

वाल्व निरीक्षण और परीक्षण —
परीक्षण पद्धतियाँ
(दूसरा पुनरीक्षण)

Valve Inspection and Test —
Methods of Test
(Second Revision)

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FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Chemical Engineering Plants and Related Equipment Sectional Committee had been approved by the Mechanical Engineering Divisional Council.

This standard was first published in 1971 and revised in 1981. This revision has been taken up with a view incorporating the modification found necessary as a result of experience gained in the use of this standard. Also, in this revision, the standard has been brought into the latest style and format of Indian Standards, and references to Indian Standards, wherever applicable have been updated.

The composition of the Committee responsible for the formulation of this standard is given in [Annex A](#).

In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'.

Indian Standard

VALVE INSPECTION AND TEST — METHODS OF TEST

*(Second Revision)***1 SCOPE**

This standard covers the inspection and pressure test requirements for valves such as gate, check, plug, and ball type. This standard may be used for other types of valves when it is specified in the individual valve standards or subject to agreement between the manufacturer and the purchaser if not specified in individual valve standards.

2 REFERENCES

The standard given below contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of this standard:

<i>IS No.</i>	<i>Title</i>
IS 8092 : 1992	Code for inspection of surface quality of steel castings for valves, fittings and other piping components (visual method) <i>(first revision)</i>

3 INSPECTION**3.1 Inspection at Manufacturer's Plant**

If inspection by purchaser is specified in the purchase order, it shall be done at the manufacturer's plant. All reasonable facilities shall be given to the inspector for satisfying himself that the valves are manufactured in accordance with relevant standards and the purchase order.

3.2 Inspection outside Manufacturer's Plant

If inspection of shell components produced at other than the manufacturer's plant is specified in the purchase order, these components shall be inspected by the purchaser's inspector at that location or at the valve manufacturer's works subject to agreement between the purchaser and the valve manufacturer.

3.3 Extent of Inspection

Normally inspection by the purchaser shall be limited to the following.

3.3.1 Visual examination of any finished component in the assembled valve. Visual examination of castings to ensure conformity to IS 8092.

3.3.2 Dimensional check of the finished valve.

3.3.3 Dimensional checks of the valve components. These checks shall be carried out when agreed to between the manufacturer and the purchaser.

3.3.4 While witnessing of shell and seat pressure tests as specified in this standard, the purchaser's inspector may waive any part of normal inspection.

3.4 If specified in the purchase order, non-destructive testing, such as radiography and magnetic particle, on casting and forgings shall be carried out by the manufacturer to an agreed procedure or specification in the presence of purchaser's inspectors either at the valve manufacturer's plant or at the place of the supplier of the components. If copies of the relevant test certificates are to be given, this shall be so stated in the purchase order, including the number of copies required.

3.5 Material used for various components of valves shall be as specified in various specifications indicated in the relevant individual valve-type standards. Any requirements of certificates for physical tests and chemical composition of materials shall be stated in the purchase order.

3.6 If inspection is specified, the valve manufacturer shall give at least seven days' notice on the availability of valves for inspection and tests.

3.7 Valves shall normally be tested before painting/primer coating. However, if phosphate coating is a normal practice of the valve manufacturer before assembly, such coating need not be removed before testing. If pressure tests in the presence of the purchaser's representative are specified in the purchase order, painted valves from stock may be retested without removal of paint. In case of valve with permanent lining such as PTFE, rubber, glass etc, the purchaser may specify pressure test on the shell prior to lining of the valve in addition to such tests on shell following lining.

4 PRESSURE TESTS

The pressure-tests indicate in this standard shall be carried out on each valve.

4.1 Shell Test

The hydrostatic test for the shell of the valves shall be carried out at a gauge pressure not less than 1.5 times the pressure rating at 38 °C rounded off to the

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next higher 1 bar increment. During these tests discs or wedges, plugs shall remain in the open position and balls in the half open position. The packing gland in valves with stuffing box shall be sufficiently tight to maintain the test pressure. Visually detectable leakage through pressure boundary walls is not acceptable. There shall be no harmful inelastic deformation during or after tests. Leakage from packing shall not be the cause for rejection, if it could be demonstrated that the packing will not leak at the rated working pressure of the valve.

4.2 Back Seat Test

This hydrostatic test shall be made on gate- and globe-valves by applying pressure inside the assembled valve, with the valve ends closed, valve fully opened and either with stem packing removed or completely loose. Back seat test pressure shall be same as that of seat test pressure.

4.3 Seat Test (Air)

4.3.1 Valves shall be subjected to an air seat test at any pressure between 5.5 bar to 6.9 bar gauge. In case pressure rating is less than 5.5 bar, air seat test pressure, if specified in purchase order, shall be equal to pressure rating. There shall be no leakage during the test.

4.3.2 On valves intended for low differential pressure service or vacuum service, a low pressure air seat test shall be carried out by the manufacturer, if so specified in the purchase order. The test pressure, then shall be specified by the purchaser and witnessed by purchaser's representative, if so desired. The pressure shall be applied as given below:

- a) Globe-valves, under the disc;
- b) Check-valves, this test is not required; and
- c) Gate, plug and ball-valves, successively to each side of the closed valves. For valves designed for flow in one direction only and so marked on the valve the pressure shall be applied on the upstream side of the valve only.

4.3.3 In all cases the valve shall be in the closed position with the side not under pressure open to atmosphere for detection of leakage.

4.3.4 For valves in double block and bleed application and for valves with independent double seating, the pressure shall be applied inside the bonnet or body with the discs closed and both sides open for inspection.

4.3.5 Plug and ball-valves shall be operated from fully closed to fully open position three times to demonstrate satisfactory mechanical operation and

continued tightness after operation. It is permitted to charge sealant before testing on valves relying on sealing compound to effect seal.

4.4 Hydrostatic Seat Test

4.4.1 The seat test shall be made with seat clean and free of oil. However, if necessary to prevent galling, the seats may be coated with a film of oil of viscosity not greater than that of kerosene. This requirement does not apply to a valve in which a lubricant provides the primary seal. The seat test shall be carried out by closing the valve in the normal manner.

4.4.2 Valve shall be subjected to hydrostatic seat tests at a gauge pressure not less than 110 percent (the hydrostatic seat test pressure shall not exceed the body rating or seat rating whichever is lower) of the rated pressure at 38 °C rounded off to the next higher 1 bar increment. This shall be applied as specified in the seat test (air). There shall be no visible leakage during the test.

4.4.3 For check valves the hydrostatic seat pressure shall be applied on the downstream side. In addition to this, check valves shall also be tested on the downstream side to 25 percent of the hydrostatic seat test pressure. No leakage is permissible during these tests.

5 TEST DURATION

The specified test pressure shall be maintained for each type of test as given in [Table 1](#).

6 TEST FLUID

- a) Hydrostatic tests shall be carried out with water at ambient temperature containing water soluble oil or suitable rust inhibitor. The use of any other liquid is subject to agreement between the manufacturer and the purchaser, and the viscosity of the same shall in no case be greater than that of water; and
- b) The fluid for pneumatic tests shall be either air or inert gas. Air when used shall be free from oil as much as possible.

7 TEST CERTIFICATES

If specified by the purchaser, test certificate confirming that the valves have been tested in accordance with this standard and stating the actual pressure and medium used in the tests shall be furnished by the manufacturer.

8 SPECIAL TESTS

8.1 Fire Safe Tests

When required, and specified in the relevant Indian

Standard, these tests shall be carried out to an agreed procedure and requirement between the manufacturer and the purchaser.

8.2 Antistatic Device Testing

When required and specified in the relevant Indian Standard, these tests shall be carried out to an agreed procedure and requirement between the manufacturer and the purchaser.

9 TEST GAUGES

9.1 The gauges used for pressure testing shall be calibrated at intervals not exceeding three months by an independent competent authority, if the manufacturer does not have such facilities. The results shall be recorded and shall be liable to inspection and verification by the purchaser's representative for acceptance as and when required.

9.2 In all the pressure tests, test pressure shall be measured for the stated duration without continuous use of any input to pressure build up by mechanical or any other means,

9.3 Notes to Purchaser

Purchaser shall inform the manufacturer at the inquiry stage and in the purchase order, of the following, as some of the clause of this standard permit alternatives:

- a) Whether normal inspection is required at the manufacturer's plant (*see 3.1 and 3.6*);
- b) Whether inspection of shell components is required (*see 3.2*);
- c) Whether any special material tests and any associated test certificates are required (*see 3.4*);
- d) Whether any supplementary inspection and any associated test certificates are required (*see 3.5*);
- e) Whether a test fluid other than water is required at ambient temperature (*see 6*); and
- f) Whether valve test certificates are required (*see 7*).

Table 1 Test Duration — Seconds (Minimum)

(*Clause 5*)

SI No.	Valve Size mm	Duration s		
		<i>Shell</i>	<i>Backseat</i>	<i>Seat</i>
(1)	(2)	(3)	(4)	(5)
i)	Up to and including 50	15	15	15
ii)	65 up to and including 150	60	15	60
iii)	200 up to and including 300	120	15	120
iv)	350 and larger	300	15	120

ANNEX A

(Foreword)

COMMITTEE COMPOSITION

Chemical Engineering Plants and Related Equipment Sectional Committee, MED 17

<i>Organization</i>	<i>Representative(s)</i>
CSIR - Indian Institute of Petroleum, Dehradun	DR MRITUNJAY KUMAR SHUKLA (Chairperson)
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