IS 12300 (1988): Valve Fittings for refrigerant Cylinders - [MED 16: Mechanical Engineering]

AMENDMENT NO. 5 AUGUST 2009
TO
IS 12300 : 1988 VALVE FITTINGS FOR REFRIGERANT CYLINDERS — SPECIFICATION

(Page 2, *Table* 1, *heading)* — Delete '(STUB THREADS)'.

(Page 2, Table 1) — Substitute the following for the existing:

Designation of Threads			1/4" —18 NGT	3/8" —18 NGT	1/2" — 14 NGT
p — Pitch of the thread			1.411	1.411	1.814
L_1 – Length of hand tight engagement			5.08	6.096	8.128
External	Small end	Major dia, D_0	13.253	16.672	20.716
		Pitch dia, E_0	12.126	15.545	19.263
	Full threads	Pitch dia, E_8	12.972	16.457	20.452
		Length, L_8	13.546	14.562	19.014
	Large end	Major dia, D_{10} (approx)	14	17.6	22
		Overall length, L_{10} (approx)	16	17.5	20.6
	G, *Min* - if thread relief groove provided = 2 p (approx)		2.8	2.8	3.6
Internal	Pitch diameter, E\		12.443	15.926	19.771
	Full threads	Minor diameter, K_3	10.7	14.2	17.4
		Pitch diameter, E_3	11.862	15.281	18.293
		Length $L_1 + L_3$	9.314	10.330	13.571
		L_9, Length of full root, *Min*	12.136	13.152	17.198

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 4 JANUARY 2007
TO
IS 12300 : 1988 VALVE FITTINGS FOR REFRIGERANT CYLINDERS

[*Cover page, Title (See also Amendment No.* 2)] — Substitute the following for the existing title:

"रेफ्रीजरेंट सिलिंडरों की वाल्व फिटिंग्स – विशिष्टि

VALVE FITTINGS FOR REFRIGERANT CYLINDERS– SPECIFICATION"

(ME 16)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 3 DECEMBER 2004
TO
IS 12300:1988 SPECIFICATION FOR
VALVE FITTINGS FOR SMALL FREON CYLINDERS

(*Page* 1, *clause* **1**, *read with Amendment No.* 2) — Substitute 'hydrocarbon' *for* 'hatocarbon'.

(MED 16)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 2 APRIL 2004
TO
IS 12300:1988 SPECIFICATION FOR VALVE FITTINGS FOR SMALL FREON CYLINDERS

(*Page* 1, *Title*) — Substitute the following for the existing:

'Indian Standard

VALVE FITTINGS FOR REFRIGERANT CYLINDERS — SPECIFICATION'

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

1. Scope — Covers basic dimensions and construction requirements of valve fittings for small refrigerant (halocarbon/halocarbon) cylinders up to 25 litres water capacity.'

(ME 16)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 1 JUNE 2003
TO
IS 12300:1988 SPECIFICATION FOR VALVE FITTINGS FOR SMALL FREON CYLINDERS

(*Page* 3, *Fig.* 2) — Substitute 'Fig. 2 3/8 FL (5/8" - 18 UNF - RH)' *for* 'Fig. 2 3/8" FL(5/8" - UNF-RH)'.

(*Page* 3, *Fig.* 3) — Substitute

'Fig. 3 1/2 FL(3/4" - 16 UNF-RH)' *for* 'Fig. 3 1/2" FL (3/4" — 16 UNF — RH)'.

(*Page* 3, *Fig.* 4) — Substitute 'Fig. 4 5/8 FL (7/8" - 14 UNF - RH)' *for* 'Fig. 4 5/8" FL (7/9" - 14 UNF - RH)'.

(ME 16)

Reprography Unit, BIS, New Delhi, India

UDC 621-646-9 :621.642.02 : 547.412.262.31-13

IS : 12300 - 1988
(Reaffirmed 2007)

Gas Cylinders Sectional Committee, EDC 16; Gas Cylinders Valves and Fittings (Including Regulators) Subcommittee, EDC 16:1 [Ref: Doc : EDC 16 (4591)]

Indian Standard

SPECIFICATION FOR VALVE FITTINGS FOR SMALL FREON CYLINDERS

1. Scope — Covers basic dimensions and construction requirements for valve fittings for small freon gas cylinders up tor 25 litres water capacity.

2. Material — All components used in valve construction shall be made from material compatible with gas to be contained in the cylinder and with the material of the cylinder *(see also* **2.3** and **2.4**).

2.1 *Chemical Composition* — Chemical composition shall be compatible with the gas to be contained in the cylinder. Actual composition shall be as agreed to between the purchaser and the manufacturer.

2.2 The valve body blank shall be forged from wrought or extruded sections of non-ferrous material.

2.2 *Tensile Strength and Elongation* — The tensile strength and elongation of the material of the valve determined according to IS : 2654-1977 'Method for tensile testing of copper and copper alloys (*first revision)'* shall be respectively at least 40 kgf/mm' and 18 percent measured on a gauge length of $5.65 \sqrt{S_o}$, S_o being the original area of cross section.

2.4 *Impact Strength* — The izod impact strength of the material of the valve determined according to IS : 1598-1977 'Method for izod impact test of metals *(first revision*)', or other applicable specification shall not be less than the following:

Brass, manganese, bronze aluminium, bronze or any other non-ferrous material	2.2 kgf.m

2.5 *Test Samples* — Test samples for the tensile and izod impact tests shall, where practicable, be taken from a valve blank. Where this is not practicable, the test piece shall be subjected to the same treatment as the valve so as to be representative of the material in the condition in which it has to be used. The scale of sampling and criteria for conformity shall be in accordance with the requirements of Appendix A, unless otherwise agreed to between the manufacturer and the purchaser.

3. Screw Threadings on the Valve Stem (Stub Threads) — Three taper screw thread connections specified are designated as under:

1/4" NGT, 3/8" NGT and 1/2" NGT

3.1 The principal dimensions shall be as given in Table 1.

4. Valve Outlet Connections Th dimensions of valve outlets shall be in conformity with any one of the following sizes:

635 mm (1/4")FL, 953 mm (3/8")FL,
127 mm (1/2")FL and 15.88 mm (5/8")FL

4.1 The principal dimensions shall be in accordance with Table 1 and Fig. 1, 2, 3 and 4.

4.1.1 Combination of inlet and outlet sizes shall be permitted as per table given below:

Value Outlet Size (Flare)	Valve Stem Size	Designation of Valve Size Combination Possible	Sq. on Spindle
6.35 mm (1/4")FL	1/4" — 18 NGT	1/4" FL × 1/4" NGT	6 mm
	3/8" — 18 NGT	1/4" FL × 3/8" NGT	6 mm
9.53 mm (3/8")FL	1/4" - 18 NGT	3/8" FL × 1 /4" NGT	6 mm
	3/8" — 18 NGT	3/8" FL × 3/8" NGT	6 mm
	1/2" — 14 NGT	3/8" FL × 1/2" NGT	7.5 mm
12.7mm(1/2")FL	3/8"— 18 NGT	1/2" FL × 3/8" NGT	7 5 mm
	1/2"— 14 NGT	1/2" FL × 1/2" NGT	7.5 mm
15.88 mm (5/8")FL	3/8" - 18 NGT	5/8" FL × 3/8" NGT	7.5 mm
	1/2* —1 4 NGT	5/8" FL × 1/2" NGT	7.5 mm

Adopted 12 April 1988

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

4.2 *Spindle* — The spindle end shall be square of the size specified in Table 1.

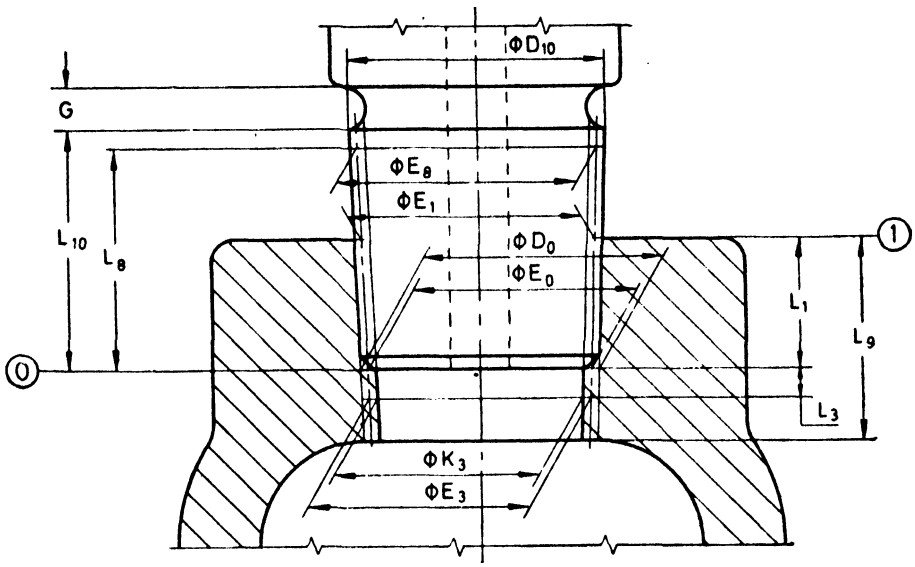
4.3 All spindles shall close the valve by means of clockwise movement.

4.4 The general machining tolerance, unless otherwise stated, shall be of medium class specified in IS : 2102 (Part 1)-1980 'General tolerances for dimensions and form and position: Part 1 General tolerances for linear and angular dimensions *(second revision)'*.

TABLE 1 PRINCIPAL DIMENSIONS OF SCREW THREADINGS ON VALVE STEM (STUB THREADS)

(*Clauses* 3.1, 4.1 *and* 4.2)

All dimensions in millimetres.



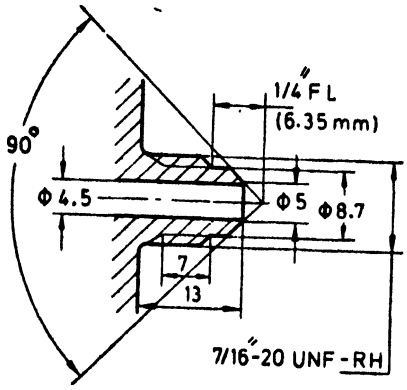
D = Major Diameter
E = Pitch Diameter
K = Minor Diameter
L_1 = Std Hand Tight Engagement
L_3 = 3 Threads (for Wrenching)
L_8 = Full External Threads
L_8 = Full Roats on Internal Threads
L_{10} = Overall External Threads
1 — Reference Plane for gauging Internal Threads
0 — Reference Plane for Gauging External Threads

Limits on Size

For both External and Internal Threads:

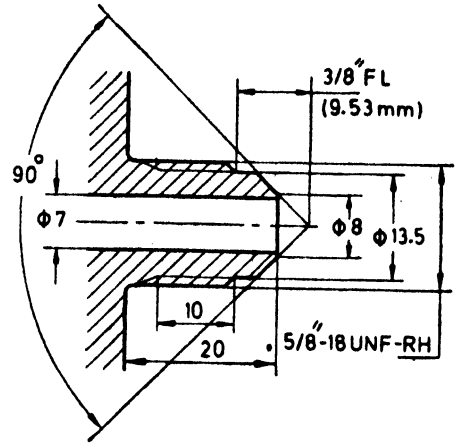
±1 Turn from Basic (on Pitch Diameter)

	Designation of Threads		1/4" — 18 NGT	3/8" — 18 NGT	1/2" — 14 NGT
	L_1		5.750	6.100	8.200
External	Small Ends	D_0	13-250	16.500	20.750
		E_0	12.200	15.500	19.250
	Full Threads	D_0 45° × *Min*	45°	45°	45°
		$C_{\%}$	13.000	16.500	20.500
		L_s	14 250 +3.0 -2.0	14.500 + 3.0 - 2.0	19.000 +3.5 -0.0
	Large Ends	0io Approx	14.000	17.600	22.000
		L_{iQ} Approx	16.750 + 3.0 -0 0	17.00 + 3.0 -0.0	20.500 +3.5 -0.0
	G *Min*	X Pitch	2.8	2.8	3.6
Internal	E_1		12.500	16.000	20 000
	C Sink 90° on K_3		90°	90°	90°
	Full Threads	K_3	10.750	14.200	17-500
		E_3	11.750	15.200	19000
		$L_1 + L_2$	10.000	10.500	13.500
		L_9	13.000	13.250	17-260



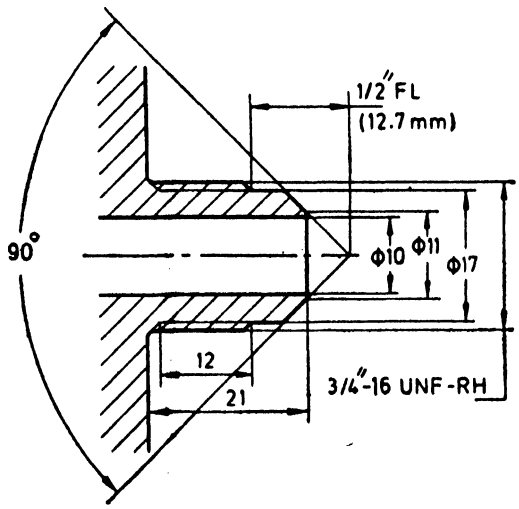
Major Dia	Effective Dia	Minor Dia
11.10	10.287	9.550
10.894	10.157	9.342

FIG. 1 1/4" FL (7/16" - 20 UNF - RH)



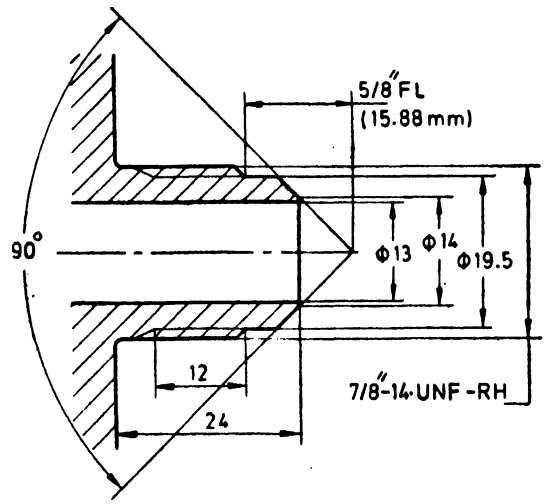
Major Dia	Effective Dia	Minor Dia
15.875	14.960	14.148
15.654	14.840	14.123

FIG. 2 3/8" FL (5/8" - UNF - RH)



Major Dia	Effective Dia	Minor Dia
19.050	18.008	17.094
18.811	17.881	16.878

FIG. 3 1/2" FL (3/4" - 14 UNF - RH)



Major Dia	Effective Dia	Minor Dia
22.225	21.031	19.990
21.963	20.894	19.759

FIG. 4 5/8" FL(7/9" - 14 UNF — RH)

5. Valve Capsules — A valve capsule, of suitable soft metal or PTFE tape, for fitting between taper threaded portion of the cylinder valve and the internally threaded portion of cylinder neck, may be used to ensure a gas tight joint when the valve is screwed home. A torque limiting device shall be used.

6. Testing — Each assembled valve shall be subjected to a pneumatic test at a pressure not less than the normal working pressure in both open and closed positions.

7. Safety Requirements — All valve spindles relying for their retention under pressure on a suitable thread shall have, in addition, a second means of retention to safeguard against the spindle being ejected with high velocity thereby endangering life in the event of the failure of the engaging threads.

8. Type Approval Tasting

8.1 *Design and Fabrication* — Before the design of the valve is approved, it shall be checked for conformity to all the requirements of this specification. Whenever there is a change in material or design of the valve, it shall be retested and shall conform to all the requirements of this specification.

8.2 *Cycle Test* — The valve shall perform satisfactorily at not less than 500 cycles of opening and closing operation at a torque not exceeding 1.2 m.kgf. After the cycle test the valve shall be subjected to the pneumatic test and shall perform satisfactorily.

9. Marking — The valve shall be permanently marked with the following information:

a) Year of manufacture,

b) Manufacturer's identification,

c) Number of this specification, and

d) Maximum working pressure in kgf/cm^2.

9.1 *Certification Marking* — Details available with the Bureau of Indian Standards.

APPENDIX A

(*Clause* 2.5)

TEST SAMPLES

A-1. Scale of Sampling

A-1.1 *Lot* — In any consignment all the valve blanks of the same material and size and manufactured under similar process of production shall constitute a lot.

A-1.2 Valve blanks shall be selected and examined for each lot separately for ascertaining their conformity to the requirements of mechanical properties.

A-1.3 The number of valve blanks to be selected from a lot shall depend upon the size of the lot and shall be in accordance with col 1 and 2 of Table 2. All these samples shall be taken at random from the lot.

A-1.4 All the valve blanks selected according to col 2 of Table 2 shall be divided into two equal halves. The tensile and elongation tests shall be carried out on all samples of the first half and the izod impact test on the second half.

TABLE 2 SCALE OF SAMPLING

Lot Size (Blanks)	Sample Size	
	For Izod Test	For Tensile and Elongation Test
(N)	(n_1)	(n_2)
Up to 600	2	2
501 to 1 000	4	4
1 001 to 3 000	6	6
3 001 to 6 000	8	8
6 001 to 7 500	10	10
7 501 to 10 000	12	12
10 001 to 15 000	15	15

A-2. Criteria for Conformity

A-2.1 *Tensile and Elongation Test* (*see* **2.3**) — All the samples of the first half *(see* **A-1.4**) shall be examined for tensile and elongation test. The lot shall be declared as satisfactory with respect to the requirements of tensile and elongation test if each sample passes the test satisfactorily.

A-2.2 *Impact Test* (*see* **2.4**) — All the samples of the second half shall be examined for izod impact test. The lot shall be declared as satisfactory with respect to the requirements of the izod Impact test if each valve material passes the test satisfactorily.

A-2.3 The lot shall be declared as conforming to the requirements of mechanical properties if it has been found satisfactory according to A-2.1 and A-2.2.

EXPLANATORY NOTE

Manufacture, possession and use of any gas when contained in cylinders in compressed or liquefied state is regulated under the Gas Cylinder Rules, 1981 of Government of India, as amended from time to time. This specification has been prepared in consultation and agreement with the statutory authorities under those rules.

IS : 3224-1979 'Specification for valve fittings for compressed gas cylinders excluding liquefied petroleum gas (LPG) cylinders' covers the requirements of valve fittings for gas cylinders for compressed, liquefied or dissolved gases, other then liquefied petroleum gas (LPG). It was felt necessary to prepare a separate standard for valve fittings for freon gas cylinders as the requirements of such type of valve fittings are not covered in IS : 3224-1979.

Assistance has been derived from ANSI B-57.1-1977 'Compressed gas cylinder valve outlet and inlet connections' issued by American National Standards Institute (ANSI).

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