



1500mm Triple Eccentric Butterfly Valve to Metro Water Authority, Bangkok (Thailand)

Triple Eccentric Butterfly Valves

WHERE FLUID CANNOT LEAK

CLASS 150 / 300 • API 609 • MSS SP-68
WAFER • WAFER LUGGED • FLANGED

Triple Eccentric Butterfly Valves

The Fouress Triple Eccentric Butterfly Valve is a high integrity Butterfly Valve, which is particularly suitable for a variety of arduous applications. Basically, such valves can be classified into three categories:

1. Fire safe to API 607
2. High temperature
3. Other critical applications

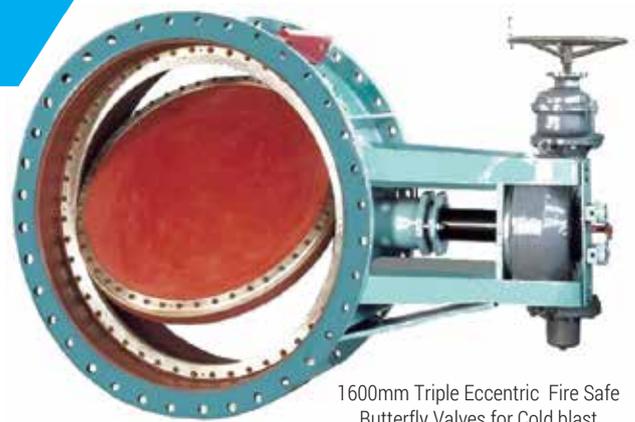
A Triple Eccentric Fire Safe Butterfly Valve is not intended for use at high temperatures during normal operation. It only has to withstand a fire and retain its sealing integrity after the fire, for a short period of time, after which the valve may be refurbished. The fire-safe testing in accordance with API 607 is a mandatory requirement for such critical applications. Conversely, a valve designed to operate continuously at elevated temperatures need not necessarily conform to the fire-safe requirements. Fire-safe valves are normally installed in pipelines carrying hydro-carbons and other flammable liquids or gases. The line fluid is generally at temperatures around ambient and the function of the valve is to prevent leakage of the line fluid either past the valve seal or to the atmosphere, where the leakage could fuel a fire external to the valve. One of the major differences between the Fouress Design and the other types of fire-safe valves is that the valve remains intact even after being exposed to fire. It does not rely on components melting and disintegrating allowing secondary seals to come into use.

'High temperature' Butterfly Valves are designed to suit specific applications and particular attention is given to the selection of the correct materials for the duty involved. The term 'High Temperature' in the context of Butterfly valves covers the range of temperatures above which traditional resilient sealed valves operate (Maximum recommended operating temperatures are approx. 110°C for Nitrile Rubber and 200°C for Viton).

The third category of Butterfly Valves is for critical applications, where for some specific reasons the use of resilient valve seals is precluded. Typical uses would be pipelines carrying solvents or other chemicals and liquids or gases containing corrosive particles.

These high technology Triple Eccentric Butterfly Valves are designed and manufactured at our Bangalore Plant and have gone through the process of development over 5 years at our R & D department.

This product is a breakthrough in Butterfly Valve design, which is not only certified as fire-safe but can also be used continuously at elevated temperatures upto 700°C.

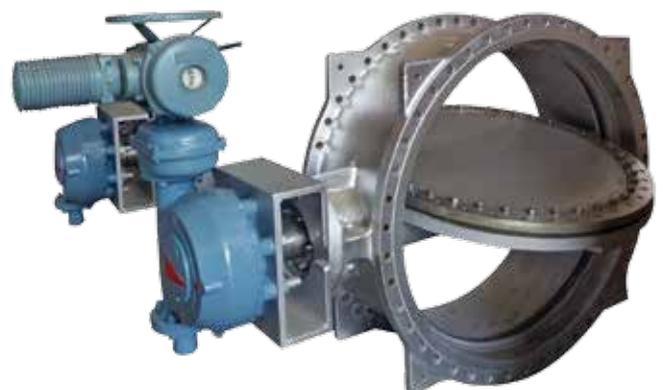


1600mm Triple Eccentric Fire Safe Butterfly Valves for Cold blast application - Vizag Steel Plant

SALIENT FEATURES

The salient features of these valves make them the ideal choice for an extensive range of high temperature and fire borne applications.

- A unique tilted cone/sphere geometry which ensures complete freedom from the problems of scuffing and pick-up, that are often experienced with many existing valves with metal to metal seal. As a result, it is possible to obtain a bi-directional tight shut off throughout the temperature range and a low operating torque range which ensures long life and high integrity on thermal cycling.
- Replaceable laminated disc seal.
- Suitable for pressure applications ranging from vacuum to 30 kgs/cm² bi-direction. Valves for higher pressure applications are also available on special request.
- Size range: From 80mm to 2100mm nominal bore
- On specific request, valves of larger sizes and/or suitable for higher temperature applications can also be supplied.
- Can be supplied either as flangeless lugged or double flanged valves to any standards as per client's requirement.
- Valves are certified as fire safe as per API 607.
- Valves can be offered with manual, pneumatic, electric or hydraulic actuators. Also, fail-safe system for emergency operation can be offered.



1200mm Triple Offset Metal Seated Butterfly Valve to M/s. Campagnie Sucriere Senegalaise, S.A.Senegal

STANDARD SPECIFICATIONS

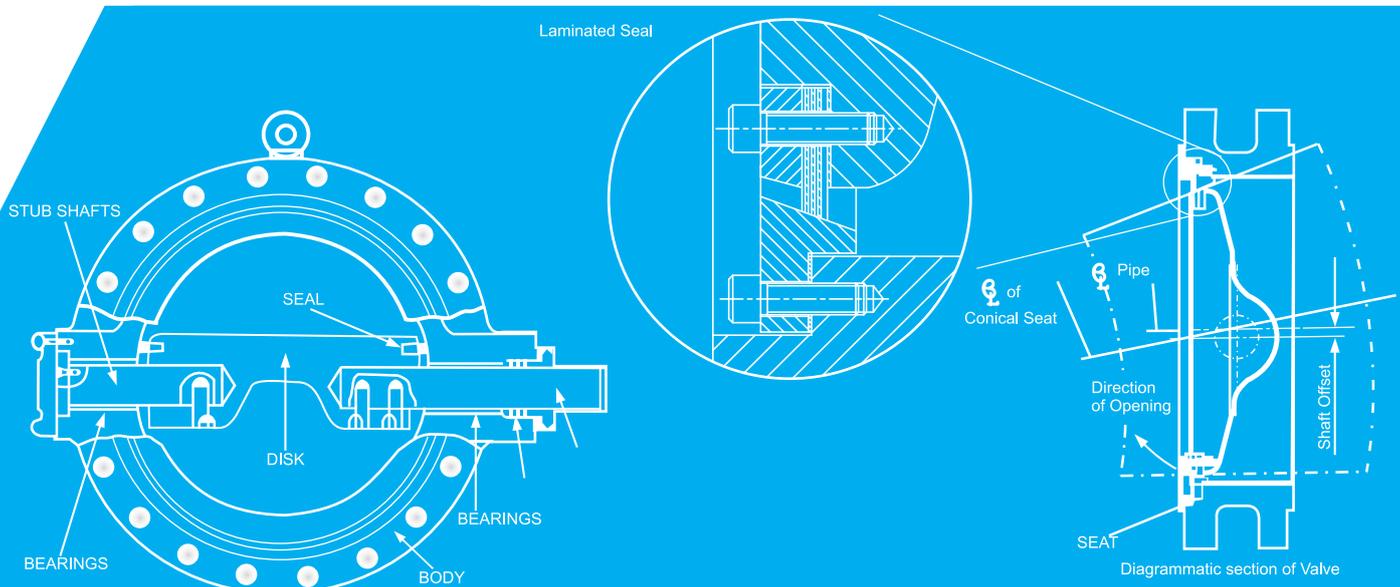
Design	API 609, BSEN 593 / ISO 5752, ANSI B16.34
Valve Size	4"(100mm) - 84"(2100 mm); Larger Size on request
Pressure Class	Class 150, Class 300
Body styles	Lugged, Double Flanged, Butt Weld End
Flanges	ANSI B 16.5 (100 MM - 600 MM) ANSI B 16.47 Series A/B (650 mm - 2100 mm)
Face to face dimension	API 609, BSEN 593 / ISO 5752
Pressure Temp. rating	ASME / ANSI B 16.34
Testing Standard	API 598, BS EN 12266



84 Inch 150 Class Triple Eccentric Fire Safe Butterfly Valves to M/s. Reliance Petroleum, Jamnagar Refinery

MATERIAL OF CONSTRUCTION

Item No.	Description	Materials for Certified fire-safe valve	Typical Materials for valve for use in steam service (up to 230°C)	Typical Materials for corrosion resistant service	Typical Material for high temperature	Typical Material for water
1	Body	ASTM A216 GR WCB/ ASTM A217 GR WC6/ ASTM A351 GR CF8/CF8M	ASTM A351 GR CF8/CF8M	ASTM A216 GR WCB/ ASTM A217 GR WC6/ ASTM A351 GR CF8/CF8M ASTM A216 GR WCB	ASTM A216 GR WCB/ ASTM A217 GR WC6/ ASTM A351 GR CF8/CF8M	ASTM A536 GR 65/45/12 BS2789 GR 500/7 ASTM A216 GR WCB
2	Disc	ASTM A216 GR WCB/ ASTM A217 GR WC6/ ASTM A351 GR CF8/CF8M	ASTM A351 GR CF8/CF8M	ASTM A216 GR WCB ASTM A351 GR CF8/CF8M	ASTM A216 GR WCB/ ASTM A217 GR WC6/ ASTM A351 GR CF8/CF8M	ASTM A536 GR 65/45/12 BS2789 GR 500/7 ASTM A216 GR WCB/
3	Stub / Drive Shaft	Stainless Steel BS970 431-S29 ASTM A479 TYPE 410/431/304/316 ASTM A564 TYPE 630	Stainless Steel BS970 431-S29 ASTM A479 TYPE 410/431/304/316 ASTM A564 TYPE 630	Ferralium Stainless Steel ASTM A479 TYPE 316 ASTM A564 TYPE 630	ASTM A479 TYPE 304/316 ASTM A564 TYPE 630	Stainless Steel BS 970/431/529 ASTM A479 TYPE 304/316
4	Seal	Laminate Of St. St. With High Performance Glass Fibre / Graphite	Laminate of St. St. With Bonded Acrylic Fibre Laminate/ Graphite Gaskets	Laminate of St. St. with P.T.F.E /Graphite Gaskets	Laminate Of St. St. With Graphite Gaskets	Laminate Of St. St. With Gasket Suitable For Potable Water
5	Seat	Stainless Steel Type 304/316	Stainless Steel TYPE 304/316	Stainless Steel TYPE 304/316	Stainless Steel TYPE 304/316	Stainless Steel TYPE 304/316
6	Bearing	NI-Resist type D2	Steel Backed P.T.F.E / NI-resist Type D2	Steel Backed P.T.F.E	NI-Resist Type D-2	Leaded Bronze / Steel Backed P.T.F.E / Bronze Backed P.T.F.E
7	Gland Packing	GRAFOIL	GRAFOIL	P.T.F.E	GRAFOIL	'O' Ring-NBR/EPDM or P.T.F.E Packing



FIRE SAFE TESTING

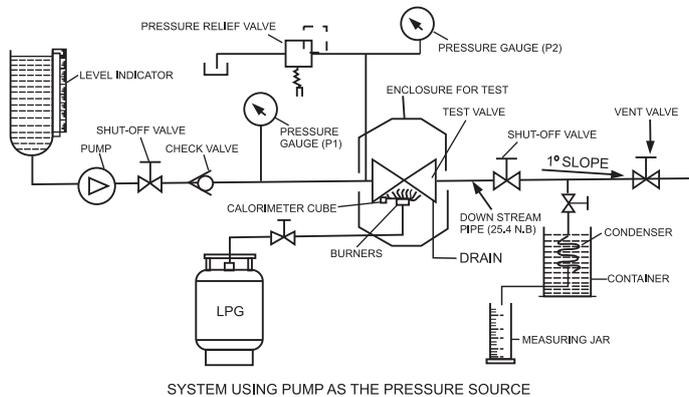
This test method establishes the pressure-containing capability of a valve during and after the fire test. The test exposes a valve in the closed position, filled with water under pressure, to flames with an environmental temperature of around 760°C in the area of the valve; to establish the leakage through the valve and externally to the atmosphere during this period. After cooling down the valve from the fire test, the valve is hydrostatically tested to assess the pressure-containing capability of the shell and valve seats.

TEST SET-UP

The overleaf sketch gives the details of the test set-up. Pump is used to pressurize the upstream side of the test valve. Pressure relief valve is mounted to ensure that the system pressure does not exceed a set value. The test valve is mounted horizontally along with the gear box. Calorimeter cubes and flame environment thermocouples are located. Downstream of the valve is connected to a condenser, and a graduated container collects the condensed water.

TEST CONDUCT

- With the test valve in partially open condition, open the water supply and flood the system with water and purge air completely.
- Close the supply valves, vent valve and test valve, Then downstream of the test valve is drained completely.
- Now the upstream of the valve is pressurized to 14.5 bar $\pm 10\%$ (Tolerance on test pressure as given in table no.1 of API-607 standard).
- Open the fuel supply and establish the flame. Monitor the flame temperature as indicated by the thermocouples and also monitor the environment temperature range of 760°C to 980°C (min. 705°C) as indicated by the calorimeter cubes.



- Temperature and pressure reading are recorded every two minutes.
- At the end of 30 minutes test duration, the fuel supply is stopped. Immediately the amount of water collected in the container is recorded to establish the total leakage through valve seat during the burning period.
- Now the test valve is allowed to cool down naturally to 93°C, or below. Record the time taken to cool the external surface of the valve to 93°C.
- Record the external leakage if any.
- Reduce the system pressure to a low test pressure of 2.0 bar leakage through the valve and external leakage is measured for a period of 5 minutes, by recording the amount of water collected in the calibrated measuring jar.
- The system is now raised to the test pressure of 14.5 bar. The test valve is operated against this pressure through one full cycle (close-open-close) by closing downstream shut-off valve. The maximum torque required to operate the valve is recorded.
- Now with the test valve in open position, increase the system pressure to the test pressure of 14.5 bar. The external leakage for a period of 5 min. is measured and recorded.



8 inch Triple Offset Fire Safe Butterfly valves to Mezagaon Dock for Aviation fuel

We have successfully tested our valves for fire safety as per the above procedure from 100mm to 600mm which qualifies Fouress to supply Fire Safe Butterfly valves from 80mm to 1200mm as per API-607 & BS 6755 PART – II.



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