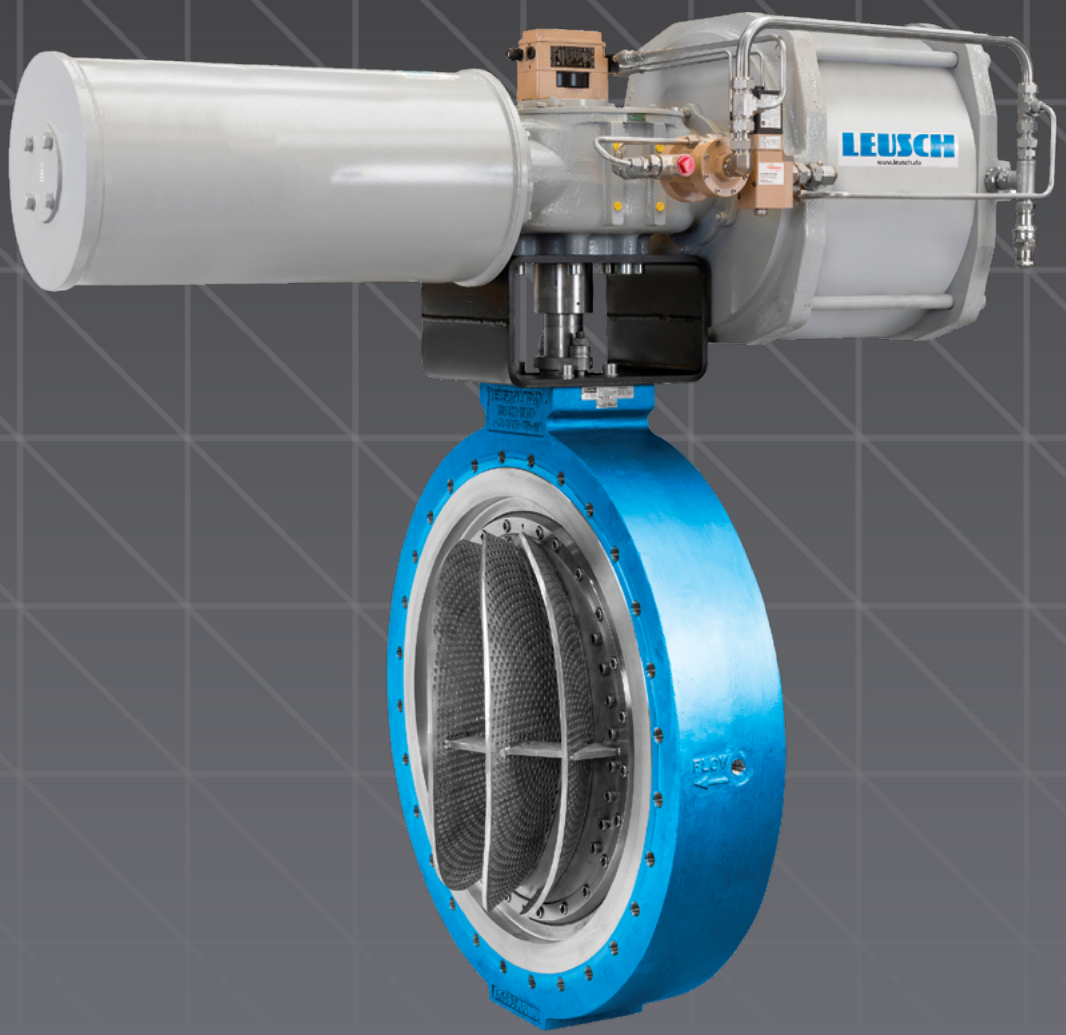
TRIPLE OFFSET BUTTERFLY VALVE

TYPE LTR 43



SMART IN FLOW CONTROL

FEATURES AND BENEFITS

Excellent Controllability

Specially machined and polished shaft reduces friction, hysteresis, and torque requirement.

Replaceable Body Seat (yellow)

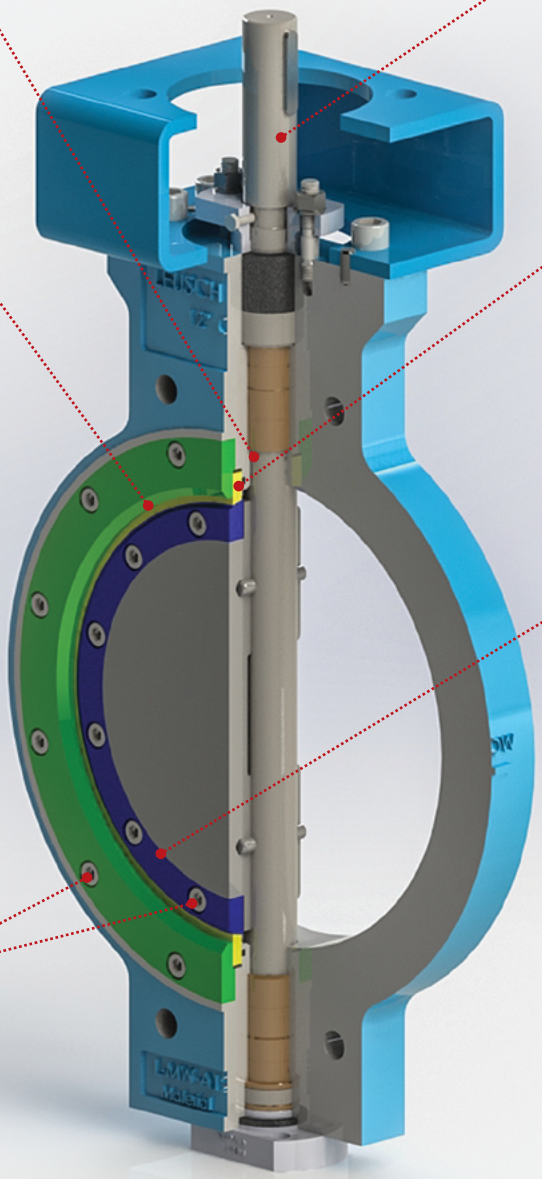
In addition to the disc seal, the body seat can be easily replaced in the field. Many competing triple offset butterfly valve designs utilize an integrated seat, requiring repairs to be done in a specialty machine shop.

Large Sealing Surface Area

The large sealing surface of the seat and disc seal ring guarantee bi-directional tight shutoff, even at high pressures.

Secured Fasteners

Internal fasteners are secured with special washers. Ensuring that the sealing system is not compromised while maintaining a user friendly and serviceable design.



Retained Shaft

An external shaft retainer located outside of the process medium increases product safety by preventing shaft blow-out.

Cryogenic & High Temperature

The laminated seat design provides for slight flexibility, this maintains a tight shut-off even in extremely low or high temperatures.

Replaceable Disc Seal ring

Like the body seat, the disc seal ring is also field replaceable. This allows for a dependable tight seal and a longer service life.

Large Shaft and Shaft Bearings

A large shaft and replaceable shaft bearings provide long term reliability and reduced torque requirements.

OTHER BENEFITS

- A standard design with high quality materials, suitable for fire-safe applications at no extra cost.
- The standard LTR 43 valve can be used for up to Safety Integrity Level III applications acc. to IEC 61508.
- A valve designed and built for maximum service life, providing for a low total cost of ownership.

Triple Offset Butterfly Valve

EVOLUTION

1 CENTRIC BUTTERFLY VALVE

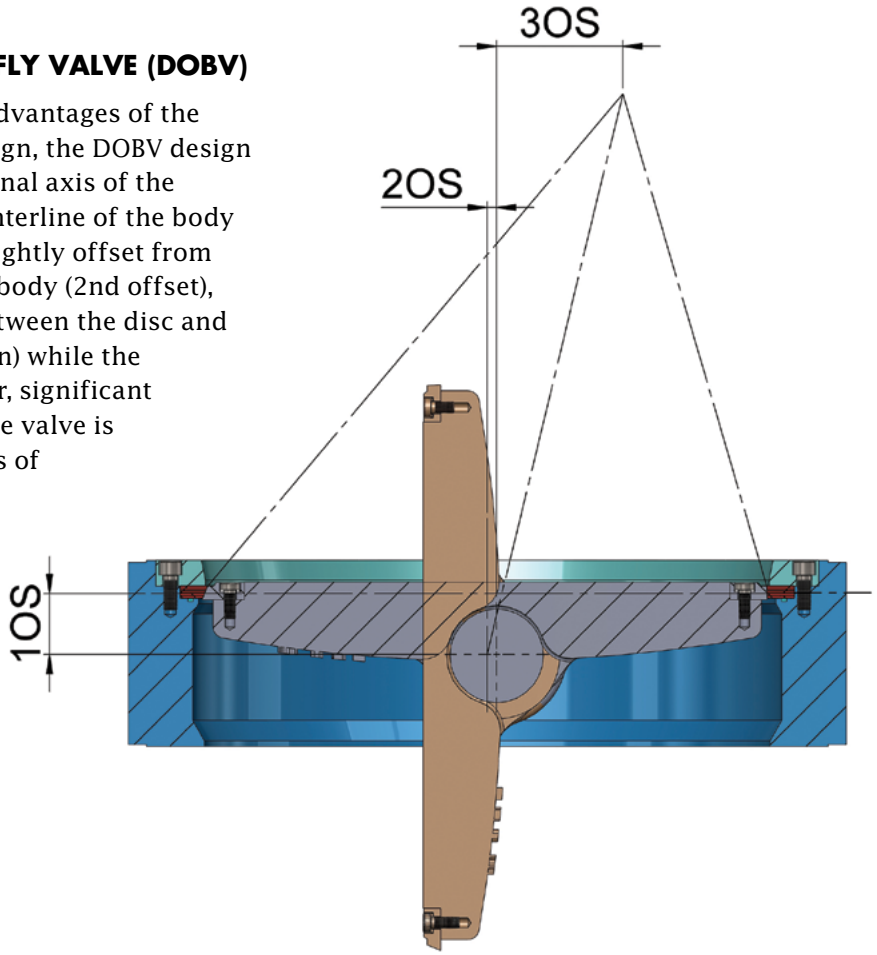
The first butterfly valve was designed in such a way that the body, shaft, and seat all shared the same axis. The disadvantage of this early design is that it creates significant friction between the disc and seat during the opening and closing operation.

2 DOUBLE OFFSET BUTTERFLY VALVE (DOBV)

To eliminate the main disadvantages of the centric butterfly valve design, the DOBV design was developed. The rotational axis of the disc was set behind the centerline of the body seat (1st offset) and also slightly offset from the centerline of the valve body (2nd offset), eliminating any contact between the disc and body (and therefore friction) while the valve is operating. However, significant friction still exists when the valve is within the first few degrees of opening/closing.

3 TRIPLE OFFSET BUTTERFLY VALVE (TOBV)

A further improvement on the DOBV design, the TOBV adds a third offset in which the geometrical design of the seating system forms a conical shape with respect to the centerline of the body (3rd offset). This allows the disc to immediately lift off the seat and eliminates any friction at small opening angles. This also allows for a larger sealing surface, providing better overall shut-off.

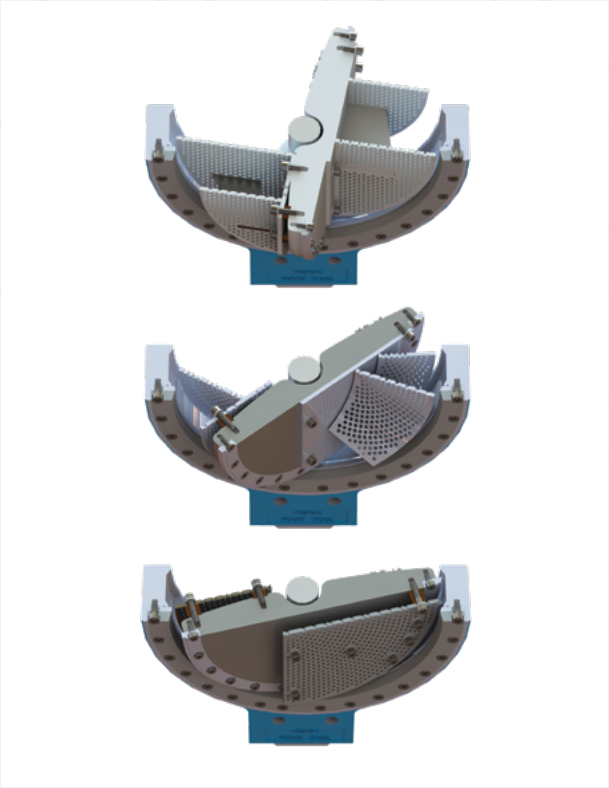


DESIGN BENEFITS OF A TRIPLE OFFSET BUTTERFLY VALVE

- Reduced wear and tear
- Lower actuator torque requirement
- Tight shut-off achievable over a longer service life

SPECIAL APPLICATIONS

Cavitation, Flashing and High Noise



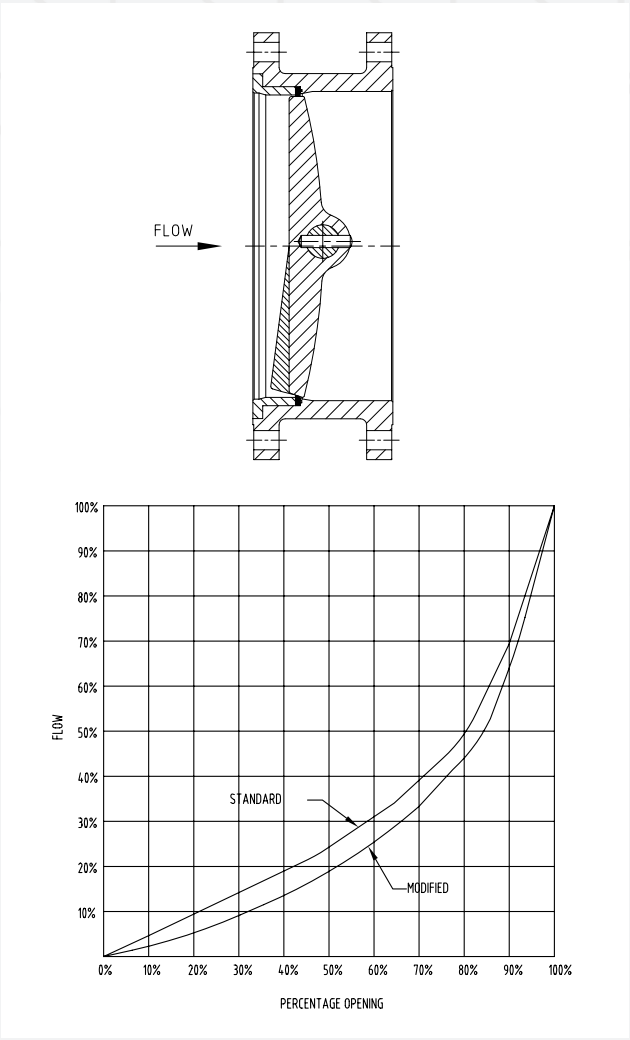
CHALLENGES

- Cavitation bubbles form during throttling in the vena contracta and subsequently implode.
- High velocity of liquid droplets during flashing and partial flashing.
- Noise emissions generated through high pressure drops in gases, and cavitation in liquids.
- Cavitation, flashing, and excessive noise can cause damaging vibration of the valve, pipeline, and other components in the system.

SOLUTIONS

The specially designed anti-cavitation trim plate ensures that the pressure in the vena contracta does not fall below the vapor pressure. The flexibility of this trim design combats challenging process conditions, and up to a 10 dB(A) noise reduction can also be achieved.

Special Trim Modification for Start-up and Minimum Flow Service



CHALLENGES

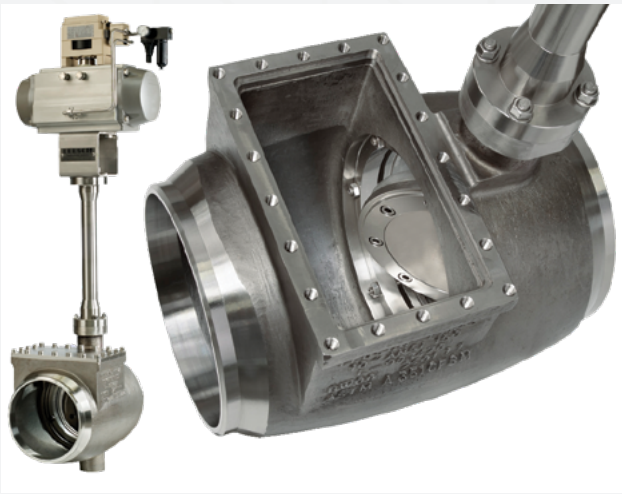
The optimal control range for butterfly valves is between 8˚ and 64˚. Significant challenges arise during plant startup and commissioning where opening angles can be as low as 2˚.

SOLUTIONS

A specially designed trim alters the characteristic of the disc in the lower operating angles without affecting the overall flow capacity of the valve. This eliminates the need for smaller start-up or bypass valves.

SPECIAL APPLICATIONS

Cryogenic Applications



CHALLENGES

Internal valve leakage and sticking problems caused by material contraction from extremely low temperatures.

SOLUTIONS

The use of high quality materials and precision machining allows for the strict tolerances required in cryogenic applications; operating conditions down to -320˚F (-196˚C) can be achieved. SAMSON Leusch LTR 43-2 & LTR 43-4 valves have been successfully tested under cryogenic conditions in sizes up to 36" and ANSI Class 600 (acc. to BS 6364).

Solid Particles in Liquids & Gases

CHALLENGES

Particles entrained in the operating medium can find their way into the shaft bearing, potentially causing difficulty in control or damage to internal valve components.

SOLUTIONS

- An optional metallic bearing protector ring welded on the inside of the valve prevents particles from entering the bearing area.
- The LTR 43 inner packing/outer bearing design utilizes the soft packing to block the ingress of particles, thereby protecting the shaft and bearing from damage. This proven solution is also used for aggressive media where bearing materials can be limited.

Other Special Options

- NACE Version according to ISO 15156 / MR0103 / MR0175
- Noise and cavitation reducing discs
- Version for high cycle counts
- Emergency shutdown & blowdown valves with fast stroking speeds (<0.3s)
- Heating jacket to maintain ideal process fluid temperatures
- Top Entry design for LNG and other special applications
- Streamlined disc design for reduced pressure loss under maximum flow conditions
- Double packing with drainage line
- Live loading packing for emissions reduction
- Low emission packing acc. to ISO 15848-1 and TA-Luft
- Electric and pneumatic actuators (Scotch Yoke, Rack and Pinion, Diaphragm type)

TECHNICAL DETAILS

Valve Size	NPS 3” to 100”
Pressure Rating	ANSI Class 150 to 2500
End Connections	■ Lugged ■ Flanged ■ Wafer ■ Standard Butt-weld and Top Entry Butt-weld
Materials	■ Carbon Steel (A216 WCC) ■ Stainless Steel (A351 CF8M) ■ Low/High Temperature Steels (LCC/LC3/WC6/WC9) ■ Special Alloys (Duplex, Monel, Titanium, etc.)
Temperature Range	-320 to 1832˚F (-196 to 1000˚C)
Internal Leakage Rate	Class VI according to ANSI/FCI 70-2 , API 598 & IEC 60534-4
Fire Safe	According to API 607, API 6FA, and BS 6755 Part 2

GENERAL INDUSTRIES

Chemical/Petrochemical, Oil & Gas (upstream, midstream, & downstream), Refining, Power generation, Industrial gases, Steel production, Desalination plants, Renewable energy (solar, geothermal, and hydro), Shipyard, Aerospace, Cryogenic, etc.

APPLICATIONS

Gas: Natural gas, Syngas, Oxygen, Hydrogen, Nitrogen, Air, Carbon dioxide, Flue gas, Coke oven gas, Flare gas, Sour gas, Acidic gas, Steam (saturated and superheated), Ethylene, Methane, Ammonia, etc.

Liquid: Hydrocarbon (diesel, crude oil, naphtha, jet fuel, kerosene, gasoline etc.), Sea water, Waste water, Heat transfer fluid, Thermal oil, Molten salt, etc.

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