



**PRODUCT MANUAL  
FOR  
YOKE TYPE VALVE CONNECTIONS FOR  
SMALL MEDICAL GAS CYLINDERS  
ACCORDING TO IS 3745: 2006**

*This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification license/certificate.*

1.	<b>Product</b>	:	IS 3745: 2006
	<b>Title</b>	:	Yoke Type Valve Connections for Small Medical Gas Cylinders
	<b>No. of Amendments</b>	:	Nil
2.	<b>Sampling Guidelines:</b>		
a)	<b>Raw material</b>	:	As per Cl. 3 of IS 3745
b)	<b>Grouping guidelines</b>	:	Each Variety of valve shall be tested for GoL/CSoL
c)	<b>Sample Size</b>	:	1. Assembled valves- 5 pieces 2. Samples for material testing (Tensile and Izod)- 3 pieces each 3. Valve body piece for chemical test- 3 pieces 4. Brass components- 5 pieces
3.	<b>List of Test Equipment</b>	:	Please refer ANNEX – A
4.	<b>Scheme of Inspection and Testing</b>	:	Please refer ANNEX –B
5.	<b>Possible tests in a day:</b>	:	Please refer ANNEX- C
6.	<b>Scope of the Licence:</b>	:	Please refer ANNEX –D

**ANNEX--A****List of Test Equipment***Major test equipment required to test as per the Indian Standard*

<b>Sr No</b>	<b>Tests used in with clause reference</b>	<b>Test equipment</b>
1.	Tensile strength and % Elongation, 3.2.1	Tensile testing machine
2.	Izod impact test, Cl. 3.2.2	Izod Impact testing machine
3.	Coating thickness, Cl. 5.1.1	Coat Meter
4.	Valve inlet connections, Cl. 5.3.1	Thread Plug Gauges and Ring gauges of suitable sizes
5.	Minimum wall thickness, Cl. 5.3.6	Dial caliper
6.	Valve outlet connections, Cl. 8.1 to 8.11	Thread Plug Gauges and Ring gauges of suitable sizes
7.	Hydraulic Test, Cl. 10	Test bench with pressure gauge
8.	Pneumatic test, Cl. 11	Test bench with Pressure gauges
9.	Valve Torque test, Cl. 12	Torque wrench with fixture
10.	Cycle test, Cl. 13	Holding fixture for cycle test and arrangement counter
11.	Stress Corrosion Test, Cl. 5.1.2	Stress Corrosion Test Apparatus with glassware & chemical (DM water, Nitric acid, Mercurius Nitrate, Nitric Acid)
12.	Yoke dimensions, Cl. 6.1, 6.2, 7	Vernier caliper, micrometer

*The above list is indicative only and may not be treated as exhaustive.*

**ANNEX B****Scheme of Inspection and Testing**

**1. LABORATORY** - A laboratory shall be maintained which shall be suitably equipped (as per the requirement given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.

1.1 The manufacturer shall prepare a calibration plan for the test equipments. The following equipments shall be calibrated at a frequency shown against each and records kept:

1.1.1 Universal Testing Machine - Once in a year

1.1.2 Impact Testing Machine- Once in three years

1.1.3 Pressure Gauges - Once in a month

1.1.4 Pyrometer used for heating furnace- Once in six months

1.1.5 Master gauges against which inspection gauges are checked periodically shall be sent for rechecking in an independent laboratory once in three years.

1.2 The firm shall procure a set of certified gauges for inspection of different components.

**2. TEST RECORDS** – The manufacturer shall maintain test records for the tests carried out to establish conformity. Records of all the tests made at the valve manufacturer's work shall be kept and copies of test certificates shall be forwarded to the purchaser of the valve and the inspecting authority.

**3. LABELLING AND MARKING** – As per the requirements of IS 3745: 2006.

**4. CONTROL UNIT** – The control unit shall consist of a lot of valve blanks of the same type & size manufactured in a day from the material from the same supplier or blanks from the same heat number, whichever is later, under similar process of production.

**5. LEVELS OF CONTROL** - The tests as indicated in column 1 of Table 1 and the levels of control in column 3 of Table 1, shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2 above.

**5.1** Each control unit of finished valves shall be offered for inspection to BIS before dispatch (See Table 2). Valves failing to meet the requirements of the specification shall not be marked with the BIS Standard Mark.

**5.2** A certificate as per Annexure -I shall be issued by the BIS Inspecting Officer in respect of every batch/inspection lots of cylinders marked with BIS Standard Mark.

5.3 MATERIAL - The material shall conform to the requirements specified in 3.1 & 3.2 of IS 3745:2006. A test certificate shall be supplied by the supplier with the supply of the material for the valve fabrication. The Bureau shall be given the opportunity of making an independent check test, if necessary. The manufacturer of the valves should establish means to identify the valves with the certificate. Material with seams, cracks, lamination or other injurious defects shall not be used.

5.4 DESIGN, FABRICATION & DIMENSIONS – The valves shall conform to the requirements given in clause 4 to 8 of IS 3745:2006. A fully dimensional sectional drawing of the valve and scheme of manufacture shall be submitted by the manufacturer to the inspecting authority for final approval by Statutory Authority.

5.5 In respect of all other clauses of the specification at all stages of production, appropriate controls and checks shall be maintained by the factory so as to ensure that the product conforms to the various requirements of the specification.

## **6. FORGING & MACHINING**

The licensee shall possess all the requisite infrastructure for the forging and machining of the valve housing in their own premises. Under no circumstances, the forgings of valve housing (body) or machining there of shall be permitted to be sub-contracted or bought from outside.

**7. REJECTIONS** – Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016.

**TABLE 1**

(1)			(2)	(3)			
Test Details				Levels of Control			
Clause	Requirement	Test Methods		Test equipment requirement Required (R) or Sub-contracting permitted (S)	No. of Sample	Frequency	Remarks
		Clause	Reference				
<b>3</b>	<b>MATERIAL</b>						
	Chemical composition of Valve body	3.1	IS 3745	S	One	Each consignment	No further testing is required, if accompanied with test certificate or ISI marked. The approved material as per drawing shall only be used.
	Brass components	3.1.3	IS 3745	S	One	Each consignment	No further testing is required, if accompanied with test certificate or ISI marked. The approved material as per drawing shall only be used.
	Tensile strength and % Elongation	3.2.1	IS 3745 IS 1608	R	Annex A of IS 3745	Each Control Unit	If any of the samples fail, twice the number of samples shall be tested for the failed test from the same control unit. If any of these samples fail to meet the requirements, the entire control unit shall be rejected. (Ref. A-2.3 of Annexure A of IS:3745:2006)

	Izod impact strength	3.2.2	IS 3745 IS 1598	R	Annex A of IS 3745	Each control unit	
<b>5</b>	<b>CONSTRUCTION</b>						
<b>5.1.1</b>	<b>Requirements for electroplating</b>						
-	Appearance	7.1	IS 1068	R	Each valve		
-	Thickness	7.2, 7.2.3, 7.2.4,9.1	IS 1068	R	Each valve		-
-	Ductility	7.2.3.2, 9.4	IS 1068	R	1 of 1000 valves or less electroplated at a time		-
-	Adhesion	7.3, 9.2	IS 1068	R	1 of 1000 valves or less electroplated at a time		-
-	Corrosion resistance	7.4, 9.4	IS 1068	R	1 of 1000 valves or less electroplated at a time		-
5.1.2	Stress Corrosion test (Applicable for copper alloy valve body)	--	IS 2305	R	As per Table 2	Each Control unit	-
5.2	Yoke dimensions	6.1, 6.2, 7.1, 7.2, 8.1 to 8.11	IS 3745	R	Each Valve		-
8	Valve outlet Connections	8.1 to 8.11	IS 3745	R	Each Valve		-

9	Valve inlet connections	9, 5.3.1	IS 3745	R	Each Valve	
10	Hydrostatic test	10	IS 3745	R	Annex A of IS 3745	Each Control unit
11	Pneumatic test	11	IS 3745	R	Each valve	
12	Valve torque test	12	IS 3745	R	One sample out of 5000 valves of same type subject to minimum of one valve in a month	
13	Cycle test	13	IS 3745	R	One sample out of 5000 valves of same type subject to minimum of one valve in a month	

**Note-1:** Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled by the Bureau.

**Note-2:** The control unit and levels of control as decided by the Bureau are obligatory, to which the licensee shall comply with.

**Table 2***(Cl. 5.1 of SIT)***INSPECTION OF FINISHED LOT**

Lot – For the purpose of lot inspection, the lot shall be the same as the Control Unit defined in Clause 4 of the Scheme of Inspection and Testing.

1. Depending upon the size of the lot, the following number of samples shall be drawn at random and subjected to the test for valve inlet connections, valve outlet connections and pneumatic test etc.:

<b>Control Unit Size</b>	<b>Sample Size</b>
Upto 500	13
501 to 1000	20
Over 1000	32

In case of failure of a sample in any requirement mentioned under 1, all the valves in the lot should be tested by the licensee for the requirement where failure has occurred and segregated lot be reoffered for BIS Inspection as fresh lot.

2. Hydrostatic Test, **Stress Corrosion Test** shall be carried out on 2 valves from each control unit.

3. The lot may be considered as having passed the requirements of IS 3745: 2006 if all the samples tested above are found to be conforming.

**NOTES:**

1. Tensile strength, Elongation and Impact Strength of the material of valve body as per frequency given in Table 1 of STI shall be carried out by the licensee. BIS officer will verify the relevant test records before carrying out lot inspection. However, such tests to be witnessed by BIS officer whenever possible.

2. Cycle test, and valve torque test as per the frequency given in Table 1 of STI shall be carried out by the licensee in the presence of BIS officer whenever possible. Records of such tests shall be verified by BIS officer before carrying out lot inspection.



**ANNEX – I**

(Para 5.2 of the Scheme of Inspection and Testing)

Test Certificate for Yoke Type Valve Connections for Small Medical Gas Cylinders - IS 3745

Manufacturer:		Certificate No.		
Purchaser:		Order No:		
Control unit No:				
Valve fittings description / Outlet No.		Quantity offered for Inspection:		
<p>This is to certify that the valve fittings as mentioned below were inspected at M/s _____ and _____ these meet the Requirements of IS 3745: 2006 and Drawing No. _____.</p>				
<b>RESULTS OF INSPECTION:</b>				
Sr. No	Requirements	Quantity Inspected	Quantity Passed	Quantity Rejected
1	Valve inlet connections			
2	Valve outlet connections			
3	Pneumatic test			
4	Hydrostatic test			
5	Finish			
6*	Tensile strength and elongation tests			
7*	Impact strength test			
8*	Valve torque test			
9*	Cycle Test -Batch No			
* From manufacturer's test record.				
Quantity Passed				
Rejected valve fittings and the method of their disposal				
Signature:		Signature		
Name & Designation of the Officer		Inspecting Officer		
representing the company		Bureau of Indian Standards		

**ANNEX C****Possible tests in a day**

<b>Sr No.</b>	<b>Test</b>	<b>Clause reference</b>
1.	Tensile Strength and elongation	3.2.1
2.	Impact strength	3.2.2
3.	Stress corrosion test	5.1.2
4.	Valve outlet connections	8
5.	Valve inlet connections	9
6.	Hydrostatic test	10
7.	Pneumatic test	11
8.	Valve torque test	12
9.	Cycle test	13

**ANNEX D****Scope of Licence**

“Licence is granted to use Standard Mark as per IS 3745: 2006 with the following scope:

Name of the product	Yoke Type Valve Connections for Small Medical Gas Cylinders
Type of gas/gas mixture	
Inlet connection	
Outlet connection	
Any other aspect	PESO approval number and drawing number