

**BUREAU OF INDIAN STANDARDS**

**DRAFT FOR COMMENTS ONLY**

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**DRAFT AMENDMENT NO. 1**

**TO**

**IS 3224 : 2021 VALVE FOR COMPRESSED GAS CYLINDERS EXCLUDING LIQUEFIED PETROLEUM GAS ( LPG ) CYLINDERS — SPECIFICATION**

*( Fourth Revision )*

ICS 23.020.30, 23.060.01

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Gas Cylinders Sectional  
Committee, MED 16

Last date for receipt of  
comments is **19 June 2024**

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*(Page 1, clause 1.2, first sentence)* — Substitute the following for existing:

‘This standard gives the details of the dimensions of inlet taper threads as well as parallel threads and outlet of the valves so as to ensure interchangeability.’

*(Page 5, Fig. 2, Title)* — Substitute the following for existing:

‘ILLUSTRATION OF PRESSURE SEAL VALVE, NON-METALLIC SEAL (WHEEL OPERATED)’

*(Page 7, clause 5.2, first para, line 6)* — Delete the line:

‘For valves used with gas mixtures, the compatibility of the gas welded materials with each component of the gas mixture shall be considered.’

*(Page 7, clause 5.2, fourth para)* — Delete the paragraph:

‘Brass components other than valve body shall be made from free cutting brass rods (*see* IS 319) or from any forging quality brass, such as leaded brass or naval brass (*see* IS 6912).

*(Page 8, clause 5.3.1)* — Substitute the following for existing clause.

‘The tensile strength and elongation of the material of the valve body determined according to IS 1608 (Part 1) shall be respectively at least 392 MPa (40 kgf/mm<sup>2</sup>) and minimum 18 percent measured on a gauge length  $5.65\sqrt{S_0}$  ( $S_0$  being the original area of cross-section) except for valves used for CO<sub>2</sub> and N<sub>2</sub>O for which the minimum tensile strength of the material of the valve body according to IS 1608 (Part 1) shall be 343 MPa (35 kgf/mm<sup>2</sup>) and minimum elongation shall be 18 percent on a gauge length  $5.65\sqrt{S_0}$ .’

(Page 8, clause 5.3.2, Title) — Substitute ‘Izod Impact Test’ for ‘Impact Strength’.

(Page 9, Table 1, row xxii, col 2 5.3.2, Title) — Substitute ‘Difluoromethane’ for ‘Difloromethane’.

(Page 10, Table 1, last row) — Add the following at the last row of the Table.

Sl No.	Gas		Designation of Screw Thread Outlet (Parallel threads) <sup>1)</sup>	Pitch	Outlet No.	Width Across Flat of the Square of Spindle <sup>2)</sup>
	Name	Chemical Symbol				
lii)	Bio-CNG	Bio-CNG <sup>5)</sup>	G5/8-14 TPI-LH	1.814	21	9.5 mm

(Page 10, Table 1, Key) — Add the following at the end of key points.

‘5) Bio-CNG valves shall be strictly used for bio-gas conforming to IS 16087.’

(Page 10, clause 6.3.2, line 4) — Substitute ‘values’ for ‘valves’.

(Page 11, Table 2, col 4, row g) — Substitute ‘other’ for ‘pther’.

(Page 12, clause 6.3.3, Note 2) — Substitute the following for existing note:

‘For special designs, the number of cycles shall be defined by the manufacturer on the basis of a specification from the customer or industry based on the likely service conditions. The number of cycles shall be documented in the drawing. The number of cycles shall be 500 for squeeze grip valves.’

(Page 13, Table 3, col 7, row x) — Substitute ‘12 to 14’ for ‘15 to 17’.

(Page 14, clause 7.2.1) — Substitute the following for existing clause.

‘Where the pressure relief device is a bursting disc fitted to the valve of seamless or welded cylinder the bursting pressure of the disc (when tested at temperature of 65 °C) shall not exceed the 110 percent of test pressure of the cylinder for which device is intended and shall be more than the developed pressure of the gas at 65 °C. Bursting disc may be rated at room temperature provided correlation between room temperature and elevated temperature is determined.’

(Page 14, clause 8.1.1, Note, line 2) — Substitute ‘CGA Standard CGA-V-1’ for ‘CGA Standard V-1-2013’.

(Page 16, Fig. 9b, Title) — Substitute ‘VALVE INLET’ for ‘VALVE STEM’.

(Page 16, Fig. 9b, Table, first heading) — Substitute ‘Nominal Diameter of Valve’ for ‘Normal Diameter of Valve’.

(Page 16, Fig. 9b, Table, last heading) — Substitute ‘DIMENSION’ for ‘DIAMENSIONS’.

(Page 19, clause 8.1.2, Note) — Substitute the following for existing note.

‘This type of thread also conforms to DIN 477 : 2021 ‘Gas cylinder valves for cylinder test pressures up to 300 bar — Valve inlet and outlet connections’ and ISO 11363-1 : 2018 ‘Gas cylinders — 17 E and 25 E taper threads for connection of valves to gas cylinders — Part 1: Specifications’. The 17 E and 25 E threads have profile normal to the cone.’

(Page 19, clause 8.3.2, line 3) — Substitute ‘manufacturer’ for ‘manufacture’.

(Page 24, clause 9.1.1, first sentence) — Delete ‘and outlet connection listed in this clause’.

(Page 26, Figure of Outlet No. 2) — Substitute ‘METHANE’ for ‘METHENE’.

(Page 27, Figure of Outlet No. 5) — Substitute ‘CHLOROTRIFLUOROMETHANE’ for ‘CHLOROTRIFLUOROMETHENE’.

(Page 27, Figure of Outlet No. 5, last line) — Substitute ‘BORON TRIFLUORIDE AND DIFLUOROMETHANE’ for ‘AND BORON TRIFLUORIDE’.

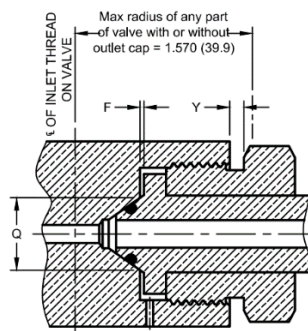
(Page 27, Figure of Outlet No. 6) — Substitute ‘METHYL CHLORIDE’ for ‘METHYLE CHLORIDE’.

(Page 30, Figure of Outlet No. 17) — Substitute ‘CYANOGEN’ for ‘CENOGEN’.

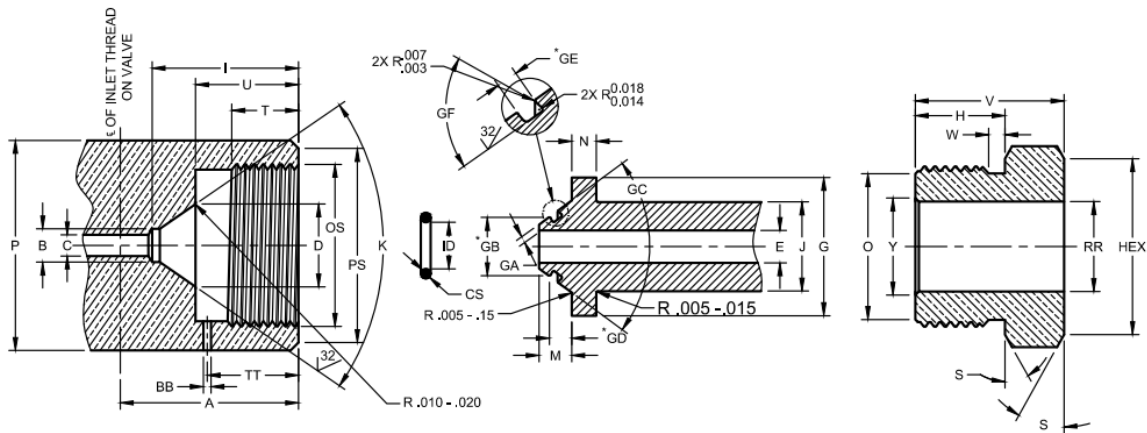
(Page 31, Figure of Outlet No. 21, Figure Name) — Substitute the following for existing figure name.

‘OUTLET NO. 21 OUTLET CONNECTION FOR COMPRESSED NATURAL GAS AND BIO-COMPRESSED NATURAL GAS’

[Page 32, Figure of Outlet No. 21(A)] — Insert the following at the end.



STANDOFF REF.	F	0.049	(1.24)
CLEARANCE REF.	Y	0.128	(3.25)
CONTACT DIA REF.	Q	0.635	(16.13)



All dimensions are in inches (millimeters).

### VALVE OUTLET

Sl No.	Dimension	Symbol	Dimension	
			in inch	in mm
(1)	(2)	(3)	(4)	(5)
i)	Thread		1.250-14NGO-LH-INT	
ii)	Minor Dia.		1.172 7 - 1.180 4	29.787 - 89.983
iii)	Pitch Dia.		1.203 6 - 1.207 6	30.572 - 30.673
iv)	Major Dia.		1.250 0 <i>Min</i>	31.750 <i>Min</i>
v)	Length	A	1.312 <i>Max</i>	33.33 <i>Max</i>
vi)	Bore Depth	B	0.250 <i>Max</i>	6.35 <i>Max</i>
vii)	Drill Dia.	C	0.156 <i>Min</i>	3.96 <i>Min</i>
viii)	Bore Dia.	D	0.635	16.13
ix)	C'bore Depth	I	1.125 <i>Min</i>	28.58 <i>Min</i>
x)	Angle	K	69°	
xi)	Boss Dia	P	1.625 <i>Min</i>	41.28 <i>Min</i>
xii)	Full Thread	T	0.600 <i>Min</i>	15.24 <i>Min</i>
xiii)	Bore Depth	U	0.793	20.14
xiv)	Bl Hole Dia.	BB	0.062	1.57
xv)	Bl Hole Dist.	TT	0.685 - 0.715	17.40 - 18.16
xvi)	Thd Chamfer	OS	45° × 1.265	32.13
xvii)	Chamfer Dia.	PS	45° × 1.495	37.97

### NIPPLE<sup>1</sup>

Sl No.	Dimension	Symbol	Dimension	
			in inch	in mm
(1)	(2)	(3)	(4)	(5)
i)	Drill Dia.	E	187 ± 0.60	4.75 ± 1.2

ii)	Shoulder Dia.	G	1.055	26.80
iii)	Shank Dia.	J	0.675	17.145
iv)	Nose Length	M	0.260	6.60
v)	Shoulder Length	N	0.177 - 0.192	4.50 - 4.88
vi)	Shank Length	Z	1.125 <i>Min</i>	28.58 <i>Min</i>
vii)	Groove Depth	GA	0.051 - 0.053	1.30 - 1.34
viii)	Groove Dia. <sup>2</sup>	GB	0.446 - 0.454	11.33 - 11.53
ix)	Angle	GC	70°	
x)	Groove Location <sup>2</sup>	GD	0.180	4.57
xi)	Groove Width <sup>2</sup>	GE	0.075 - 0.079	1.91 - 2.01
xii)	Dovetail Angle	GF	64° - 68°	

<sup>1)</sup> Nipple may be made from 1.000 (25.40) hex material.

<sup>2)</sup> Dimension to theoretical intersection.

### HEXAGON NUT

Sl No.	Dimension	Symbol	Dimension	
			in inch	in mm
(1)	(2)	(3)	(4)	(5)
i)	Thread	1.245-14NGO-LH-EXT		
ii)	Major Dia.		1.245 0 - 1.240 0	31.623 - 31.496
iii)	Pitch Dia.		1.1986 6 - 1.194 6	30.44 - 30.35
iv)	Minor Dia.		1.157 4 <i>Max</i>	29.39 <i>Max</i>
v)	Hex		1.375	34.92
vi)	Shank Length	H	0.687 ± 0.15	17.450 ± 38
vii)	Chamfer Dia.	O	30° × 1.144	29.06
viii)	Hole Dia.	R	0.685 - 0.690	17.40 - 17.52
ix)	Hex Chamfer	S	30° × 1.375	34.92
x)	Length	V	1.125 <i>Min</i>	28.57 <i>Min</i>
xi)	Neck	W	0.16 × 1.144 <i>Min</i>	4.1 × 29.06 <i>Min</i>
xii)	R Chamfer Dia.	Y	45° × 0.720 - 0.750	18.29 - 19.05

### O-RING

Sl No.	Dimension	Symbol	Dimension	
			in inch	in mm
(1)	(2)	(3)	(4)	(5)
i)	Size (Ref)	2-012		
ii)	Cross Section	CS	0.067 - 0.073	(1.71 - 1.85)
iii)	Inside Dia.	ID	0.364	(9.25)
iv)	Durometer, Shore A		85 - 95	

OUTLET NO. 22 OUTLET CONNECTION FOR HYDROGEN GAS SERVICE  
USED FOR WORKING PRESSURE GREATER THAN 300 BAR AND UPTO 800 BAR

[Page 33, clause 10.1.5(a)] — Substitute the following for the existing:

‘Repeat of valve impact test, valve burst pressure test, endurance test and subsequent leak tightness test;’

[Page 33, clause 10.1.5(n), Title] — Delete ‘/Integration’.

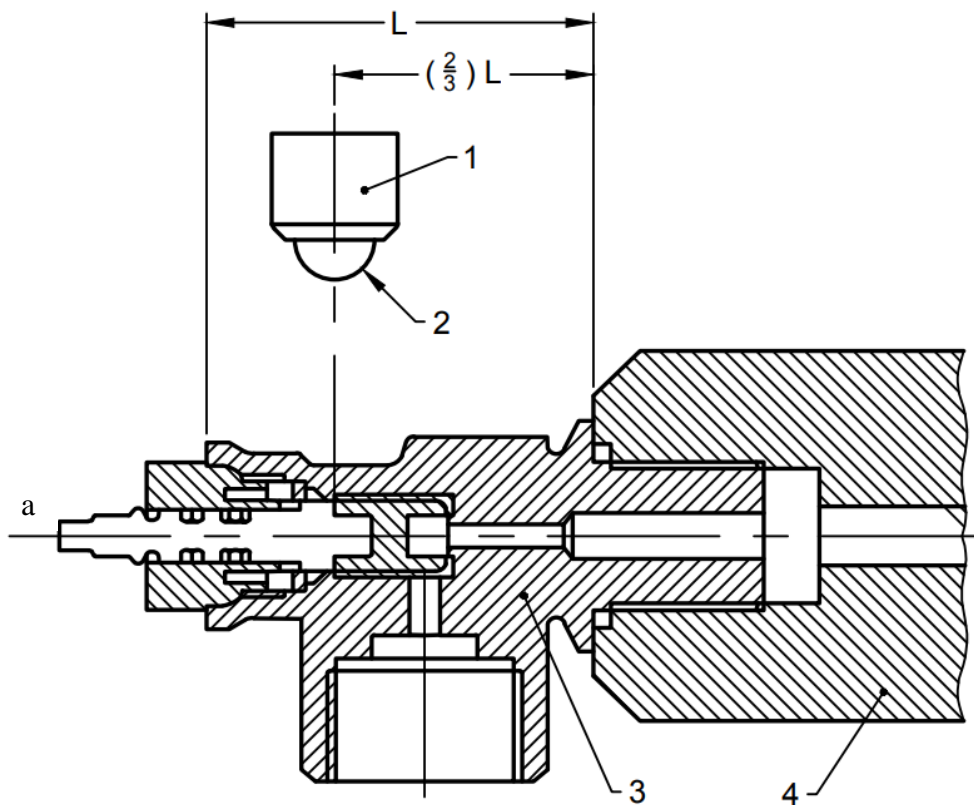
(Page 34, clause 10.3.2) — Substitute ‘ $P_{vt} = P_w$ ’ for ‘ $P_{vt} \geq P_w$ ’.

(Page 34, clause 10.4.1, second sentence) — Substitute the following for the existing:

‘The burst pressure test shall be carried out with the valve seat in open position with valve outlet/filling connection(s) plugged.’

(Page 35, Fig. 13, Key 2) — Substitute ‘HARDENED’ for ‘HARDEND’.

(Page 35, Fig. 13) — Substitute the following for the existing.



(Page 35, Table 13, Title) — Substitute the following for the existing table title:

**‘Table 13 — Recommended Valving Torques for Taper Threaded Valve Stems for Seamless Steel Cylinder and Composite Cylinders with Steel Boss’**

(Page 35, Table 13, col 5 and col 6) — Delete sub-heading ‘Seamless Steel Cylinder’.

(Page 36, Table 14) — Substitute the following for the existing table:

**‘Table 14 Recommended Valving Torque for Parallel Threaded Valve Stem for Seamless Steel Cylinders and Composite Cylinders with Steel Boss**

(Clauses 10.4.2.3, 10.4.3.4 and 10.4.3.5)

SI No.	Valve Material	Category	Inlet Thread Code	Valving Torque - Nm	
				Min	Max
(1)	(2)	(3)	(4)	(5)	(6)
i)	Copper base alloy, Carbon steel and Stainless steel	a) I	a) 18P	100	130
			b) U12		
		b) II	c) 25P	100	130
			d) SP12		
			e) U18		
			f) 30P		

(Page 36, Table 15) — Substitute the following for the existing:

**‘Table 15 Recommended Valving Torques of Taper Threaded Valve Stems for Aluminium Alloy Cylinders and Composite Cylinders with Aluminium Alloy Boss**

(Clauses 10.4.2.3, 10.4.3.4 and 10.4.3.5)

SI No.	Valve Material	Category	Inlet Thread Code	Valving Torque		
				Min Nm	Max Nm	
					Without cylinder neck reinforcement	With cylinder neck reinforcement
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	Copper base alloy and Carbon steel	a) I	a) 18T	a) 75	a) 95	a) 140
			b) 08N			
			c) 17E			
		b) II	d) 25.4	b) 95	b) 110	b) 180
			e) 12N			
			f) 25E			

**NOTE** — The torque figures given above are for use with PTFE thread sealant. If different sealant or pressure ranges are introduced, the torque figures given in the table may have to be changed to ensure a gas tight joint.

(Page 37, clause 10.4.4.3.3, line 4) — Delete ‘other’.

(Page 38, clause 10.5.1, line 1) — Substitute ‘shall’ for ‘will’.

[Page 38, clause 10.5.3 (f)] — Delete the point.

(Page 39, clause **10.6.1.11**, line 2) — Substitute ‘shall’ for ‘will’.

(Page 40, Fig. 14, Key 1) — Substitute ‘TORQUE’ for ‘TORQE’.

(Page 40, Fig. 14, Key 8) — Substitute ‘DISPLAY’ for ‘DIPLAY’.

(Page 40, Fig. 15, Key 8) — Substitute ‘ATMOSPHERIC PRESSURE’ for ‘ATMOSPHERIC RESSURE’.

[Page 41, clause **10.9 (b)**, line 2] — Substitute ‘ $W_c$ ’ for ‘W’.

(Page 43, clause **11.1.5**) — Delete clause and its sub clause.

(Page 44, clause **11.1.8.4.1**) — Delete ‘Test Procedure:’ after heading.

(Page 44, clause **13.3**, first sentence) — Substitute the following for the existing:

‘All valves shall be subjected to both internal leak tightness and external leak tightness at room temperature at minimum working pressure ( $P_w$ ).’

(Page 45, clause **13.3**, second para) — Substitute the following for the existing:

‘For valves equipped with pressure relief device, testing shall be done at minimum 0.8 times the minimum rated burst pressure of pressure relief device.’

(Page 45, Table 22) — Substitute the following for the existing:

**‘Table 22 Scale of Sampling**

(Clause 13.4.1)

<b>Sl No.</b>	<b>Batch Size</b>	<b>Sample Size</b>
(1)	(2)	(3)
i)	3 up to including 3000	2

(Page 45, clause **13.4.5**, line 2) — Substitute ‘shall’ for ‘will’.

(Page 45, clause **13.4.6**, line 2) — Substitute ‘shall’ for ‘will’.

(Page 45, clause **13.4.5**) — Substitute ‘**13.5 Checking of Inlet Connection**’ for ‘**13.4.5 Checking of Inlet Connection**’.

(Page 45, clause **13.4.6**) — Substitute ‘**13.6 Checking of Outlet Connection**’ for ‘**13.4.6 Checking of Outlet Connection**’.

(Page 45, clause **13.4.7**) — Substitute ‘**13.7 Checking of Other Dimensions**’ for ‘**13.4.7 Checking of Other Dimensions**’.



(Page 45, clause **13.4.8**) — Substitute ‘**13.8 Scale of Sampling**’ for ‘**13.4.8 Scale of Sampling**’.

(Page 45, clause **13.4.8.1**) — Substitute ‘**13.8.1**’ for ‘**13.4.8.1**’.

(Page 45, clause **13.4.8.2**) — Substitute ‘**13.8.2**’ for ‘**13.4.8.2**’.

(Page 45, clause **13.4.8.3**) — Substitute ‘**13.8.3**’ for ‘**13.4.8.3**’.

[Page 45, clause **14.1 (e)**] — Substitute the following for the existing:

‘Working pressure, MPa /bar / (kgf/cm<sup>2</sup>)’

[Page 46, clause **14.1 (m)**, line 2] — Delete ‘or PRD’.

(Page 47, Annex A, left side column, point 4) — Substitute ‘IS 1608 (Part 1) : 2022/ ISO 6892-1 : 2019 Metallic materials — Tensile testing: Part 1 Method of test at room temperature (*fifth revision*)’ for ‘1608 (Part 1) : 2018 Metallic materials — Tensile testing: Part 1 Method of test at room temperature (*fourth revision*)’

(Page 47, Annex A, right side column, point 7) — Substitute ‘IS/ISO 11114-1 : 2020 Gas cylinders — Compatibility of cylinder and valve materials with gas contents: Part 1 Metallic materials (*first revision*)’ for ‘IS/ISO 11114-1 : 2012 Transportable gas cylinders — Compatibility of cylinder and valve materials with gas contents — Metallic materials’

(Page 47, Annex A) — Add the following in the end:

<i>IS No./Other Standards</i>	<i>Title</i>
IS 2102 : 1993/ ISO 2768-1 : 1989	General tolerances: Part 1 Tolerances for linear and angular dimensions without individual tolerance indications ( <i>third revision</i> )
IS 3745 : 2006	Yoke type valve connections for small medical gas cylinders — Specification ( <i>second revision</i> )
IS 7302 : 2018	Valve fittings for self contained breathing apparatus (SCBA) and self contained underwater breathing apparatus (SCUBA) — Specification ( <i>first revision</i> )
IS 8776 : 1988	Specification for valve fittings for use with liquefied petroleum gas (LPG) cylinders up to and including 5 litre water capacity ( <i>first revision</i> )
IS 12300 : 1988	Valve fittings for refrigerant cylinders — Specification
IS 16087 : 2016	Biogas (biomethane) — Specification ( <i>first revision</i> )
IS 16988 : 2018	Compressed natural gas cylinder valve integrated with solenoid operation (remotely controlled) for automotive use — Specification
ANSI/ASME B1.2 : 1983	Gages and gaging for unified screw threads

**Doc: MED 16 (25087)WC**  
**May 2024**

ANSI/ASME B1.20-1 : 1983	Pipe threads, general purpose (inch)
BS 341-1 : 2022	Gas cylinders — Cylinder valves: Part 1 Threads for connection of valves to gas cylinders — Specification
DIN 477 : 2021	Gas cylinder valves for cylinder test pressures up to 300 bar — Valve inlet and outlet connections
CGA V-1 : 2023	Standard for compressed gas cylinder valve outlet and inlet connections
ISO 10297 : 2014	Gas cylinders — Cylinder valves — Specification and type testing
ISO 11363-1 : 2018	Gas cylinders — 17 E and 25 E taper threads for connection of valves to gas cylinders — Part 1: Specifications