INTERPLANT STANDARD - STEEL INDUSTRY

IPSS	**SPECIFICATION OF BUTTERFLY VALVES GAS AND AIR APPLICATION** (Second Revision) Corresponding IS does not exist	**IPSS:1-06-012-02** Formerly : IPSS:1-06-012-94

0. FOREWORD

0.1 This Inter Plant Standard prepared by the Standards Committee on Pipes, Fittings, Valves and Piping Layout, IPSS 1:6 with the active participation of the representatives of all the steel plants and established manufacturers of valves, was adopted in December 2002.

0.2 Inter Plant Standards for steel industry primarily aim at achieving rationalization and unification of parts and sub-assemblies used in steel plant equipment and accessories, and provide guidance in indenting stores or equipment for existing or new installations by individual steel plants. For exercising effective control on inventories, it is advisable to adopt procedure for installation as mentioned in this standard for the purpose of company standards of individual steel plants. It is not desirable to make deviations in technical requirements.

0.3 This IPSS Standard was first published in year 1986 and subsequently revised in 1994. During the usage of this standard, it was felt that certain changes were necessary to increase the effectiveness of this standard. These changes have been incorporated in this revision which are based on practical experience of the plants.

0.4 In preparation of this standard, the assistance has been derived from the following :

i) BS 5155/ISO 5752:1982(E) for face to face dimensions

ii) IS 6392:1971 for Steel pipe flanges (Amendment 1) for other flange dimension and drilling of flanges.

iii) IS 6418:1971 for cast iron flanges, dimension and drilling of flanges.

iv) IS 13095:1991.

1. SCOPE

1.1 This Inter Plant standard covers the requirement of butterfly valves used in steel plants on lines conveying gas or air for throttling or tight shut-off or low leakage purposes upto a maximum working pressure of 10 kg/cm^2 (gauge); temperature upto 200^{o}C and nominal sizes from 50 mm to 3000 mm.

NOTE: 1) This standard shall not be used for water application.

2) This standard does not cover oxygen service.

2. CLASSIFICATION

2.1 Butterfly valves shall be classified according to the purpose of use; i.e. throttling/low leakage/tight shut-off.

3. NOMINAL SIZE

3.1 The nominal size of butterfly valves means the inner diameter of valve body shell.

4. DIMENSIONS

4.1 Face to face and flange dimensions for double flanged short and wafer short type butterfly valves shall be as per Table 1 & 2 respectively. (Read Table-1 along with Fig-6).

4.2 Tolerances on the face to face dimensions given in Table 1 & 2 shall be as follows :

Nominal size (mm)		Tolerances (mm)
Over	Upto & including	
0	250	± 2
250	500	± 3
500	800	± 4
800	1000	± 5
1000	1600	± 6
1600	3000	± 8

5. VALVES END CONNECTION

5.1 A valve having flanged end connections to pipe flanges by individual bolting shall be as shown in Fig.1.

5.2 A valve for clamping between two pipe flanges using through bolts shall be as shown in Fig. 2, 3 & 4. The purchaser will specify the type of clamping arrangement while placing order depending on the conditions.

6. DESIGN

6.1 The construction/materials to be used for the body of double flanged/wafer type valve with or without replaceable lining are indicated below. The body shall be coated with Epoxy/PTFE depending upon the service conditions.

Double flanged type		Wafer type	
50-300 mm	CI body	50-300	CI body
350-600	CS/steel Fabricated	350-600	CI/CS body
700-3000	Steel fabricated body	700-1200	CI/CS body

The purchaser shall indicate his specific requirements while placing order or issuing enquiry.

6.2 Flanges shall be drilled as per IS 6392:1971 so that holes will be off centre w.r.t. centre lines unless otherwise specified by the purchaser. Tapped/through holes in flanges may be used when required by valve design.

6.3 Butterfly valves for throttling purpose (see Fig 5A) - The valves disc does not contact with body shell i.e. no stoppers in the body shell. Disc mounted at either on bush bearings or antifriction ball bearings external to the body shell, ensuring easy running. Bearings shall not be directly exposed to line medium.

6.4 Butterfly valve with low leakage (see Fig-5B) - Stoppers cum body seat ring shall be provided for shut-off purpose. All other details as per 6.2.

6.5 Butterfly valve for tight shut off (See Fig 5C) - Elastomer seal suitable for service medium temperature shall be used on the disc/body. The body seat ring shall be either overlaid with min 12% Cr welding electrode or made out of stainless steel as per ASTM-A-479 type 304/316 and welded, swaged or bolted to body. Disc mounted at the body supported by bush bearing or antifriction ball bearings fitted external to vale body shall ensuring easy running. Bearings shall not directly exposed to line medium.

7. MATERIAL

7.1 The materials for various components of valves shall be as indicated in Table-3.

8. OPERATION

8.1 Unless otherwise specified the valves of the following specifications shall be manually operated by lever:

0-2.5 kg/cm^2	2.5-6 kg/cm^2	6-10 kg/cm^2
600 NB Max	300 NB Max	250 NB Max

The purchaser shall specify the suitable means of valve operation while placing the order.

8.1.1 Unless otherwise specified, manually operated valve shall be closed by turning handwheel or lever in clockwise direction when facing handwheel or lever.

8.1.2 All gear/travelling nut operators shall be provided with suitable stopper to prevent movement of the valve shaft beyond the limit corresponding to the fully open and fully close position of the valve disc.

8.1.3 All gear/travelling but operators shall be packed with grease. Gears/travelling but operations shall be totally enclosed and weather proof for general application. For special application like oxygen service etc. where special grease is required, purchaser shall specify the same in enquiry/order.

8.1.4 All gear/travelling nut operators shall be self locking type, all lever operated valves shall be capable of locking at minimum three intermediate positions.

8.1.5 "Closing" direction arrow shall be suitably marked on the valve/gear operated body or on the handwheel.

8.1.6 The valve operator shall be provided with arrangement to indicate the disc position.

8.1.7 Whenever the electrical actuator is opted by the purchaser, the same shall have a manual over-ride facility and the following details shall be provided in the purchaser order :

i) Differential pressure across the dine (shall be the line pressure unless otherwise specified by the purchaser)

ii) Line pressure and temperature

iii) Exposure like flame-proof, weather-proof or explosion-proof with degree of protection.

iv) Type of control like "local" or "remote"

v) Electrical parameters

vi) Optional accessories needed.

9. VALVE TESTING

The testing of valve shall be carried as per IS 13095:1991 with the following additional features :

9.1 Butterfly valve for low leakage and throttling purpose.

9.1.1 Body test (Hydraulic)

i)	Test pressure	1.5 times the nominal working pressure of valve subject to minimum 1kg/cm^2
ii)	Test duration	5 minutes
iii)	requirement	No leakage through stuffing box or body joints. No permanent deformation or damage to the valve after testing.

9.1.2 Seat Test : Not applicable for throttling purpose valve.

9.1.3 Operation test :

i) Operation test shall be carried out under no flow, no load conition.

ii) Operate the valve for three times from open to close and close to open position.

iii) Requirement : Operation shall be smooth and operating parameters as per approved drawings/specifications to be ensured. Limit switch setting, wherever applicable shall be ensured.

9.2 Butterfly valve for tight shut-off

9.2.1 Body test (Hydraulic) - see 9.1.1.

9.2.2 Seat test (Pneumatic):

i) Close upstream side of valve with blank flanges with air connection and pressure gauge fitted. Rest the valve in disc closed and horizontal position, so that downstream side is facing up. Fill up water with corrosive inhibitor on the downstream side so that disc sealing contact is fully covered by water. Pressurize the upstream side by air to 1.1 times the normal working pressure limited to 6.0 kg/cm^2 minimum test pressure shall not be less than 1 kg/cm^2. There shall not be any bubble formation in the water pool which ensures valve is bubble tight.

ii) Test duration : 5 minutes.

iii) Result : Bubble tightness.

9.2.3 Operation test - see 9.1.3 (i), (ii), (iii)

10. INSPECTION

10.1 When inspection by the purchaser is specified in the purchaser order, the valve shall be inspected by the purchaser's inspector at the valve manufacturer's plant.

10.2 Unless additional inspection is specified in the purchase order inspection by the purchaser shall be limited to the inspection of the assembled valve to assure compliance with the specifications of the standard.

11. CERTIFICATION

11.1 The manufacturer shall issue the certificate for materials construction, pressure tests and compliance to the standard.

12. DESIGNATION : The valve shall be designated as given below :

Example – A butterfly valve having a nominal size of 400 mm with flanged ends shall be designated as :

BVFE 400 : IPSS:1-06-012

A wafer type butterfly valve having a nominal size of 400 mm shall be designated as :

BVFE 400 : IPSS:1-06-012

13. MARKING

The valve shall be marked with the following informations :

i) Manufacturer's name/trade mark, size, class & body material cast on body.

ii) IPSS No., and individual identification on non-corrosive plates firmly fitted on suitable place.

14. PREPARATION FOR DESPATCH

14.1 Valve shall be complete in all respect when shipped unless agreed otherwise. Each valve shall be drained cleaned and suitably protected with two coats o red-oxide on unmachined surfaces and rust preventative coats on machined surfaces for despatch in such a way as to minimize the possibility of damage deterioration during transit and storage.

Painting other than specified on the finished valves shall be as per the agreement between the manufacturer and purchaser.

14.2 Disc shall be unseated when despatched, but care shall be taken to ensure that there is no risk of damage to the disc.

14.3 The body ends shall be properly blanked to avoid entry of foreign matter in side the valve body during transit and storage.

14.4 Components shipped unattached with the valve shall be adequately protected and identified to ensure correct field assembly.

15. INORMATION TO BE FURNISHED BY THE PURCHASER AT THE TIME OF ENQUIRY / ORDER

15.1 **General Requirements**

i) Type of valve : a) Fabricated / cast with flanged ends

OR

b) Wafer

ii) Nominal size …… mm

iii) Body material: CI/CS/Fabricated

iv) Body lining, if applicable : Replaceable/Non-replaceable

v) Fluid handled ……..

vi) Working pressure (kg/cm^{2}g) class ……..

vii) Max flow/normal flow ……

viii) Temperature of medium handled …… ^{o}C

ix) Approximate operating time …. Seconds (for power operated valves)

x) Valve orientation w.r.t. pipe line.

xi) Type of actuator [manual/worm geared driven/electric (see clause 8.1.7)/ hydraulic/pneumatic]

xii) Type of service - tight shut-off/throttling/low leakage.

xiii) Direction of rotation of handwheel other than specified in standard

xiv) Orientation of handwheel/lever w.r.t. pipe oine

xv) Any other information.

16. INORMATIONS TO BE PROVIDED BY THE MANUFACTURER

16.1 The manufacturer shall also provide the data sheet indicating material of constructions and their composition as well as Weight of the valve.

17. GUARANTEE

17.1 Valves shall be warranted by the manufacturer against defective material, poor workmanship and improper design.

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