60
Full thread length *(T)*, min., mm	16
Bore depth *(U)*, mm	19.5 to 20.0
NUT	
Thread	GB 5/8 /16 LH† (see AS 1722.2)
Full thread length *(W)*, min., mm	12.5
Shank length *(Z)*, mm	16.5 to 17.5
Hexagon length *(V)*, min., mm	11
Hexagon size, A/F, mm	27.68 to 27.94 or 23.16 to 23.37‡
NIPPLE	
Nose diameter *(P)*, mm	18.5 to 19.0
Nose length *(H)*, mm	11.5 to 12.0
Nose radius *(S)*, mm	19.0 to 19.5

* Formerly 5/8 BSP.F.
† Formerly 5/8 BSP.F. This thread is modified by reduction of major, pitch, and minor diameters by 0.10 mm to 0.15 mm on diameter, to provide ease of assembly in service.
‡ Formerly 11/16 Whit. Hex. or 9/16 Whit. Hex.

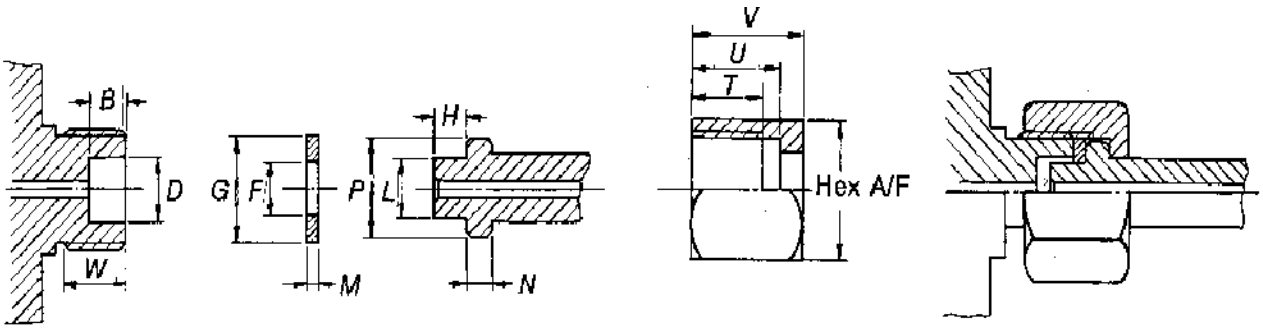
TABLE 7(d) FOR TYPE 21 CONNECTION



Detail	Dimension
VALVE OUTLET	
Thread	0.885-14NGO-LH-INT†
Minor diameter, mm	20.516 to 20.711
Pitch diameter, mm	21.300 to 21.392
Major diameter, min., mm	22.479
Seat diameter *(D)*, mm	17.0 to 18.0
Angle *(K)*, degrees	60
Full thread length *(T)*, min., mm	14
Bore depth *(U)*, mm	17.5 to 18.0
NUT	
Thread	0.880-014NGO-LH-EXT†
Major diameter, mm	22.225 to 22.352
Pitch diameter, mm	21.082 to 21.173
Minor diameter, max., mm	20.127
Full thread length *(W)*, min., mm	12.5
Shank length *(Z)*, min., mm	17.5
Hexagon length *(V)*, min., mm	11
Hexagon size, A/F, mm	27.68 to 27.94 or 28.27 to 28.57‡
NIPPLE	
Nose diameter *(P)*, mm	18.5 to 19.0
Centreline length *(H)*, mm	11.5 to 12.0
Nose radius *(S)*, mm	19.0 to 19.5
Relief (optional) *(N)*, mm	1.5

* Similar to Connection No 510 of ANSI B57.1, CGA V-1, CSA B96.
† See ANSI B57.1, CGA V-1, CSA B96.
‡ Formerly 11/16 Whit. Hex. or 1 1/8 A/F.

TABLE 7(e) FOR TYPE 30 CONNECTION

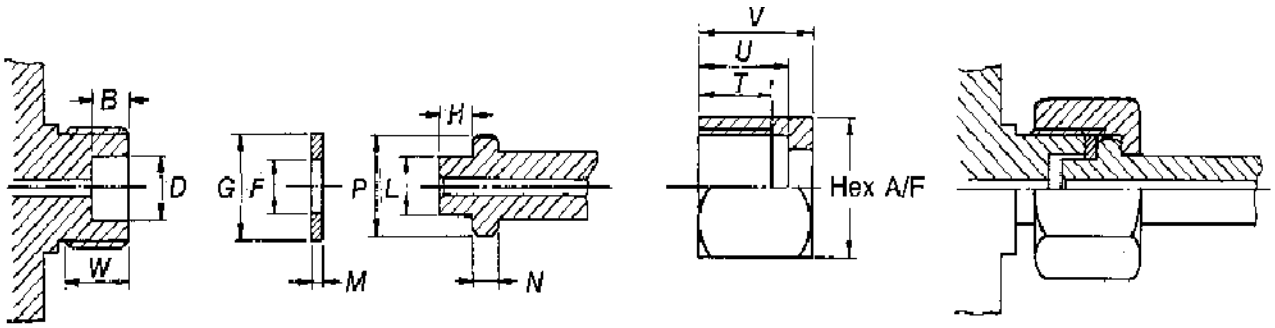


Detail	Dimension
VALVE OUTLET	
Thread	0.860 in — 14 BSW RH*
Full thread depth *(W)*, min., mm	8.5
Recess depth *(B)*, min., mm	8.0
Recess diameter *(D)*, min., mm	12.5
NUT	
Thread	0.860 in — 14 BSW RH*
Major diameter, min., mm	21.844
Pitch diameter, mm	20.683 to 20.851
Minor diameter, mm	19.522 to 20.124
Full thread length *(T)*, min., mm	10
Bore depth *(U)*, min., mm	15
Overall length *(V)*, min., mm	20
Hexagon size, A/F, mm	27.68 to 27.94†
NIPPLE	
Shoulder diameter *(P)*, mm	18.0 to 19.0
Shoulder length *(N)*, mm	4.5 to 5.0
Nose diameter *(L)*, max., mm (optional)	12
Nose length *(H)*, max., mm (optional)	7
WASHER	
Outside diameter *(G)*, mm	18.0 to 18.5
Hole diameter *(F)*, mm	To suit nipple
Thickness (nominal) *(M)*, mm	1.6

* Non-standard thread to AS B154 (superseded by AS 1722.2) with medium fitthread forms and major, pitch, and minor diameters of valve outlet thread reduced between 0.10 mm and 0.15 mm on diameter to provide ease of assembly in service.

† Formerly 11/16 Whit. Hex.

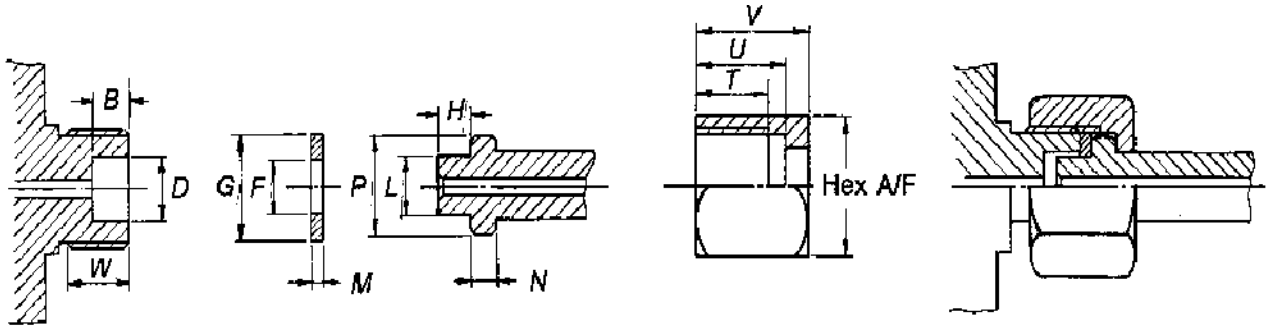
TABLE 7(f) FOR TYPE 31 CONNECTION



Detail	Dimension
VALVE OUTLET	
Thread	GB 5/8 /16 RH* (see AS 1722.2)
Full thread depth *(W)*, min., mm	13.0
Recess depth *(B)*, min., mm	8
Recess diameter *(D)*, min., mm	12.5
NUT	
Thread	G 5/8 /16 RH† (see AS 1722.2)
Full thread length *(T)*, min., mm	11
Bore depth *(U)*, min., mm	16
Overall length *(V)*, min., mm	20
Hexagon size, A/F, mm	32.72 to 33.02‡
NIPPLE	
Shoulder diameter *(P)*, mm	18.5 to 19.0
Shoulder length *(N)*, mm	4.5 to 5.0
Nose diameter *(L)*, max., mm (optional)	12
Nose length *(H)*, max., mm (optional)	7
WASHER	
Outside diameter *(G)*, mm	18.0 to 18.5
Hole diameter *(F)*, mm	To suit nipple
Thickness (nominal) *(M)*, mm	1.6

* Formerly 5/8 BSP.F. This thread modified by reduction of major, pitch, and minor diameter by 0.10 mm to 0.25 mm on diameter, to provide ease of assembly in service.
† Formerly 5/8 BSP.F.
‡ Formerly 7/8 Whit. Hex.

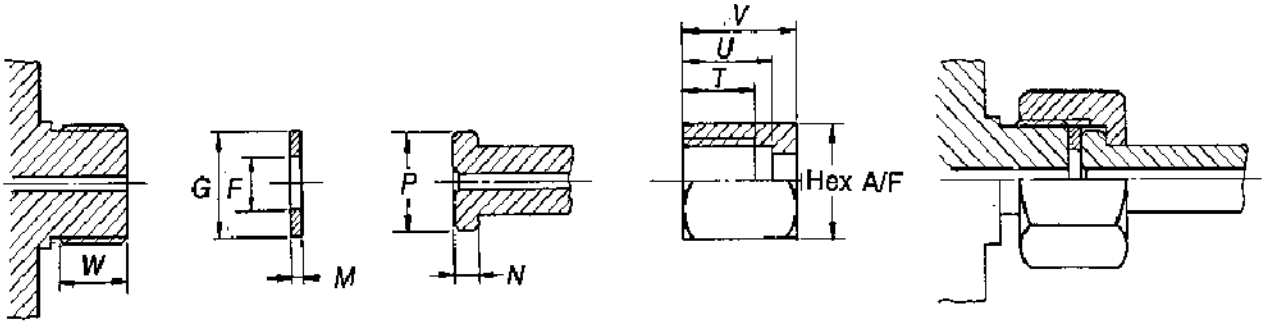
TABLE 7(g) FOR TYPE 32 CONNECTION



Detail	Dimension
VALVE OUTLET	
Thread	GB 1/2 /15 RH* (see AS 1722.2)
Full thread depth *(W)*, min., mm	11
Recess depth *(B)*, min., mm	8
Recess diameter *(D)*, min., mm	12.5
NUT	
Thread	G 1/2 /15 RH† (see AS 1722.2)
Full thread length *(T)*, min., mm	11
Bore depth *(U)*, min., mm	16
Overall length *(V)*, min., mm	22
Hexagon size, A/F, mm	30.23 to 30.48‡
NIPPLE	
Shoulder diameter *(P)*, mm	18.0 to 18.6
Shoulder length *(N)*, mm	4.5 to 5.0
Nose diameter *(L)*, max., mm (optional)	12
Nose length *(H)*, max., mm (optional)	7
WASHER	
Outside diameter *(G)*, mm	18.0 to 18.5
Hole diameter *(F)*, mm	To suit nipple
Thickness (nominal) *(M)*, mm	1.6

* Formerly 1/2 BSP.F. This thread modified by reduction of major, pitch, and minor diameter by 0.10 mm to 0.15 mm on diameter, to provide ease of assembly in service.
† Formerly 1/2 BSP.F.
‡ Formerly 3/4 Whit. Hex.

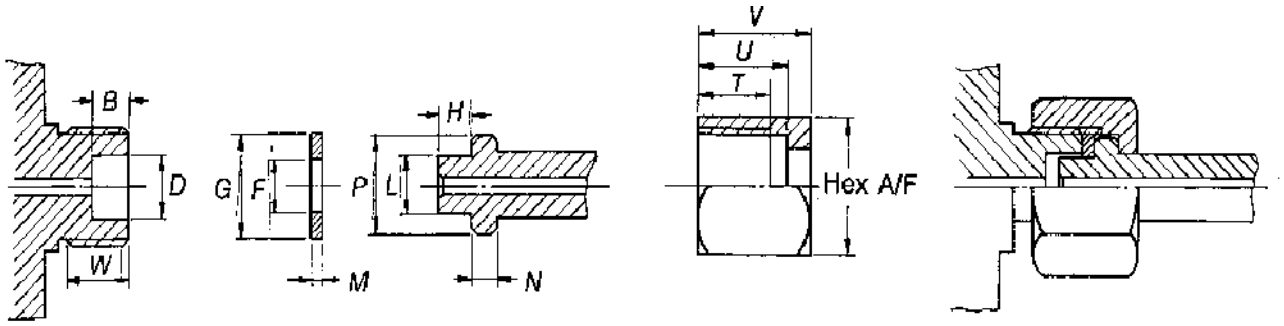
TABLE 7(h) FOR TYPE 33 CONNECTION



Detail	Dimension
VALVE OUTLET	
Thread	GB 1/4 /19 RH* (see AS 1722.2)
Full thread depth *(W)*, min., mm	9.4
NUT	
Thread	G 1/4 /19 RH† (see AS 1722.2)
Full thread length *(T)*, min., mm	9.4
Bore depth *(U)*, min., mm	14
Overall length *(V)*, min., mm	17.3
Hexagon size, A/F, mm	20.62 to 20.83‡
NIPPLE	
Shoulder diameter *(P)*, mm	11.0 to 11.3
Shoulder length *(N)*, mm	2.8 to 3.3
WASHER	
Outside diameter *(G)*, mm	11.0 to 11.3
Hole diameter *(F)*, mm	To suit nipple
Thickness (nominal) *(M)*, mm	3.0

* Formerly 1/4 BSP.F. Modified by reduction of major, pitch, and minor diameter by 0.10 mm to 0.15 mm on diameter, to provide ease of assembly in service.
† Formerly 1/4 BSP.F.

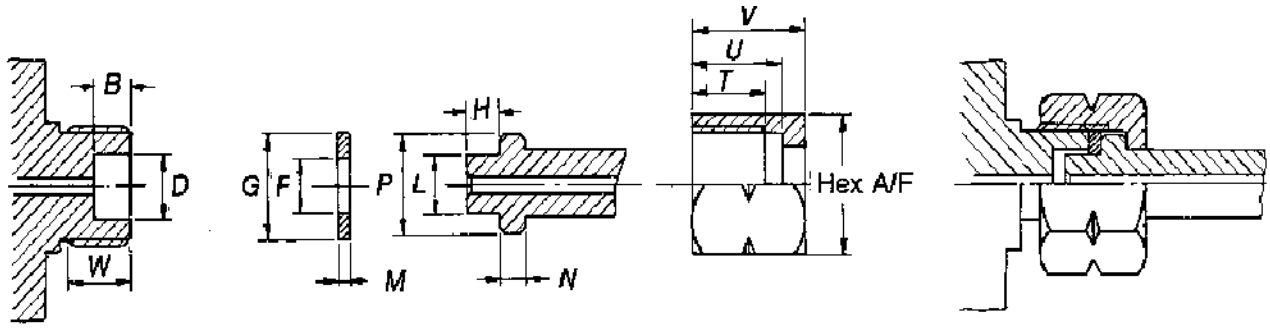
TABLE 7(i) FOR TYPE 34 CONNECTION



Detail	Dimension
VALVE OUTLET	
Thread	GB 3/4 /20 RH* (see AS 1722.2)
Full thread depth *(W)*, min., mm	13
Recess depth *(B)*, min., mm	8
Recess diameter *(D)*, min., mm	14.0 to 14.5
NUT	
Thread	G 3/4 /20 RH† (see AS 1722.2)
Major diameter, mm	26.441 to 26.855
Pitch diameter, mm	25.281 to 25.433
Minor diameter, mm	24.120 to 24.661
Full thread length *(T)*, min., mm	11
Bore depth *(U)*, min., mm	16
Overall length *(V)*, min., mm	22
Hexagon size, A/F, mm	32.72 to 33.02‡
NIPPLE	
Shoulder diameter *(P)*, mm	22.0 to 22.5
Shoulder length *(N)*, mm	4.5 to 5.0
Nose diameter *(L)*, max., mm (optional)	13.5
Nose length *(H)*, max., mm (optional)	7
WASHER	
Outside diameter *(G)*, mm	22.0 to 22.5
Hole diameter *(F)*, mm	To suit nipple
Thickness (nominal) *(M)*, mm	1.6

* Formerly 3/4 BSP.F. This thread modified by reduction of major, pitch, and minor diameter by 0.10 mm to 0.25 mm on diameter, to provide ease of assembly in service.
† Formerly 3/4 BSP.F. Modified to dimensions given.
‡ Formerly 7/8 Whit. Hex.

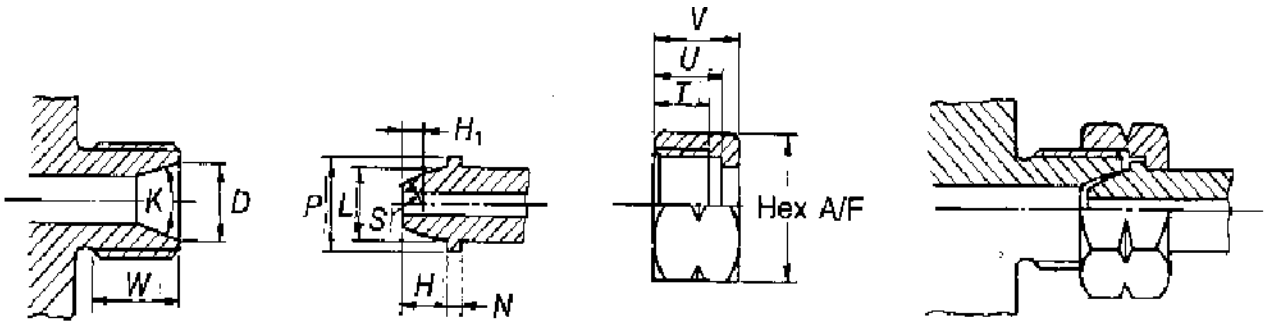
TABLE 7(j) FOR TYPE 40 CONNECTION



Detail	Dimension
VALVE OUTLET	
Thread	GB 5/8 /16 LH* (see AS 1722.2)
Full thread depth *(W)*, min., mm	13
Recess depth *(B)*, min., mm	8
Recess diameter *(D)*, min., mm	12.5
NUT	
Thread	G 5/8 /16 LH† (see AS 1722.2)
Full thread length *(T)*, min., mm	11
Bore depth *(U)*, min., mm	16
Overall length *(V)*, min., mm	22
Hexagon size, A/F, mm	32.72 to 33.02‡
NIPPLE	
Shoulder diameter *(P)*, mm	18.0 to 19.0
Shoulder length *(N)*, mm	4.5 to 5.0
Nose diameter *(L)*, max., mm (optional)	12
Nose length *(H)*, max., mm (optional)	7
WASHER	
Outside diameter *(G)*, mm	18.0 to 18.5
Hole diameter *(F)*, mm	To suit nipple
Thickness (nominal) *(M)*, mm	1.6

* Formerly 5/8 BSP.F. This thread modified by reduction of major, pitch, and minor diameter by 0.10 mm to 0.15 mm on diameter, to provide ease of assembly in service.
† Formerly 5/8 BSP.F.
‡ Formerly 7/8 Whit. Hex.

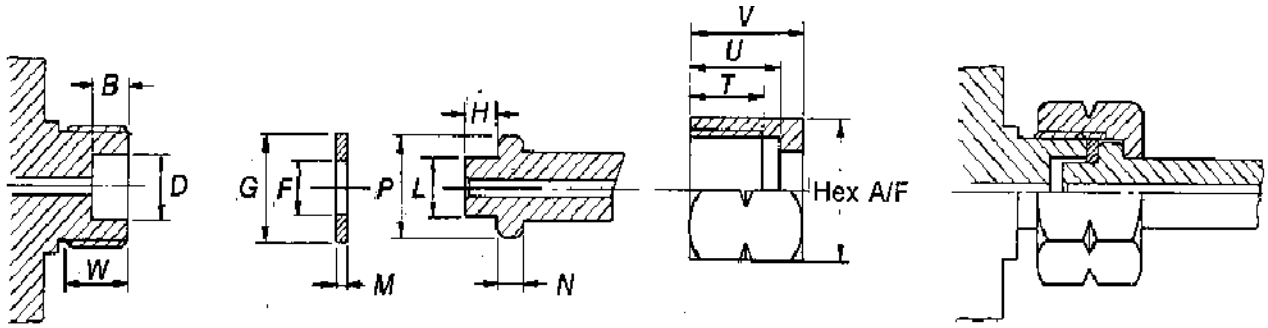
TABLE 7(k) FOR TYPE 41 CONNECTION



Detail	Dimension
VALVE OUTLET	
Thread	GB 3/8 /10 LH* (see AS 1722.2)
Full thread depth *(W)*, min., mm	13.5
Seat diameter *(D)*, mm	12.5 to 13.0
Angle *(K)*, degrees	37
NUT	
Thread	G 3/8 /10 LH† (see AS 1722.2)
Major diameter, min., mm	16.662
Pitch diameter, mm	15.806 to 15.938
Minor diameter, mm	14.950 to 15.395
Full thread length *(T)*, min., mm	10
Bore depth *(U)*, min., mm	12
Overall length *(V)*, min., mm	16
Hexagon size, A/F, mm	23.16 to 23.37‡
NIPPLE	
Shoulder diameter *(P)*, mm	14.5 to 14.9
Nose diameter *(L)*, mm	12.0 to 12.5
Nose radius (nominal) *(S)*, mm	6.35
Reference dimension *(H)*, mm	5
Nose length *(H)*, min., mm	9
Shoulder length *(N)*, mm	4.5 to 5.0

* Formerly 3/8 BSP.F. This thread modified by reduction of major, pitch, and minor diameter by 0.10 mm to 0.15 mm on diameter, to provide ease of assembly in service.
† Formerly 3/8 BSP.F. Modified to dimensions given.
‡ Formerly 11/16 Whit. Hex.

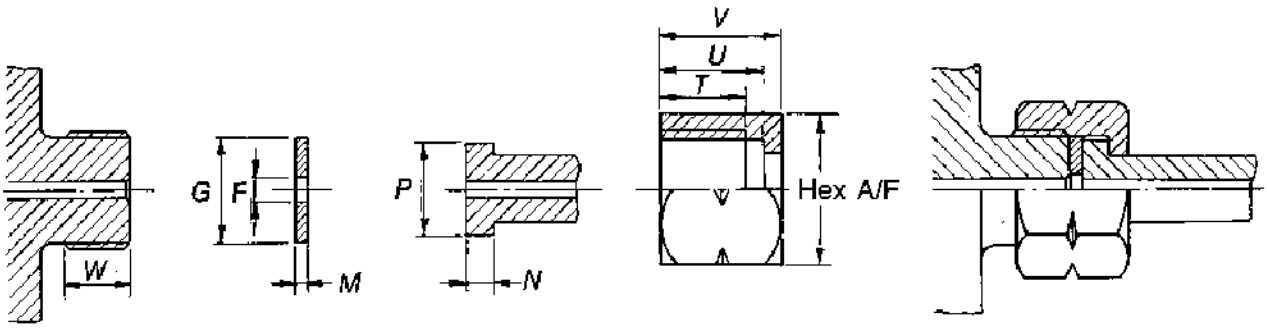
TABLE 7(l) FOR TYPE 42 CONNECTION



Detail	Dimension
VALVE OUTLET	
Thread	GB 1/2 /15 LH* (see AS 1722.2)
Full thread depth *(W)*, min., mm	11
Recess depth *(B)*, min., mm	8
Recess diameter *(D)*, min., mm	12.5
NUT	
Thread	G 1/2 /15 LH† (see AS 1722.2)
Full thread length *(T)*, min., mm	11
Bore depth *(U)*, min., mm	16
Overall length *(V)*, min., mm	22
Hexagon size, A/F, mm	30.23 to 30.48‡
NIPPLE	
Shoulder diameter *(P)*, mm	18.0 to 18.6
Shoulder length *(N)*, mm	4.5 to 5.0
Nose diameter *(L)*, max., mm (optional)	7
Nose length *(H)*, max., mm (optional)	12
WASHER	
Outside diameter *(G)*, mm	18.0 to 18.5
Hole diameter *(F)*, mm	To suit nipple
Thickness (nominal) *(M)*, mm	1.6

* Formerly 1/2 BSP.F. This thread modified by reduction of major, pitch, and minor diameter by 0.10 mm to 0.25 mm on diameter, to provide ease of assembly in service.
† Formerly 1/2 BSP.F.
‡ Formerly 3/4 Whit. Hex.

TABLE 7(m) FOR TYPE 43 CONNECTION



Detail	Dimension
VALVE OUTLET	
Thread	0.825-14NGO-LH-EXT†
Major diameter, mm	20.825 to 20.955
Pitch diameter, mm	19.685 to 19.776
Minor diameter, max., mm	18.730
Full thread depth *(W)*, min., mm	14
NUT	
Thread	0.825-14NGO-LH-INT†
Major diameter, min., mm	21.082
Pitch diameter, mm	19.903 to 19.945
Minor diameter, mm	19.118 to 19.314
Full thread length *(T)*, min., mm	13
Bore depth *(U)*, min., mm	19
Overall length *(V)*, min., mm	23.5
Hexagon size, A/F, mm	27.65 to 27.94 or 28.27 to 28.57‡
NIPPLE	
Shoulder diameter *(P)*, mm	18.0 to 19.0
Shoulder length *(N)*, mm	4.5 to 5.0
WASHER	
Outside diameter *(G)*, mm	18.0 to 18.5
Hole diameter *(F)*, mm	11
Thickness (nominal) *(M)*, mm	1.6

* Similar to Connection No 330 of ANSI B57.1, CGA V-1, CSA B96.
† Special thread, see ANSI B57.1, CGA V-1, CSA B96.
‡ Formerly 11/16 Whit. Hex. or 1 1/8 in A/F.

APPENDIX A

RECOMMENDED GAUGES FOR CYLINDER NECK AND VALVE STEM THREADS

(This Appendix forms an integral part of this Standard.)

A1 GENERAL APPLICATION. This Appendix provides recommendations for gauges for the cylinder threads and corresponding valve stems specified in this Standard. The measurement of thread gauges is a specialized subject that cannot be adequately covered within this Appendix. The dimensions and tolerances are therefore of a basic nature, and reference should be made to relevant Standards for comprehensive details. For 3/4 NGS thread, reference to ANSI B2.1 is recommended. For the 0.6, 0.715 and 1.0 in taper threads, no Standard exists, but reference is recommended to AS 1722.1 for details of a similar thread form. AS 1722.1 specifies threads with the thread form normal to the thread axis. The taper threads specified in this Standard have the thread form normal to the cone surface. Some improvization in checking of threads may be necessary.

The gauges specified in this Appendix are for the checking of threads on the valve stems and on the cylinder necks, and are not for checking of other gauges.

A2 DIMENSIONS AND FORMS. The thread dimensions and thread forms are given in Tables A1 and A2.

A3 USE. The gauges are designed to be pressed or screwed by hand into the thread being checked. The neck of a conforming cylinder thread, or the stem of a conforming valve thread, should lie flush with or protrude beyond the face designated ‘a’ but not protrude beyond the face designated ‘b’.

The plug screw and ring screw gauges for effective diameter are designed to operate at about mid-length of the thread.

A4 HARDNESS. Gauges should be hardened at the wearing surfaces. The following hardnesses are recommended:

(a) Threaded gauge — 650 HV to 800 HV (57 HRC to 62 HRC)

(b) Plain gauge — 750 HV to 850 HV (61 HRC to 63 HRC)

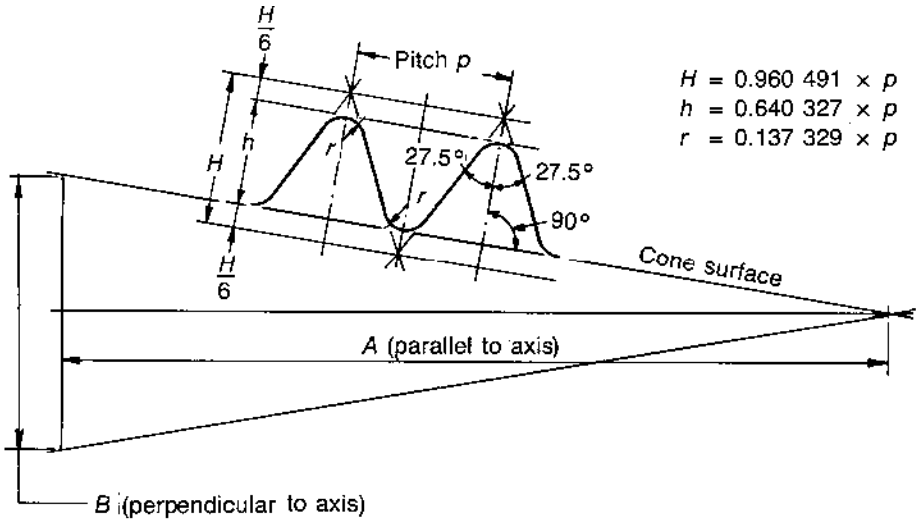
A5 MARKING. Each gauge should be marked with the following:

(a) Nominal size of thread (see Tables Al and A2).

(b) Manufacturer’s name or trade mark.

(c) Serial number of gauge.

TABLE A1
BASIC FORM AND TOLERANCES* FOR GAUGES FOR 0.6, 0.715, AND 1.0 THREADS (TAPER THREADS, WHITWORTH FORM NORMAL TO CONE)



Dimension	Screw plug gauge		Screw ring gauge	
	Nominal thread size, in			
	0.6	1.0 0.715	0.6	1.0 0.715
Ratio *A* to *B*	5.625/1	8/1	5.625/1	8/1
Maximum pitch error between any two threads†, µm	8	10	10	15
Maximum flank angle error, seconds of arc	±15	±10	±20	±15
Maximum taper error on diameter on length of taper‡, µm	±15	+20	–23	–30
Diameter tolerance at gauge plane, µm				
Major	±13	±13	+20, –10	+20, –10
Pitch	±8	±8	±10	±10
Minor	+8, –15	+8, –15	±15	±15

* The tolerances are taken from AS 1722.1 for similar size threads. AS 1722.1 is applicable to parallel threads, but these tolerances are proposed for use for these special taper threads.

† Maximum allowable error in pitch between any two threads whether adjacent or separated by any amount not exceeding the full length of thread less one full thread at each end.

‡ The maximum taper error on diameter over the length of taper of a screw gauge should be measured over the full length of thread less one full thread at each end of gauge.

Length tolerances, in micrometres (see AS 1772.1):

(a) Dimensions *e*, *h*, *l* and *n*:

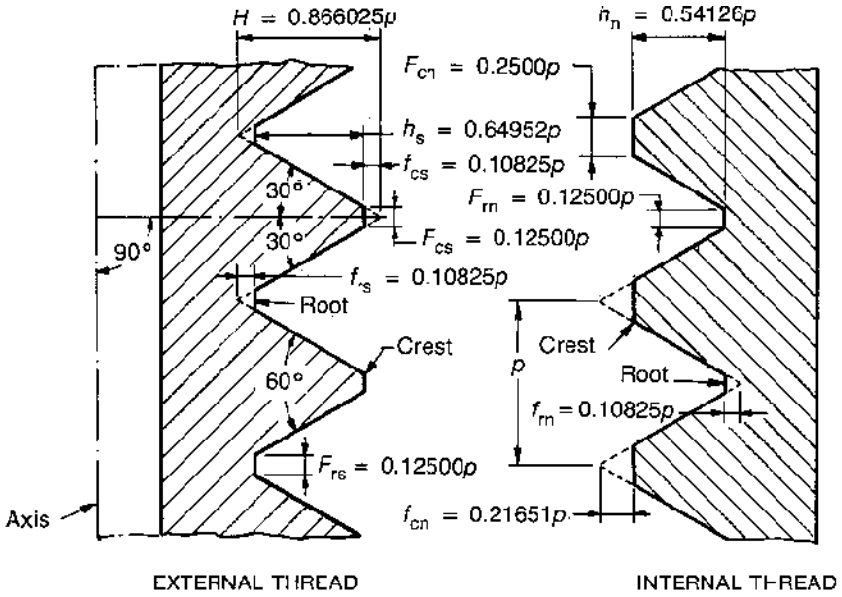
+0, –25 for sizes below 1/25
+0, –50 for sizes 1/25 and above

(b) Dimensions, *c*, *f*, *j* and *q*:

+125, –0 for sizes below 1/25
+250, –0 for sizes 1/25 and above

End faces of plug and ring gauges to be square to the axis of taper to within 0.001(25.4 + D) full indicator movement, measured as close as possible to the screw thread, where *D* = basic major diameter of thread in millimetres.

TABLE A2
DIMENSIONS AND TOLERANCES* FOR GAUGES, 3/4 NGS THREAD

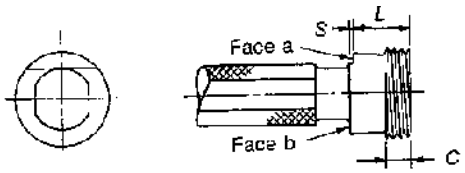


EXTERNAL THREAD INTERNAL THREAD DESIGN FORMS (MAX. MATERIAL CONDITION)

Dimension		Screw plug gauge		Screw ring gauge	
		GO	NO GO	GO	NO GO
Pitch diameter, mm	max.	25.126	25.301	25.085	24.950
	min.	25.110	25.286	25.070	24.935
Major diameter, mm	max.	26.274	26.078		
		26.271	26.076		
Minor diameter, mm	max.			23.899	24.161
	min.			23.896	24.158
Pitch variations (between any two threads), mm	max.	0.055		0.008	
Flank angle error, seconds of arc		±10		±15	

* The tolerances are taken from ANSI B2.1.

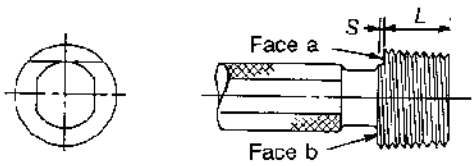
TABLE A3
FULL FORM PLUG SCREW GAUGE



millimetres

Dimensions	Nominal thread size, in			Tolerances
	0.6	0.715	1.0	
Major diameter at face a	19.192	20.142	27.787	
Effective diameter at face a	18.032	18.980	26.624	+0, –0.015
Minor diameter at face a	16.871	17.816	25.461	+0, –0.023
Length *L*	22.225	15.875	19.050	±0.254
Length *S*		1.194		+0.025, –0

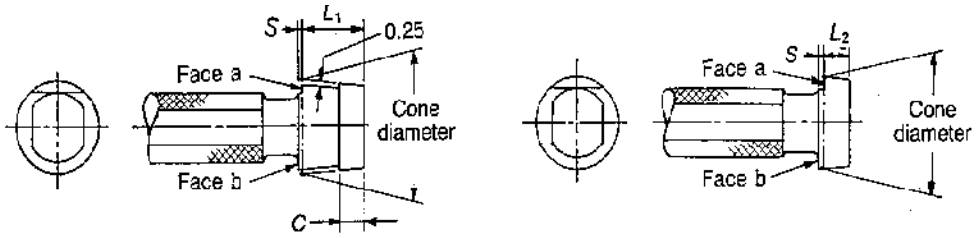
TABLE A4
PLUG SCREW GAUGE FOR EFFECTIVE DIAMETER



millimetres

Dimensions	Nominal thread size, in			Tolerances
	0.6	0.715	1.0	
Effective diameter at face a	18.032	18.979	26.624	+0, –0.015
Length *L*	12.7		17.462	±0.254
Length *C*	7.938			
Length *S*	1.194			+0.025, –0

TABLE A5
PLUG SCREW GAUGE FOR EFFECTIVE DIAMETER

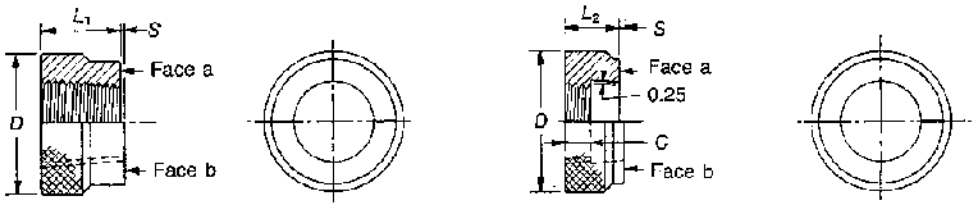


(a) Gauge for small end (b) Gauge for large end

millimetres

Dimensions	Nominal thread size, in			Tolerances
	0.6	0.715	1.0	
Cone diameter at face a	16.871	17.816	25.461	+0, –0.015
Length L_1	22.225	15.875	19.050	±0.254
Length L_2	7.938			
Length S	1.194	1.753		+0.025, –0

TABLE A6
RING SCREW GAUGE

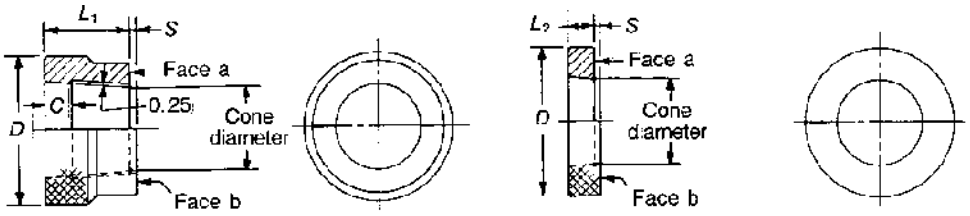


(a) Gauge for full form (b) Gauge for effective diameter

millimetres

Dimensions	Nominal thread size, in			Tolerances
	0.6	0.715	1.0	
Major diameter at face a	15.240	18.161	25.400	+0.23, –0
Effective diameter at face a	14.079	16.998	24.237	+ 0.015, –0
Minor diameter at face a	12.918	15.834	23.073	
Length L_1	22.225	19.050	22.225	±0.254
Length L_2	12.70	15.875	17.462	
Length C	7.938			
Length S	1.194			+0.025, –0
Diameter D	44.45			±1.60

TABLE A7
PLAIN RING GAUGE FOR MAJOR DIAMETER



(a) Gauge for large end

(b) Gauge for small end

millimetres

Dimensions	Nominal thread size, in			Tolerances
	0.6	0.715	1.0	
Cone diameter at face a	15.240	18.161	25.400	+0.015, –0
Length L_1	22.225	19.050	22.225	
Length L_2	7.938			±0.254
Length C	7.938			
Length S	1.194	1.753		+0.0254, –0
Diameter D	44.45			±1.60

APPENDIX B

SUGGESTED SAMPLE SELECTION FOR TEST PURPOSES

(This Appendix does not form an integral part of this Standard.)

The Standard requires that every valve be capable of passing nominated tests, and that every valve be subjected to a pneumatic pressure test. The following sample selections do not ensure that every valve is capable of passing any test, but in the absence of a statistically based sample plane these selections have proved to be helpful to manufacturers:

(a) *Mechanical tests.* One sample taken at random from each batch, one to provide a tensile test piece and the other to provide an impact test piece.

(b) *Pressure test.* One valve per 5000 manufactured, or one per batch if the batch is less than 5000, to provide a hydrostatic test sample.

NOTE: Every valve not subjected to a hydrostatic test is to be subjected to a pneumatic test.

A batch is taken to consist of material or items of a single type, grade, class, size, and composition, and to have been manufactured under essentially the same conditions at essentially the same time.

APPENDIX C

3/8 IN BSP PARALLEL THREAD CYLINDER VALVE WITH SOFT-SOLDERED SEAL

(This Appendix forms an integral part of this Standard.)

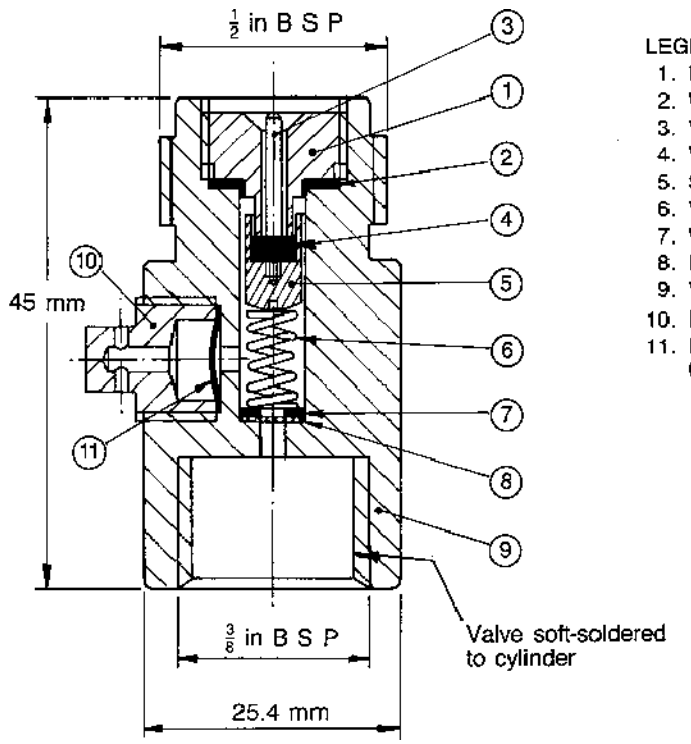
This Appendix has been reproduced from what was Interpretation No 11 to AS CB4 (now withdrawn). That Interpretation was issued in April 1977 for guidance on an aspect of the Gas Cylinders Code which was not adequately covered. It was to be regarded as equivalent to an amendment, and was subject to review or withdrawal. There has been no change to the circumstances of acceptance or application of this particular valve, but as the valve is of specialized and limited application it is not considered necessary to incorporate Interpretation No 11 into AS 2030. Instead, the Interpretation is reproduced as this Appendix and Interpretation No 11 is withdrawn. The opportunity has been taken to bring cross-references up-to-date, but in all other respects the requirements are identical with Interpretation No 11.

ENQUIRY. Under what conditions may a 3/8 in BSP parallel thread cylinder valve with soft-soldered seal (see Figure C1below), be used in Australia, on a seamless gas cylinder having a water capacity not exceeding 1 kg for use with carbon dioxide?

REPLY. It is the opinion of Committee ME/2, Gas Cylinders, that such cylinder valves will be acceptable for use in Australia provided the following requirements are met:

1. *Cylinders.* The cylinders on which the valves are used shall be constructed in accordance with a specification listed in Table 1 of AS 2030.1, SAA Gas Cylinders Code, Part 1: Cylinders for compressed gases other than acetylene.
2. *Valve body.* The material of the valve bodies shall comply with the requirements of Clause 6 of AS 2473, Valve for compressed gas cylinders (threaded outlet).
3. *Safety devices.* The safety devices shall comply with the requirements of AS 2613, Safety devices for gas cylinders, in accordance with AS 2030.1.

The Committee is also of the opinion that cylinders complying with AS B110, B111, and B114 may be designed for use with these valves.



LEGEND:
1. Insert, brass to BS 2874—CZ—121.
2. Washer, PTFE, 1 mm.
3. Valve pin, brass to BS 2874—CZ-121.
4. Valve sealing, Nitrile HA 16.
5. Sealing holder, brass to BS 2874—CZ—121.
6. Valve spring, stainless steel, 20G.
7. Washer, brass, 5 BA.
8. Filter, copper, 150 x 150 G45.
9. Valve body, brass, BS 2874—CZ—121.
10. Disc plug, brass, BS 2874—CZ—121.
11. Bursting disc, copper, manufactured to BS 2915 (certified by manufacturer to burst at 3250 lbf/in² ±10%).

FIGURE C1

APPENDIX D

IMPACT STRENGTH TEST FOR VALVES/VALVE PROTECTION

(This Appendix forms an integral part of this Standard.)

D1 GENERAL. This Appendix sets out an impact strength test for a valve or a protected valve. The impact strength requirement and a torque strength requirement (in course of preparation) are intended to ensure the adequacy of a valve, or a protected valve, to withstand in-service abuse. It is intended that these requirements will replace the currently specified material mechanical strength properties for valve bodies, thereby giving the valve manufacturer freedom to optimize strength and material sections. The specifying of material mechanical strength properties only does not ensure that a valve is sufficiently robust as the size of channels within the valve is not limited.

The impact value specified is derived from tests and calculations for valved and laden gas cylinders falling from a loading dock. The acceptance criteria are set as retention of cylinder content and then control of release of cylinder contents.

D2 ACCEPTANCE CRITERIA. When a valve is tested in accordance with this Appendix, there shall be no leakage of gas from the valve, or when a valve/cylinder combination is tested, there shall be no leakage of gas from the cylinder.

The valve shall be operable to close without leakage and to open to enable controlled release of gas. Fracture of any handwheel shall be disregarded for acceptance purposes, and tools may be used to demonstrate operability of the valve.

Where the test is applied to valve protection, the valve protection may be forced away from the valve to demonstrate operability, but any leakage resulting from deformation of the valve protection shall be cause for failure of the test.

DRAFTING NOTE: The acceptance criteria will appear in the body of the Standard, and not in the test method, when the new edition is published.

D3 TEST RIG. The test rig shall comprise a means to apply the specified impact at a point a distance not greater than one-third of the valve or valve protection height below the top edge of the valve or valve protection as shown in Figure D1.

A pendulum type test rig is the preferred rig, but other means of applying the impact are acceptable. The test rig shall be calibrated to the specified impact value.

D4 IMPACT VALUE. The applied impact value shall be as given in Table D1.

D5 PROCEDURE. The test procedure shall be as follows:

(a) Set the test rig to the impact level specified in Paragraph D4. This setting shall have been previously verified by suitable means.

(b) Install the test specimens in the rig, with the striking point set in accordance with Figure D1 as appropriate. Close valve to manufacturer's recommended torque.

NOTE: The test specimen is the valve only where there is no valve protection, or is the complete cylinder with valve protection and valve where there is valve protection.

Align the valve/valve protection in the most adverse position with respect to the point of striking, i.e. so that the impact will have the greatest effect on valve breakage, or on valve protection to valve clearance, as appropriate.

(c) Apply the impact, taking suitable precautions to protect personnel and equipment from injury and damage due to the destructive nature of the test.

(d) Observe the effect of impact on the valve.

(e) Apply the specified pressure to the valve, without adjustment to the valve check for leakage from the valve body, valve components, and where valve protection is under test, the cylinder.

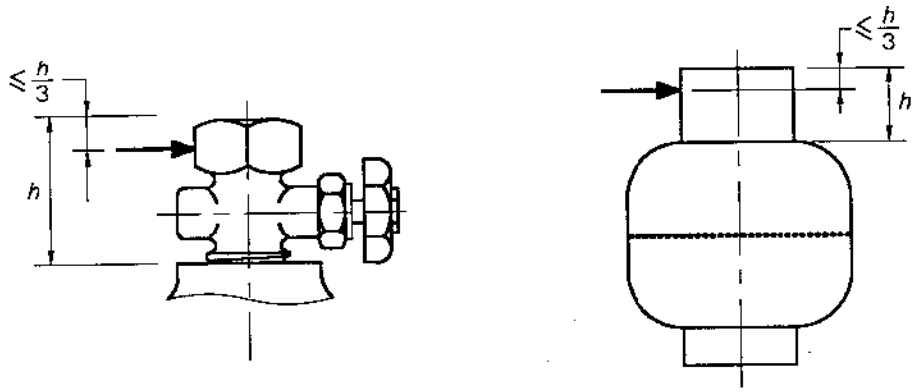
(f) Open the valve just sufficiently to demonstrate safe release of pressure.

NOTE: Where any handwheel has been damaged, tools may be used to operate the valve.

D6 REPORT. The test report shall include the following;

(a) Description of the specimen tested.
(b) The impact value applied.
(c) The pressure applied.
(d) A statement that the specimen did/did not pass this test.
(e) The date of test.
(f) A reference to this test method, i.e. AS 2473, Appendix D.

(g) The signature and title of the supervisor of the test.



(a) Impact on valve (b) Impact on valve protection

FIGURE D1 POINT OF IMPACT

TABLE D1
IMPACT VALUE

Description	Size kg	Minimum impact value *J*	
		Applied to valve	Applied to valve protection
Industrial range, not shrouded	≤20 >20	200 400	— —
Industrial range, shrouded	All	200*	400
Medical and industrial	<5	100	100
Small LP gas, external valve	≤11	100	100
Small LP gas, internal valve	≤11	No impact	No impact

* A torque test is an acceptable alternative.

This page has been left intentionally blank.