FHT VALVES
FLOW EXPERIENCE

REV.0 APR 22

3 WAY BALL VALVE

CATALOGUE

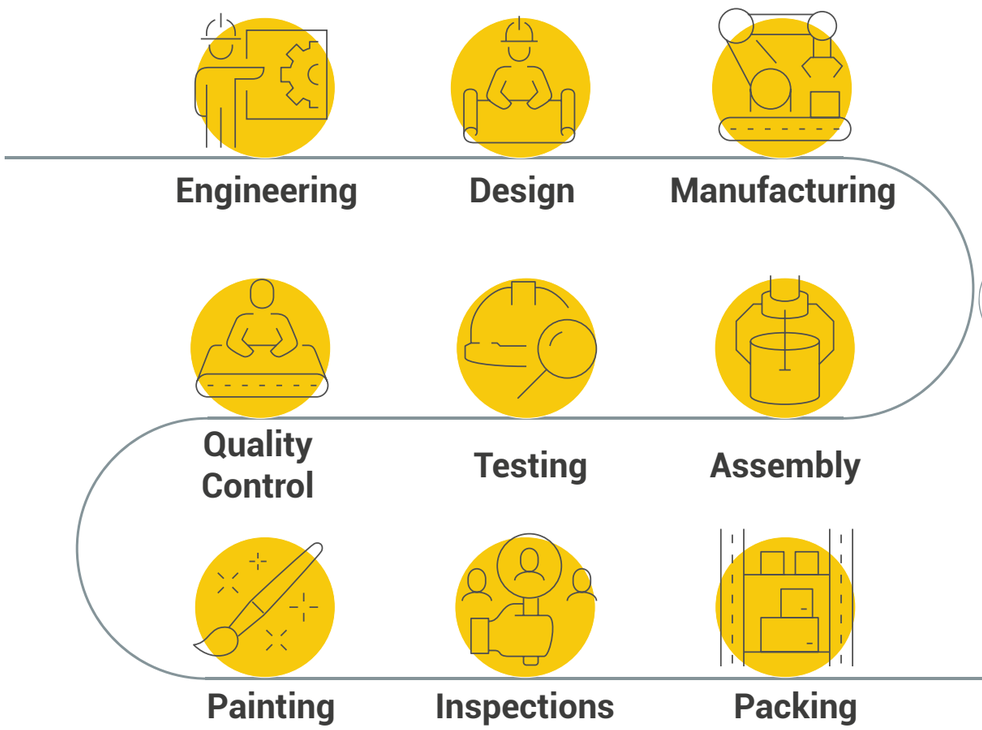
www.fhtvalves.com

COMPANY

FHT is a state-of-the-art factory, manufacturing high quality ball valves since 1997. Our roots go back to the first historical manufacturers and German designs. Using our experience in the field of chemical industry through the years, we improved those designs, to reach the best possible quality valves and highest performance.

During these years we have expanded our scope of production and developed the strategy to be present worldwide. Our factory is close to reaching perfection in quality with no NC from our clients nor accidents in our workshops. We are increasingly focused on clean processes such as hydrogen and green energies as well as the rest of the industries such as CHEMICAL, PETROCHEMICAL, HYDROGEN, OIL & GAS, POWER, PULP & PAPER, WATER, SHIPBUILDING.

We are putting our experience and know-how to the service of the industries and the safety of processes.



SATISFIED CUSTOMER

CHEMICAL, PETROCHEMICAL , HYDRO EEN ENERGIES, PULP & PAPER, WATER, SHIPBUILDING

QUALITY

FHT became the symbol of high quality and best performance valves. We work to deliver the best quality valves and the highest standards.

PRODUCT CERTIFICATES	
TA - LUFT	STEM TIGHTNESS FOR GAS EMISSIONS
SIL	SIL 3 CAPABILITY EN 61508:2010 FOR FLOATING AND TRUNNION
ATEX	EUROPEAN DIRECTIVE 2014/34/EC
ISO 15484-1	FUGITIVE EMISSION TEST ACC. ISO 15848-1:2006
FIRE SAFE	BS 6755 / EN-ISO 10497 / API 607
AD 2000 MERKBLATT	AD 2000 MERKBLATT W 0 / A 4
API MONOGRAM	STANDARD API 6D - 0613
CE 0036	MODULE H, DESIGN, MANUFACTURE AND SALE

COMPANY CERTIFICATES	
ISO 9001	QUALITY MANAGEMENT SYSTEM
ISO 14001	ENVIRONMENTAL MANAGEMENT SYSTEM
API MONOGRAM	API Q1, QUALITY MANAGEMENT SYSTEM

FHT DELIVERS THE FOLLOWING CERTIFICATES

- Mill certificate 3.1
- Hydro-static certificate 3.1
- Functional test certificate
- 3.2 certificate upon request
- ITP upon request
- Third Party Inspections
- API
- CE
- FIRE SAFE
- ISO 9001
- Fugitive Emission
- Atex
- SIL certificate and SIL calculation upon request.
- All types of NDEs
- PAS 1085
- EN 161

CHEMICAL, PETROCHEMICAL , HYDROGEN, OIL & GAS, POWER, GREEN ENERGIES, PULP & PAPER, WATER, SHIPBUILDING

RANGE OF PRODUCTION SUMMARY

MAIN RANGE

DIN & ANSI STANDARDS

SIZE: ANSI FROM ½" UP TO 56"
DIN: DN 15 UP TO DN 1400

PRESSURE ANSI: CLASS: 150, 300, 600, 800, 900, 1500 AND 2500
DIN: PN 10 UP TO PN 420

FULL BORE AND REDUCED BORE

END CONNECTION FLANGED RF, RTJ, FF, WELDING ENDS AND THREADED

CONSTRUCTION SIDE ENTRY, SPLIT BODY, 2 PIECES, 3 PIECES, FULLY WELDED & TOP ENTRY

SEATS SOFT SEATS AND METAL SEATS

2 WAYS, 3 WAYS AND 4 WAYS

TEMPERATURES HIGH TEMPERATURE (500ºC), NORMAL TEMPERATURE, AND CRYOGENIC (-196ºC)

MATERIALS CARBON STEEL, STAINLESS STEEL, DUPLEX, SUPER DUPLEX, MONEL, INCONEL, TITANIUM, ALUMINIUM-BRONZE AND ANY SPECIAL MATERIAL UNDER REQUEST.

CERTIFICATES API, ISO 9001; ISO 14001, ATEX, CE, SIL, AD MERKBLATT, TA-LUFT, PAS 1085, EN161, ...

MANUAL VALVES, ON/OFF VALVES, ESDV, MOV AND TAILOR-MADE AUTOMATION

FLOATING SOFT SEATED
TWO PIECE
112·INTEC
Double Packing & Double Stem Seal

113GL·INTEC
Double Packing & Double Stem Seal, Spring Loaded

115 ·INTEC
Autoadjustable Packing

125·INTEC
Autoadjustable Packing, Friction-Free Shaft

125GL·INTEC
Autoadjustable Packing, Friction-Free Shaft, Spring Loaded

130·INTEC
Autoadjustable Packing, Threaded Ends

131 - INTEC
Autoadjustable Packing, Welding Ends

TRUNNION SOFT SEATED
TWO PIECE
115G·INTEC
Autoadjustable Packing, Spring Loaded

117G·INTEC
Protected Seats & Spring Loaded, Autoadjustable Packing

THREE PIECE
115G-3P·INTEC
Autoadjustable Packing, Spring Loaded

117G-3P - INTEC
Protected Seats & Spring Loaded, Autoadjustable Packing

FLOATING METAL SEATED
TWO PIECE
114·INTEC
Autoadjustable Packing, Spring Loaded

TRUNNION METAL SEATED
TWO PIECE
116G·INTEC
Autoadjustable Packing, Spring Loaded

118G·INTEC
Protected Seats & Spring Loaded, Autoadjustable Packing

THREE PIECE
116G-3P - INTEC
Autoadjustable Packing, Spring Loaded

118G-3P - INTEC
Protected Seats & Spring Loaded, Autoadjustable Packing

3 WAYS TRUNNION SOFT SEATED
120·INTEC
Autoadjustable Packing, Spring Loaded

3 WAYS TRUNNION METAL SEATED
121·INTEC
Autoadjustable Packing, Spring Loaded

TANK BOTTOM SOFT SEATED
TWO PIECE
112FC·INTEC
Double Packing & Double Stem Seal

113FC·INTEC
Double Packing & Double Stem Seal, Spring Loaded

TANK BOTTOM METAL SEATED
TWO PIECE
112FCM- INTEC
Double Packing & Double Stem Seal

BRONZE FLOATING SOFT SEATED
TWO PIECE
310 - LB
Simple Packing

BRONZE FLOATING SOFT SEATED
THREE PIECE
311 - LB
Simple Packing

BRONZE 3 WAYS FLOATING SOFT SEATED
THREE PIECE
320- LB
Double Packing & Double Stem Seal

SOFT SEATED THREE WAYS TRUNNION

120 - INTEC

AUTOADJUSTABLE PACKING, SPRING LOADED

STANDARDS	
DESIGN	EN12516-1&2 ANSI B16.34 & API 6D
FACE TO FACE	ASME B16.10/EN 558-1
FLANGED ENDS	ASME B16.5/EN 1092-1
TOP FLANGE	ISO 5211
PRESSURE TESTS	EN12266-1/API 598/API 6D
VISUAL INSPECTION	MSS-SP-55

MAIN FEATURES
3 Ways One piece body Flanged Ends Full bore Trunnion ball Soft seat Pressure relieving seats Anti blow out stem Antistatic device Locking device Fire Safe Autoadjustable Packing

METAL SEATED THREE WAYS TRUNNION

121 - INTEC

AUTOADJUSTABLE PACKING, SPRING LOADED

STANDARDS	
DESIGN	EN12516-1&2 ANSI B16.34 & API 6D
FACE TO FACE	ASME B16.10/EN 558-1
FLANGED ENDS	ASME B16.5/EN 1092-1
TOP FLANGE	ISO 5211
PRESSURE TESTS	EN12266-1/API 598/API 6D
VISUAL INSPECTION	MSS-SP-55

MAIN FEATURES
3 Ways One piece body Flanged Ends Full bore Trunnion ball Metal seat Pressure relieving seats Anti blow out stem Antistatic device Locking device Fire Safe Autoadjustable Packing

3 WAY BALL VALVES

A 3-way valve is an industrial valve with a steady flow rate used for diversion or mixture of applications. It's also known as a multiport valve because of its three openings which can be connected to tubing for the flow of liquid or gas. These openings in the 3-way valve types either come as two inlets and one outlet, or one inlet and two outlets. This is determined by the connection application.

The rate of flow in the different valves remains steady despite being a multiport valve. A constant flow rate is maintained in any application where the valve is used even though the liquid or gas will be split into two separate openings.

The structure of this valve allows one open orifice with the other one closed or vice versa. This makes it easy for the device to be used for pressure application as an option to exhaust pressure from a valve actuator or a single-acting cylinder. 3-way valves are normally opened, closed, or universal.

This mechanism devised by the valve allows it to provide a convenient way of moving the flow of liquid or gas from one point to another.

Furthermore, the mechanism of the 3-way valve also makes it inexpensive, allowing its users to save money by eliminating the use of conventional gate valves and bypass appliances often used in steam generating plants. Not only does it eliminate conventional 3-way globe valves, it also shut-off control in one single valve body and provides flow direction. A 3-way ball valve works by turning the handle, which rotates a ball valve in the valve body , to align the cut-out channels in the ball with the inlets and outlets of the valve. The “L” shape cut-out of the ball on an L-port valve sends fluid through 90 degrees from one port to another. The “T” shape cut-out of the ball on a T-port valve can also send from one port to another, but can also be rotated so that the T aligns with the “T” shape of the valve and all three ports are mixed.

The best type of 3-way ball valve for your application depends on whether you foresee a need to shut off all ports at any stage of operation or mix all three flows. If there is a requirement to close the valve completely, then you should choose an L-port. If there is a requirement to mix all three flows, then you should choose a T-port.

Three-way ball valves are used in applications with more than one pipe or to divert fluid in two different directions. Depending on the direction of flow, the three ports are assigned as one output and two inputs or one input and two outputs.

Three-way ball valves have three ports and can be operated manually or automated. The hole through the ball comes in two varieties: port “L” and “T”. Three-way valves can:

- Cut or close the flow
- Change the flow between two different sources
- Combine the flow from two different sources
- Alternative flow between two different destinations
- Divert flow from one source to another destination
- Split flow from one source between two output destinations

The 3-way ball valve, like other ball valves in the multiport valve family, has its types. It is therefore important to know them.

There are two major types of three-way valves: The T-port valve and the L-port valve. They are named after their shape, and their usages are dependent on the function you want them to perform. The T and L shapes refer to the opening in the middle of the 3-way ball valves.

T-PORT 3-WAY BALL VALVE

The T-port valve is thus named because it has a T shape. It is also called the 180-degree ball. This ball valve type can merge two inlet flows into one outlet port. Depending on the system requirements, it can also split one inlet into two outlet flows.

The T-port 3 way valves are commonly used to split the flow of gas and liquids. Based on the permissible range of the handle motion and the system's requirements, the T-port 3 way ball valve can be used in splitting or mixing flow, diverting flow, and enabling a straight flow.

In addition, the T-port valve can not only flexibly control the merging or diverging of the medium in the pipeline, but also make the three channels communicate with each other.

GENERAL APPLICATIONS FOR 3-WAY T PORT VALVE

The 3-way ball valve T port can be used to connect the openings in a pipeline, allowing for different inlet and outlet flow patterns. Generally, the 3-way ball valve T-port valve is preferred in most cases as it allows for multidimensional flow patterns, unlike the L-port valve which seems to be non-dimensional.

The T-port valve ensures a straight flow through the valve when it is in one position with little or no loss of pressure and diverts to another direction when the position is changed.

The 3-way ball valve T-port valve can have up to two paint sprayers simultaneously alongside the three ports connected.

L-PORT 3-WAY BALL VALVE

The L-port 3 way valve is also called the 90 degrees ball. This ball valve allows the flow of liquid or gas from one inlet into one of the two separate outlets. Its mechanism in the L port 3 way ball valve gave it the name “diverter valve”. Unlike the T-port valve, the L-port 3 way ball valve diverts or coordinates flow in one direction.

It can restart, restrict or shut off the flow, unlike the T-port valve. The handle of the valve has its ranges in 90 degrees i.e it's calibrated in 90 degrees, 180 degrees and so on until it gets to 360 degrees. However, whatever angle it takes, the direction is in one way.

The L-port ball valve is quite useful in applications where more than one source is used in drawing liquid or gasses into another pipe.

There's the double L-port ball valve which is a 4-way valve used to confirm flow with 4 pipes connected to a valve. There are also flanged valves which have their ends flanged in order to connect to any pipe either with a bolt or by welding.

GENERAL APPLICATIONS FOR L-PORT 3-WAY BALL VALVE

The L-port way valve is used in applications that need a diverter. This is because it can divert flow from one primary source to another. This valve also allows simple switching between pumps, i.e, switching liquid or gas from one pump to another.

In addition, the L-port 3-way valve allows diverting flow from and between storage tanks as well as from cooling to chilling.

The 3-way T-port valve and the L-port valve are the main categories of the 3-way ball valve, which also entails the following:

Generally, an open valve allows flow from two ports, while sealing the other port known as the stop orifice. The open valve allows flow from one orifice (known as the body orifice) through the valve and out through the other orifice (known as the cavity port).

This can happen vice versa meaning that another orifice can be sealed and the other two become the inlet and outlet depending on the system requirements. The open valve always has one opening.
Usually closed valves operate like the open valve. In the system of a usually closed valve, one orifice (the body orifice) is sealed off leaving the other two orifices (the cavity port and stop port) open. This allows flow from the cavity port through the valve and out the stop port.

The system requirements change the inlet and outlet just like in the open valve (the stop orifice can be sealed off allowing flow from the body orifice through the valve and out of the stop orifice). The closed valve always has one orifice closed.

The directional control valve operates a little bit differently from the generally open and closed valve. The directional control valve allows for two ports of flow. When the stop orifice is sealed off, the body orifice is responsible for directing the line of flow through the body of the valve.

Several industrial valve manufacturers believe that the 3-way valve is one of the most used valves as it gives room for different system requirements, allowing different styles of flow in a pipeline or in whatever system it is applied.

ADVANTAGES OF THE 3-WAY BALL VALVE

It is important to note that the design of the valve determines the style and flow pattern in a system. The advantages of the 3-way ball valve cannot be overemphasized as it does not just fit into any system but can perform more than one function.

Below are some of the various advantages of the 3-way ball valve.

- Has a simple structure with low volume.

- Is the most cost-effective among other types of valves. This is because it can perform more than one function depending on the system requirements.

- Has low media resistance.

- Can mix up two different media types given that there are three ports in the valve.

- Can divert the direction of flow from one point to another considering it has reliable sealing.

- Can split the flow of any type of media into two different directions.

- Can stop the flow of one media in a particular direction and allow another media to flow in that same direction.

- Has a wide range of applications

- Can clean itself by eliminating erosion to the seat caused by high speed fluid and washing away accumulated things on the sealing face.

- Can operate conveniently with the valve opening or closing rapidly. It can only be open or closed completely by turning 90 degrees.

- Has the ball and sealing face of the seat separated from the medium when the valve is completely opened or closed.

3-WAY VALVE FUNCTION

As stated earlier, 3-way valve function is largely dependent on the system requirements. Since it can be used for a wide range of applications, the functions will be dependent on what is required of the valve in the system where it is applied. Some of such functions include:

- Shutting off the flow of liquid or gas (media) in a piping system.

- Opening the flow of liquid or gas in a piping system.

- Mixing of liquid or gas from two different pipes.

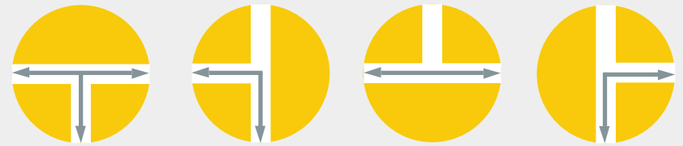
- Diverting flow of liquid or gas in the valve.

- Mixing of two different media in a piping system.

These and more are determined by the system requirements, thus the design of different types of 3-way ball valves.

HOW DO THEY WORK?

T



L

MAIN INDUSTRIES

PETROCHEMICAL

SOLVENTS, DRUGS, PESTICIDES, EXPLOSIVES, SYNTHETIC FIBRES AND RUBBERS, PAINTS, EPOXY RESINS, FLOORING AND INSULATING MATERIALS, ...

CRYOGENIC & HYDROGEN

CRYOGENIC & HYDROGEN SERVICES; STATIONARY TANKS, FUEL STATIONS, GAS INDUSTRY,

PHARMA

MEDICATIONS, VACCINES, MAINLINE, GENERIC, RESEARCH & DEVELOPMENT, HOMEOPATHIC, COSMETICS, ...

ENERGY

WIND MILLS, SOLAR, GEOTHERMAL, RENEWABLE ENERGY STORAGE, HYDROPOWER, BIOMASS, ...

PULP & PAPER

PULP, PAPER, PAPERBOARD, CELLULOSE DERIVATIVES.

WATER

WATER TRANSMISSION SYSTEM, DESALINATION, WATER AND WASTEWATER, WATER TREATMENT, ...

MARINE SERVICES

SHIPBUILDING, FPSO, TANKERS, MILITAR SERVICES, OFFSHORE, ...

FEATURES & OPTIONS

V-PORT

For reliable flow control applications. When more precise control is required with the simplicity and sealing features of a ball valve. Standards 15°, 30°, 60°, 90° V´s are cut into the ball for diverse CV's and control requirements either in soft seated or metal seated ball valves.

ANTISTATIC DEVICE

To ensure electrical continuity between ball-stem and body.

CAVITY FILLER

Specially designed to avoid dead spaces inside the valve to prevent corrosion. This feature is a must in many applications on the chemical industry and solids handling.

DOUBLE BLOCK & BLEED

Double Block and Bleed reduces the risks of product contamination, which is why many Oil & Gas companies have adopted the practice as mandatory when working on field equipment.

EMERGENCY SEAT SEAL SYSTEM

Special sealants may be injected into fittings to restore sealing integrity if seat sealing surface is damaged.

SPRING LOADED SEATS

The “Spring Loaded seats” design ensures automatic pressure cavity relief and a constant operating torque not influenced by temperature fluctuations.

LIP SEAL

For applications where elastomeric O´rings are not reliable, different types of lip seals are used. Lip Seals are self energised seal systems, made of a Teflon and a spring. The spring provides the initial load (due to the low elasticity of Teflon), while the fluid pressure provides the load to force the lips on the sealing surfaces.

SELF ADJUSTING

The double cone shape packing is loaded with a set of two Belleville springs which ensures a constant operating torque and prevents stem leaks during the whole life of the valve in service. This design provides highest protection against fugitive emissions even after a high number of cycles. ISO 15848-1 Fugitive emissions requirements fulfilled.

ANTI-BLOW OUT PROOF STEM

Designed with integral “T”-type shoulder. The stem and the double cone shape stem packing are internally inserted to provide blow-out proof safety and to ensure tightness at all pressures. This design provides highest protection against fugitive emissions even after a high number of cycles. ISO 15848-1 Fugitive emissions requirements fulfilled.

METAL TO METAL

In Metal seated ball valves for high temperature services, where elastomeric seals are not suitable, this design with double graphite seat seal allows reaching higher temperatures.

SEALING INJECTION SYSTEM

The sealant injection system located on the body can be utilized in case of emergencies, o-ring damage, or if stem leakage occurs.

BALANCING HOLE FOR PRESSURE

The ball with a balance hole prevents pressure from being stucked within the body cavity.

Your clever choice

100% EUROPEAN MANUFACTURING

www.fhtvalves.com