BUTTERFLY VALVES

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BUTTERFLY VALVES

APPLICATIONS

Drip tight shut off valve on piping systems, hydroelectric power plants and waterworks.

Flow regulation in waterworks.

Guard valve automatically operated to protect from flooding in case of pipe burst.

GENERAL CHARACTERISTICS

The butterfly valve, conceived several decades ago as shut off valve on pipings of large diameter, has become more and more the most reliable and widely used valve for shut off and flow regulation for various types of fluids in many types of plants.

These valves are used in water-distribution systems, aqueducts and irrigation nets, as primary guard valves for turbines in power outlets, as emergency valves in nuclear powerplants.

The most significant advantages are:

- perfect sealing
- lasting reliability
- minimum room and weight
- easy operation
- minimum head losses
- installation in any position, without requiring specific civil works
- easy and not expensive maintenance

In addition to that, from the point of view of cost vs. benefits, taking into account the weight and the operation conditions, the butterfly valve is in almost every application better than the sluice gates and similar valves.

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TECHNICAL FEATURES

The stiff structure together with the double eccentricity makes the butterfly valve very convenient for large diameter pipings.

In fact, the little room needed and the limited overall length do not require expensive civil works.

Opening and closing are trough 90 degree rotation of the circular leaf; the valve can be therefore used either for shut off and for regulation.

The sealing is tight with the valve installed in any position. The double eccentricity of the leaf allows the perfect sealing between the rubber seal and the seat ring with reduced friction and absence of wearing.

The stainless steel pivot shafts and the selflubricating trunnion bushes do not require any special maintenance.

The rubber seal can be changed for maintenance without removing the valve, by simply taking away the pressure-adjusting retaining ring which is bolted to the leaf.

The rubber seal design allows several adjustments to be made before substituting the seal itself. A first adjustment can be made without compressing the seal through the ring, by regulating the limit switch of the actuator.

Leaf offset design allows a great free-flow area and low head losses.

The absence of recesses in the body allows dirt water to flow through without clogging valve seat, preserving valve integrity.

Various combinations of valve and operators cover all possible applications, as described later in chapter "AVAILABLE CONFIGURATIONS"

For the semplicity of design and the consequent reliability, the butterfly valve is widely used as guard valve for emergency closure when the flow velocity in piping is in excess of a design limit. When used for this purpose, the valve operates in either a fully open or fully closed position and never remains at intermediate positions. Typically, emergency butterfly valves are located immedialtely upstream from hydroelectric generating units or on outlet works. The proposed solutions for this application garantee absolute certainty of closure.

AVAILABLE CONFIGURATIONS

SHUT-OFF AND REGULATION VALVES

Manual operators

- With worm gears reducer and handwheel
- With hydraulic cylinder with manual pump

Motorized

- With worm gears reducer and electric actuator. Emergency closure done manually with handwheel
- With two-way hydraulic cylinder, lever arm and hydraulic power pack
- Special motorizations are also available

Worm gear reducer with electric actuator under testing

GUARD VALVES

Type 1

- With one-way hydraulic cylinder and counterweight

Type 2

- With one-way hydraulic cylinder, counterweight, mechanical locking device and quick-release electric magnet. The electric magnet can be of any voltage, current-on or current-off operated, A.C. or D.C.

Type 3

- With one-way hydraulic cylinder, counterweight, a cam for velocity measurement and a quick-release device. The cam is mounted on a stub pipe upstream from the valve. When the cam detects a velocity greater than a set limit, it operates either a hammer-type mechanical quick-release device through a flexible connecting steel-wire or an electric magnet through an electric wire.
  Once safety conditions are set back the valve is open by means of a manual pump and locked in position.

Guard valve with overspeed detector and control panel.

HEAD LOSS CALCULATION

The valve headloss for different openings can be evaluated with the following equations.

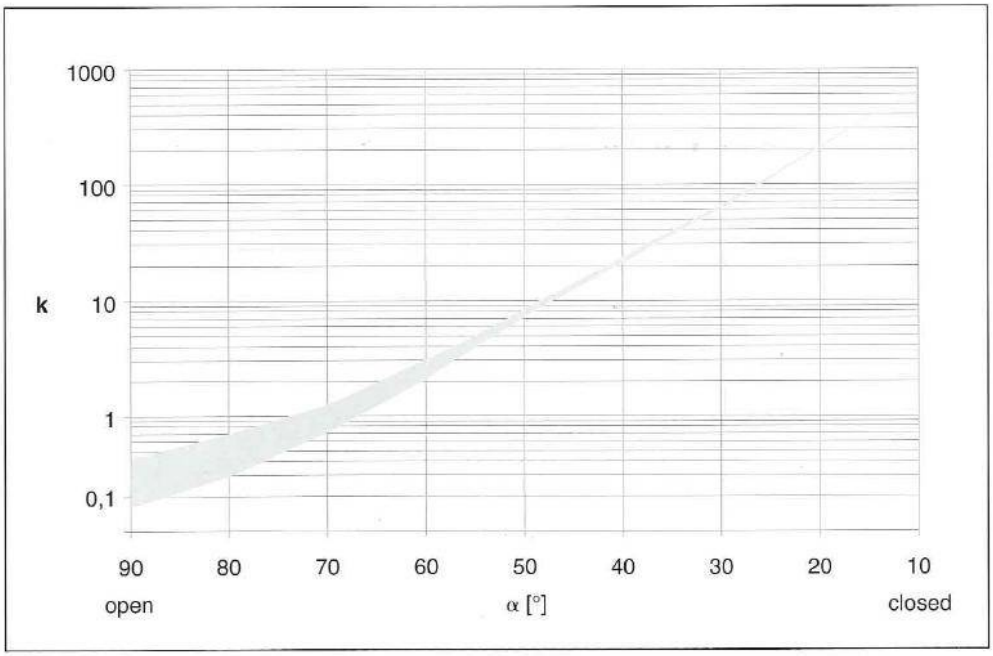
For openings between 45° to 90° (open) the headloss coefficient depends upon valve diameter (ND) and valve rating pressure (NP).

With references to the following diagram:

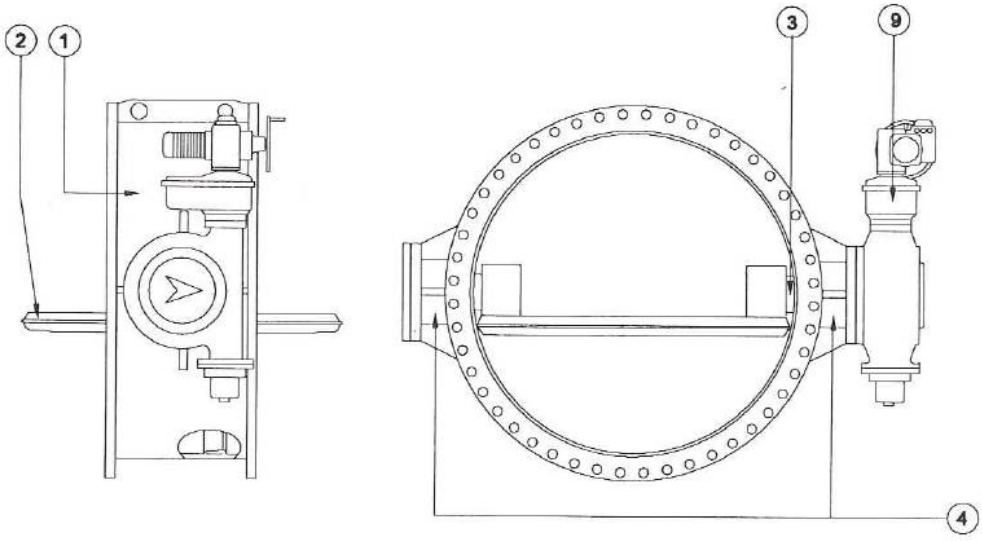
- use values near the upper curve for smaller ND and/or larger NP ;
- use values near the lower curve for greater ND and/or smaller NP .

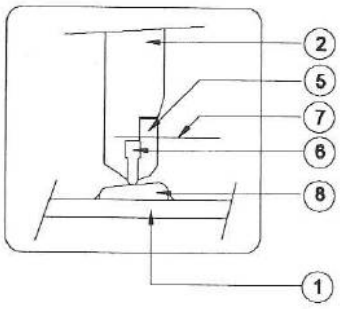
$$\Delta H = k \frac{v^2}{2g} \qquad \text{or} \qquad \Delta H = 1.623\ 10^{12}\ k \frac{Q^2 / ND^4}{2g}$$

ΔH		[m H_2O]
k	Flow coefficient	[adimensional]
g	Gravitational constant 9.81	[m / s^2]
v	Fluid velocity in the pipe	[m / s]
Q	Flow rate	[m^3 / s]
ND	Nominal Diameter	[mm]



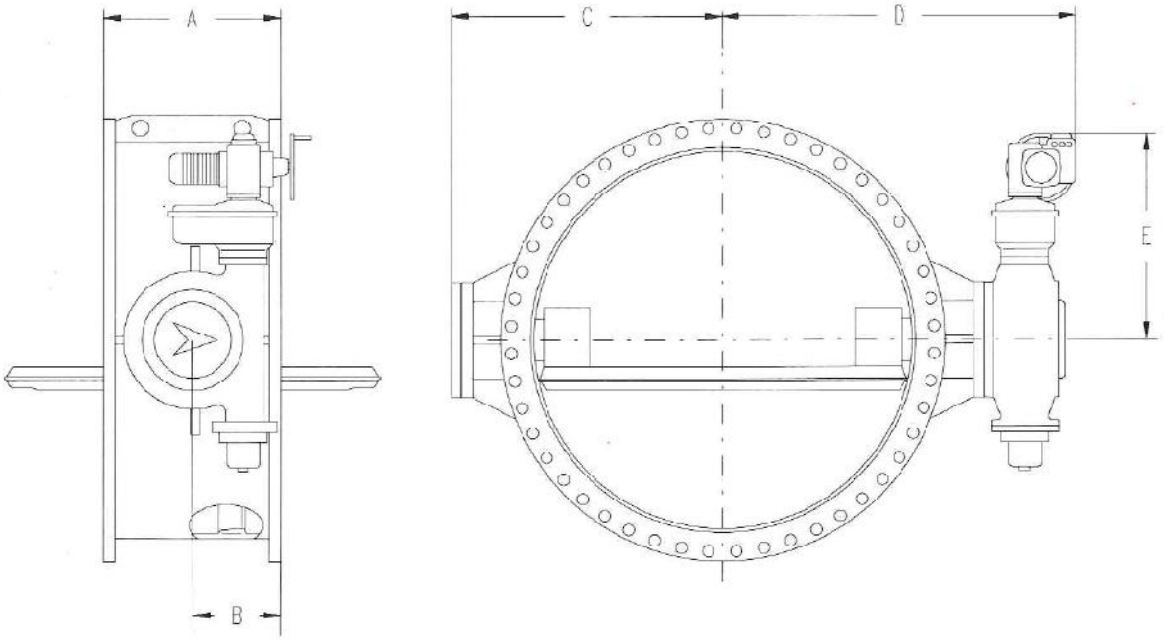
MATERIAL DESCRIPTION





MATERIAL DESCRIPTION		
POS.	**ITEM**	**MATERIAL**
1	MAIN BODY	FE 430B UNI 7070
2	VALVE LEAF	FE 430B UNI 7070
3	TRUNNIONS	AISI 420 HARDENED AND TEMPERED
4	BUSHES	SELF LUBRICATING
5	SEAL RETAINING RING	FE 430B UNI 7070
6	SEAL	NEOPRENE 75 SH
7	SEAT RING SCREW	AISI 304
8	SEAT RING	AISI 304
9	ELECTRIC ACTUATOR	

DIMENSIONS AND WEIGHTS



DIMENSIONS AND WEIGHTS

	WEIGHT INCLUDING ACTUATOR IN Kg				DIMENSIONS ir mm				
DN	PN6	PN10	PN16	PN25	A	B	C	D	E
1000	950	1400	1900	2300	550	560	720	1090	960
1200	1350	1900	2650	3200	630	560	860	1220	960
1400	2000	2850	4150	4600	710	640	1000	1390	1080
1500	2300	3600	4800	5600	750	640	1070	1470	1080
1600	2700	4250	5250	6800	790	640	1140	1530	1080
1800	3450	5500	7400	9000	870	800	1270	1710	1330
2000	4550	7000	9700	11500	950	800	1380	1820	1330
2200	6250	9750	11500		1050	900	1520	2000	1450
2400	7600	12000	14000		1110	1050	1640	2100	1450
2500	8900	13500	15500		1150	1050	1690	2100	1450
2600	10100	15000			1190	1100	1750	2400	1600
2800	12900	18000			1250	1100	1870	2600	1600
3000	14900	21500			1300	1200	1980	2800	1700

REMARK. The approximative dimensions refer to NP16 valves. The overall length A is the same for all pressure ranges.

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