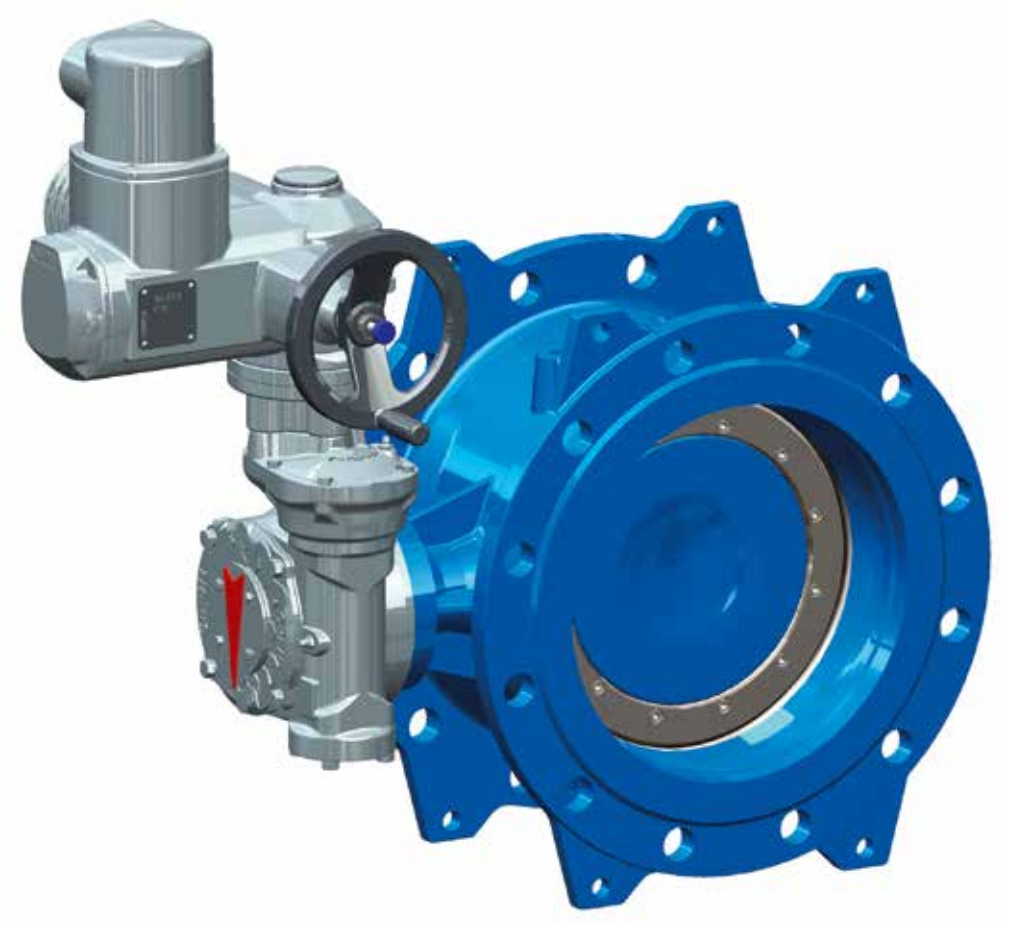
DOUBLE FLANGED DOUBLE ECCENTRIC BUTTERFLY VALVE



Double flanged double eccentric butterfly valve T.I.S. Type is designed to be installed in the pipeline in order to shut off the flow or limit it partially (indeed within certain limits double flange double eccentric butterfly valve could be also used as a control valve). During closing operation, the disc is perpendicular to the flow direction, consequently, to open the valve the disc should be rotated by 90°. The tightness of the valve is guaranteed by an automatic sealing system in the seat: in closed position the operating pressure supports the tight effect pressing the soft sealing ring against the conical seat surface in the valve body in both flow directions.

The double offset design of the valve allows to get two important advantages:
- when the valve is open, the profile sealing ring is completely unstressed
- during opening/closing operations, the disc sealing ring does not apply any friction on the body seat: the operating torque is in this way reduced, and the sealing life is extended.

The valve is suitable for drinking water application: the fusion bonded epoxy process (FBE), with certified resin powders used for internal and external surfaces, guarantees a heavy corrosion protection.

NUOVAL LINE

DOUBLE FLANGED DOUBLE ECCENTRIC BUTTERFLY VALVE PN10 - PN16 - PN25 - PN40

DESIGN FEATURES

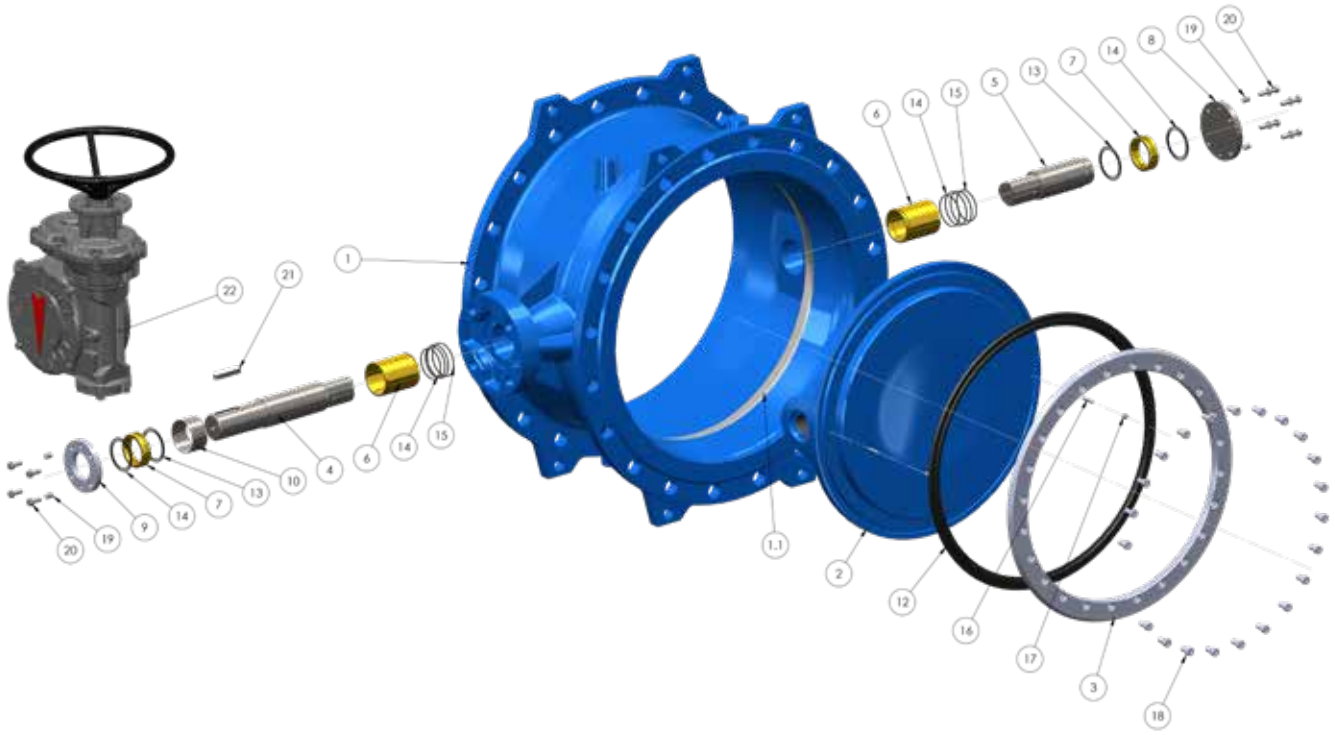
- Soft sealing according to EN 593;
- Face to face dimension according to EN 558 series 14;
- All materials, including lubricants, in contact with water approved for human consumption according to EN 1074-1 and EN 1074-2;
- One-piece body made of ductile iron EN GJS 400-15 according to EN 1563;
- Flange dimensions according to EN 1092-2;
- Screws, washers made of stainless steel A2-70 EN ISO3506-1;
- Retaining seal ring made of stainless steel EN 1.4301 EN 10088-3 (AISI 304);
- Body seat ring welded on the body, made of stainless steel;
- Shaft and disc polygon coupling “P3G” type according to DIN 32711;
- Main disc sealing ring made of EPDM according to EN 681-1 WA, WB;
- Shaft supported by solid and maintenance-free bronze bearings (PN25 - PN40, from DN600 and above, with additional PTFE low friction lining);
- Internal and external surface protection made of epoxy resin powder (FBE), blue colour RAL 5015 and thickness of 250µm;
- Hydraulic test according to EN 12266-1;
- Tight in both flow directions, rate A according to EN 12266-1 (zero drops);
- Working temperature Min. -10°C (excluded frost) Max. + 70°C;
- Gearbox with self-locking worm gear including mechanical position indicator;
- Gearbox suitable for coupling with actuator according to ISO 5210 top flange.

HIGH CORROSION-RESISTANT MATERIALS

Upon request, some parts can be produced with high corrosion-resistant materials such as:

- Retaining ring made of stainless steel 1.4571 EN 10088-3 (AISI 316Ti) or DUPLEX 1.4462 EN 10088-3;
- Shaft made of stainless steel 1.4301 EN 10088-3 (AISI 304), 1.4401 EN 10088-3 (AISI 316) or DUPLEX 1.4462 EN 10088-3;
- Screws and washers made of stainless steel A4-70 EN ISO 3506-1, DUPLEX or SUPERDUPLEX.

COMPONENTS AND MATERIALS

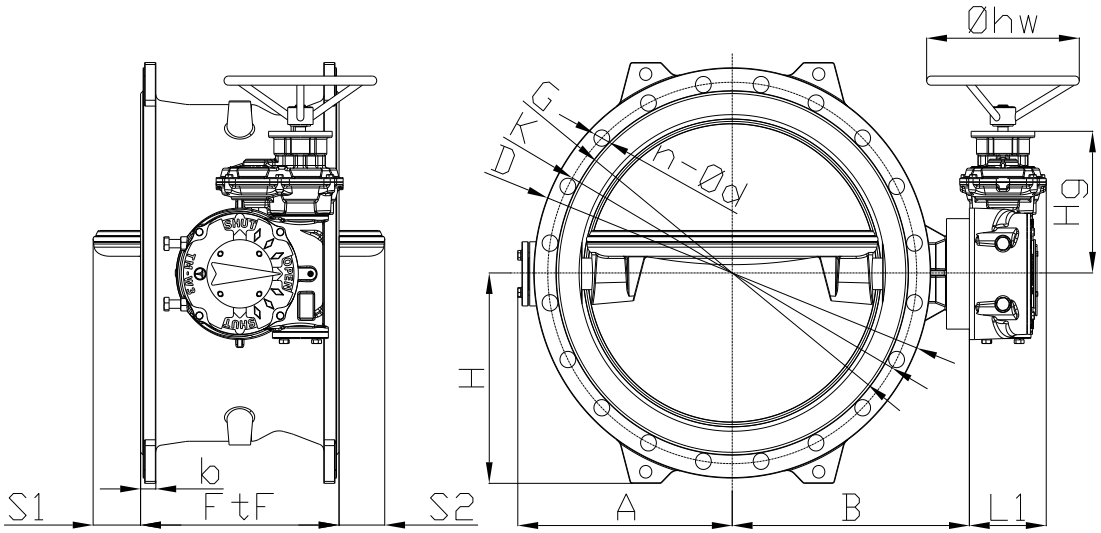


ITEM	COMPONENT	MATERIAL	NOTE
1	Body	Ductile iron EN GJS 400-15	Epoxy coating 250 µm
1.1	Body seat ring	Stainless steel	Welded and microfinished
2	Disc	Ductile iron EN GJS 400-15	Epoxy coating 250 µm
3	Retaining seal ring	Stainless steel AISI 304 (EN 1.4301)	
4	Driven shaft	Stainless steel AISI 420 (EN 1.4021)	
5	Shaft (free end)	Stainless steel AISI 420 (EN 1.4021)	
6	Bearing bush	Aluminum bronze*	
7	Sealing bush	Aluminum bronze	
8	Cover	Stainless steel AISI 304 (EN 1.4301)	
9	Sealing bush flange	Stainless steel AISI 304 (EN 1.4301)	
10	Spacer	Stainless steel AISI 304 (EN 1.4301)	
12	Disc sealing ring	EPDM rubber	
13	O-ring	EPDM rubber	
14	O-ring	EPDM rubber	
15	O-ring	EPDM rubber	
16	Anti-blow out for shaft	Stainless steel	
17	Grub screw	Stainless steel A2-70	
18	Retaining ring screw	Stainless steel A2-70	
19	Grub screw	Stainless steel A2-70	
20	Screw and washer	Stainless steel A2-70	
21	Parallel key	Steel	
22	Gearbox	According to data sheet	

* PN25-PN40, from DN600 and above, with additional PTFE low friction lining.

NUOVAL LINE

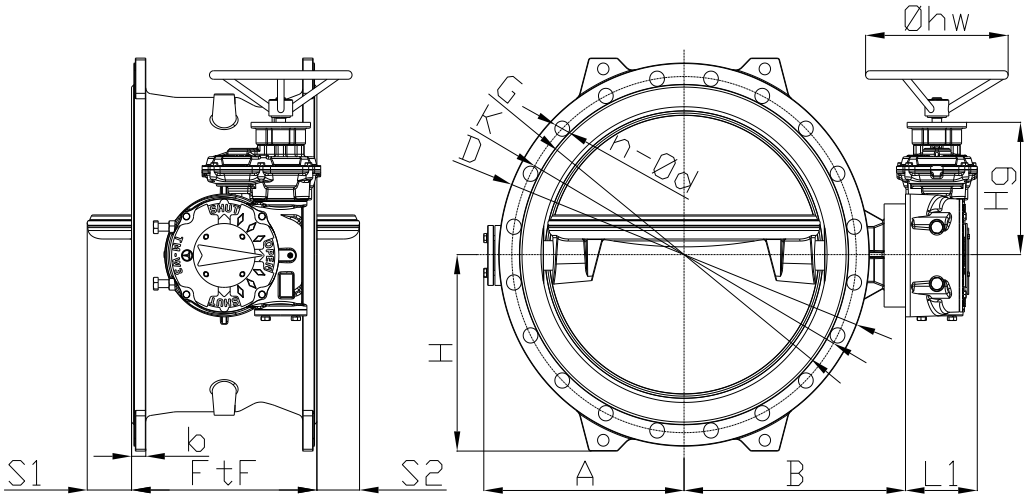
DIMENSIONS AND WEIGHTS (PN10)



PN10														
DN	G	K	D	n-ød	b	FtF	A	B	L1	H	Hg	S1 - S2	øhw	W (kg)
150	211	240	285	8-23	19.0	210	155	172	103.5	147.5	133	-	300	37.5
200	266	295	340	8-23	20.0	230	185	218	103.5	180	133	-	300	51
250	319	350	400	12-23	22.0	250	210	245	103.5	210	133	-	300	63.5
300	370	400	445	12-23	24.5	270	240	270	123.5	235	210.5	15	300	97.5
350	429	460	505	16-23	24.5	290	265	295	123.5	262	210.5	30	300	119.5
400	480	515	565	16-28	24.5	310	300	340	123.5	290	210.5	40	300	152
450	530	565	615	20-28	25.5	330	325	365	145.5	312	251	55	300	190.5
500	582	620	670	20-28	26.5	350	350	390	145.5	342	251	70	300	222
600	682	725	780	20-31	30.0	390	425	470	151	400	263.5	95	300	335.2
700	794	840	895	24-31	32.5	430	485	530	188	460	315	130	400	502.9
800	901	950	1015	24-34	35.0	470	545	620	197	520	347.5	160	400	694.5
900	1001	1050	1115	28-34	37.5	510	615	675	197	570	347.5	190	400	936.5
1000	1112	1160	1230	28-37	40.0	550	675	725	197	625	347.5	215	400	1164.5
1100	1218	1270	1340	32-37	42.5	590	755	825	267.5	695	412	250	400	1585.2
1200	1328	1380	1455	32-41	45.0	630	800	870	267.5	740	412	275	400	1898.7
1400	1530	1590	1675	36-44	46.0	710	950	960	279.5	855	464.5	330	630	2843.8
1600	1750	1820	1915	40-50	49.0	790	1075	1085	279.5	980	535.5	390	630	4153
1800	1950	2020	2115	44-50	52.0	870	1235	1245	330	1075	575	450	1000	5493.5
2000	2150	2230	2325	48-50	55.0	950	1325	1335	356.5	1180	624	510	1000	7202.5
2200	2370	2440	2550	52-56	74	1030	1415	1425	356.5	1290	624	545	1000	9012
2400	2574	2650	2760	56-57	68	1110	1565	1580	-	1390	-	605	-	-

NUOVAL LINE

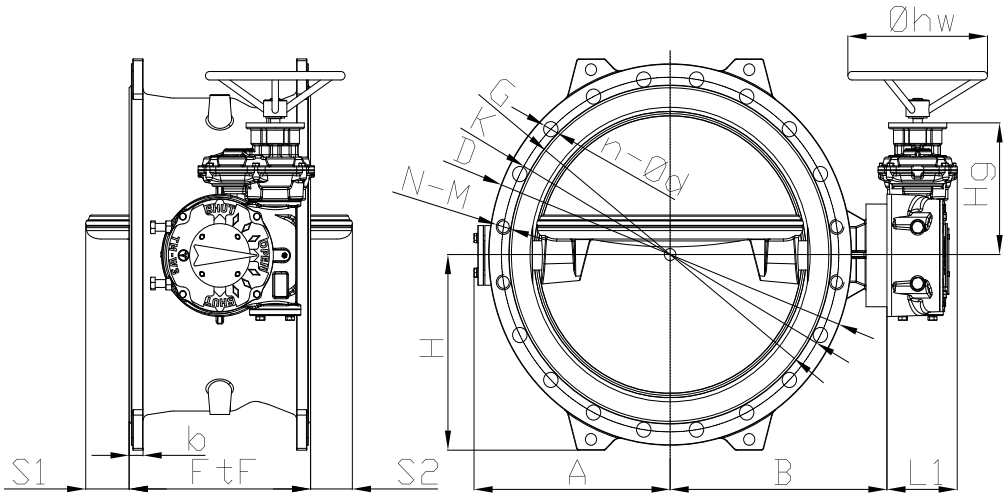
DIMENSIONS AND WEIGHTS (PN16)



PN16														
DN	G	K	D	n-ød	b	FtF	A	B	L1	H	Hg	S1 - S2	øhw	W (kg)
150	211	240	285	8-23	19	210	155	172	103.5	147.5	133	-	300	37.5
200	266	295	340	12-23	20	230	185	218	103.5	180	133	-	300	51
250	319	355	400	12-28	22	250	210	245	118.5	210	186	-	300	71.1
300	370	410	460	12-28	24.5	270	240	268	123.5	242	210.5	15	300	100.5
350	429	470	520	16-28	26.5	290	275	315	145.5	270	251	30	300	148
400	480	525	580	16-31	28	310	300	340	145.5	295	251	40	300	178
450	548	585	640	20-31	30	330	340	390	151	325	263.5	55	300	234.7
500	609	650	715	20-34	31.5	350	375	420	151	370	263.5	70	300	294.7
600	720	770	840	20-37	36	390	430	495	188	432	315	95	400	464.4
700	794	840	910	24-37	39.5	430	500	680	197	470	347.5	130	400	596
800	901	950	1025	24-41	43	470	585	630	197	525	347.5	160	400	799.5
900	1001	1050	1125	28-41	46.5	510	645	690	267.5	575	412	190	400	1121.2
1000	1112	1170	1255	28-44	50	550	705	770	267.5	640	412	215	400	1434.7
1100	1218	1270	1355	32-44	53.5	590	790	825	279.5	695	464.5	250	630	1850.3
1200	1328	1390	1485	32-50	57	630	850	890	279.5	755	464.5	275	630	2265.8
1400	1530	1590	1685	36-50	60	710	965	975	279.5	860	535.5	330	630	3478.5
1600	1750	1820	1930	40-57	65	790	1135	1140	330	980	575	390	1000	4786
1800	1950	2020	2130	44-57	70	870	1225	1235	356.5	1080	624	450	1000	6195
2000	2150	2230	2345	48-62	75	950	1390	1400	-	1200	-	510	-	-
2200	2350	2440	2550	52-62	80	1030	1465	1480	395	1290	730	545	-	10415
2400	2545	2650	2765	56-62	100	1110	1565	1580	-	1400	-	605	-	12316

NUOVAL LINE

DIMENSIONS AND WEIGHTS (PN25 - PN40)



PN25															
DN	G	K	D	n-ød	N-M	b	FtF	A	B	L1	H	Hg	S1-S2	øhw	W (kg)
150	211	250	300	8-28	-	20	210	155	172	103.5	155	133	-	300	41
200	274	310	360	12-28	-	22	230	192	220	123.5	195	210.5	-	300	75
250	330	370	425	12-31	-	24.5	250	230	265	123.5	225	210.5	-	300	102
300	389	430	485	16-31	-	27.5	270	252	290	145.5	255	251	15	300	148
350	448	490	555	16-34	-	30	290	290	340	151	290	263.5	30	300	208
400	503	550	620	16-37	-	32	310	330	375	151	312	263.5	40	300	251
450	548	600	670	20-37	-	34.5	330	370	435	188	345	315	55	400	349
500	609	660	730	20-37	-	36.5	350	395	470	188	375	315	70	400	406
600	720	770	845	20-41	-	42	390	460	520	197	433	347.5	95	400	597
700	820	875	960	24-44	-	46.5	430	545	590	197	490	347.5	130	400	830
800	928	990	1085	24-50	-	51	470	640	680	267.5	560	412	160	400	1147
900	1028	1090	1185	28-50	-	55.5	510	685	725	279.5	605	464.5	190	630	1489
1000	1140	1210	1320	24-57	-	60	550	760	780	279.5	675	464.5	215	630	1891
1100	1240	1310	1420	32-57	-	64.5	590	820	860	279.5	725	535.5	250	630	2531
1200	1350	1420	1530	32-57	-	69	630	875	905	279.5	775	535.5	275	630	3004
1400	1560	1640	1755	36-62	-	74	710	1020	1030	356.5	895	624	330	1000	4506

PN40															
DN	G	K	D	n-ød	N-M	b	FtF	A	B	L1	H	Hg	S1-S2	øhw	W (kg)
150	211	250	300	8-28		26	210	155	172	103.5	155	133	-	300	45
200	284	320	375	12-31		30	230	192	220	123.5	203	210.5	-	300	85
250	345	385	450	12-34		34.5	250	246	270	145.5	240	251	-	300	140
300	409	450	515	16-34		39.5	270	265	315	151	270	263.5	15	300	197.2
350	465	510	580	16-37		44	290	325	360	188	305	315	30	400	319
400	535	585	660	16-41		48	310	345	420	188	340	315	40	400	379
450	560	610	685	20-41		49	330	390	420	197	353	347.5	55	400	452
500	615	670	755	20-44		51	350	425	480	197	390	347.5	70	400	548
600	735	795	890	20-50		58	390	495	540	267.5	455	412	95	400	837
700	840	900	995	24-48	-	64	430	585	625	279.5	510	464.5	130	630	1204.8
800	960	1030	1140	24-56	4-M52	65	470	665	675	279.5	585	464.5	160	630	1561
900	1070	1140	1250	28-57	4-M52	76	510	725	765	279.5	640	535.5	190	630	2250
1000	1180	1250	1360	28-57	-	80	550	770	805	279.5	690	535.5	215	630	2607
1200	1380	1460	1575	32-62	4-M56	88	630	925	940	356.5	800	624	250	1000	3992
1400	1600	1680	1795	36-62		85	710	1090	1100	-	910	-	275		-

PRESSURE DROP OF PN10-PN16 VALVES

Pressure drop of double flange double eccentric butterfly valves can be calculated using below equation:

$$\Delta P = (Q / K_V)^2 \text{ [bar]}$$

Where:

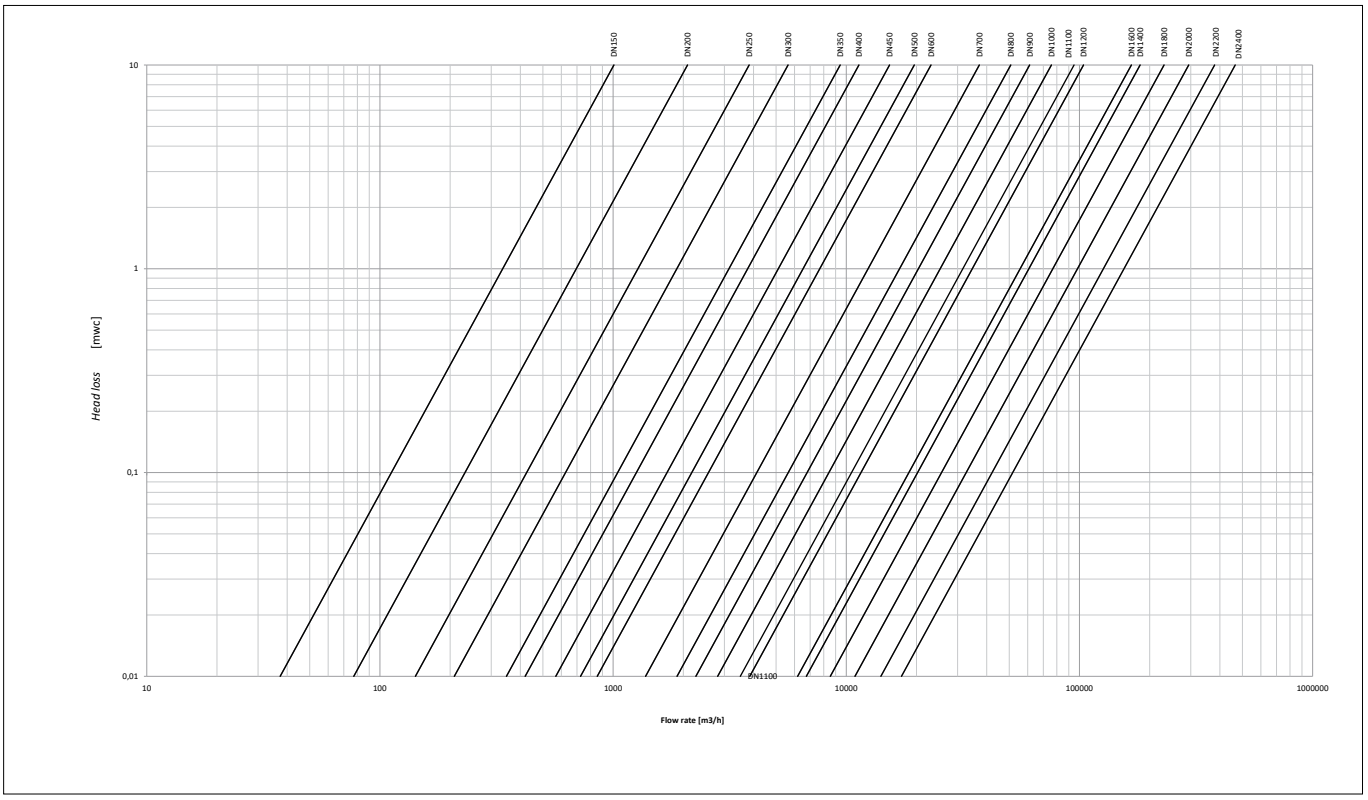
- ΔP = pressure drop [bar]
- Q = flow rate [m^3/h]
- Kv = flow coefficient [m^3/h] (see table below)

FLOW COEFFICIENT PN10-PN16

DN	150	200	250	300	350	400	450	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400
Kvs [m^3/h]	1008	2085	3832	5627	9415	11327	15328	19573	23081	37199	50747	61131	75808	94800	104074	182000	167000	230571	294141	379871	465600

Pressure drop of double flange double eccentric butterfly valves can be also evaluated by using below diagram:

PRESSURE DROP DIAGRAM PN10-PN16



NUOVAL LINE

PRESSURE DROP OF PN25-PN40 VALVES

Pressure drop of double flange double eccentric butterfly valves can be calculated using below equation:

$$\Delta P = (Q / Kv)^2 \text{ [bar]}$$

Where:

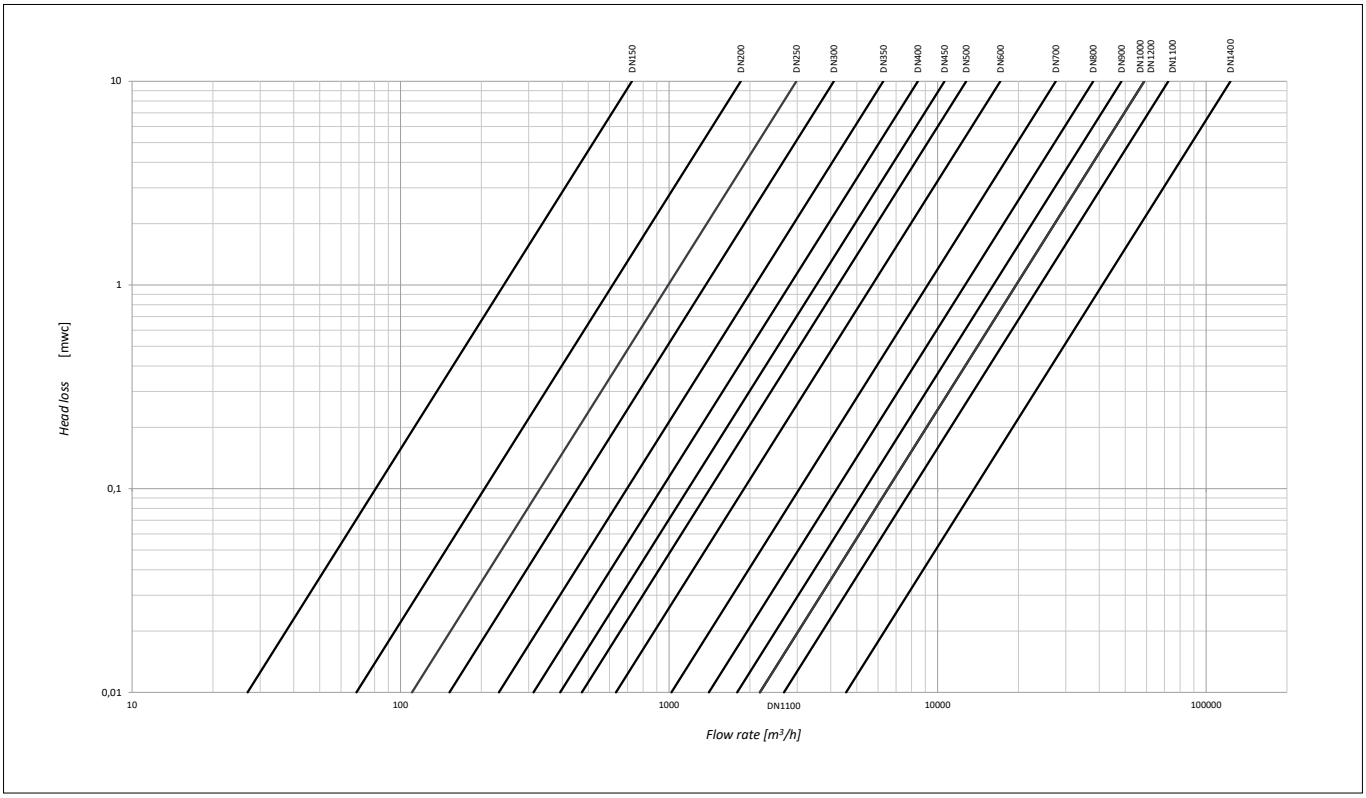
- ΔP = pressure drop [bar]
- Q = flow rate [m^3/h]
- Kv = flow coefficient [m^3/h] (see table below)

FLOW COEFFICIENT PN25-PN40

DN	150	200	250	300	350	400	450	500	600	700	800	900	1000	1100	1200	1400
Kvs [m^3/h]	727	1849	2978	4107	6274	8442	10610	12777	17122	27543	37974	48405	58836	72304	58772	123184

Pressure drop of double flange double eccentric butterfly valves can be also evaluated by using below diagram:

PRESSURE DROP DIAGRAM PN25-PN40



CAVITATION

Cavitation is a physical phenomenon which occurs when the pressure of a fluid, due to a sudden change in flow rate, drops below the evaporation pressure (at water 3.5kPa). It takes the form of small bubbles which implode instantly when they reach the area of higher pressure, causing tiny, extremely high-pressure jets. When these cavitation bubbles collapse, they are extremely noisy and cause shock waves, i.e. pressure waves which can be very intense, and they sound like rolling stones through pipeline. Measurements have shown that during the cavitation bubble burst, the pressure can rise up to 689 MPa and produce a sound of 100 decibels. If the bubbles implode near a solid wall, the micro-jet of fluid generated (known as an 'impinging jet') erodes the material of which the walls are formed and small craters (erosive pits) gradually develop. In practice, cavitation can occur when there are areas exposed to high head or sudden pressure losses. If it occurs continuously, it reduces the useful life of the components proportionally to its intensity, resulting in loss of efficiency first of all, and then going on to cause serious damage and breakage.
Cavitation is also a cause of friction and turbulence in the liquid, which leads to further reductions in efficiency.

CAVITATION LIMITS

The cavitation number is helpful when exploring flow dynamics problems in fluids in which cavitation can occur.
The cavitation number can be expressed as follows:

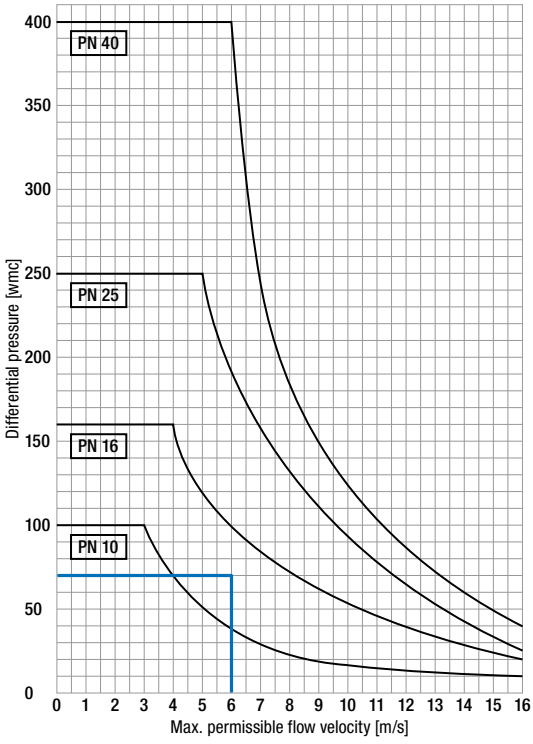
$$\sigma = \frac{P_2 + P_A - P_V}{(P_1 - P_2) + \frac{v^2}{2_g}}$$

Where: P_1 = Inlet pressure (mca) P_2 = outlet pressure (mca) P_A = Atmospheric pressure (mca) P_V = Evaporation pressure (mca) v = Flow velocity (m/s) g = Gravitational acceleration (m/s^2)

If the T.I.S. double flanged double eccentric butterfly valves are installed in the correct operating conditions, the calculated σ value should be above the K limit curve (the K limit curve is provided by T.I.S.).
Double flanged double eccentric butterfly valve are designed to intercept the flow. If a valve is used to control flow, the operating limits (maximum flow rate and cavitation) must be complied with. The recommended control range is between 20-70% of the degree of opening, above which reasonable control cannot be guaranteed since it practically no longer affects the flow through the valve. In the event of noise or vibrations during valve commissioning/operation, the actual operating conditions must be checked. If the operating conditions change, the equipment may need to be resized. If the calculated σ value is below the σK limit curves, cavitation may occur.
To address this problem, we recommend you:
- alter the back pressure;
- change the installation location.

If the σ value is above the σK limit curves, the noise may be caused by other factors and the pipeline must be checked.

LIMIT CURVE OF T.I.S. DOUBLE FLANGED DOUBLE ECCENTRIC BUTTERFLY VALVES



MAXIMUM PERMISSIBLE FLOW VELOCITY

When the fluid flows along the surface of the valve disk, the disk is exposed to flow forces determined by the flow velocity of the fluid in the pipeline. These forces act as torque on the axis of the disk.
According to standard UNI EN593, table 1, double flanged double eccentric butterfly valves are designed to withstand maximum flow velocity as stated below:

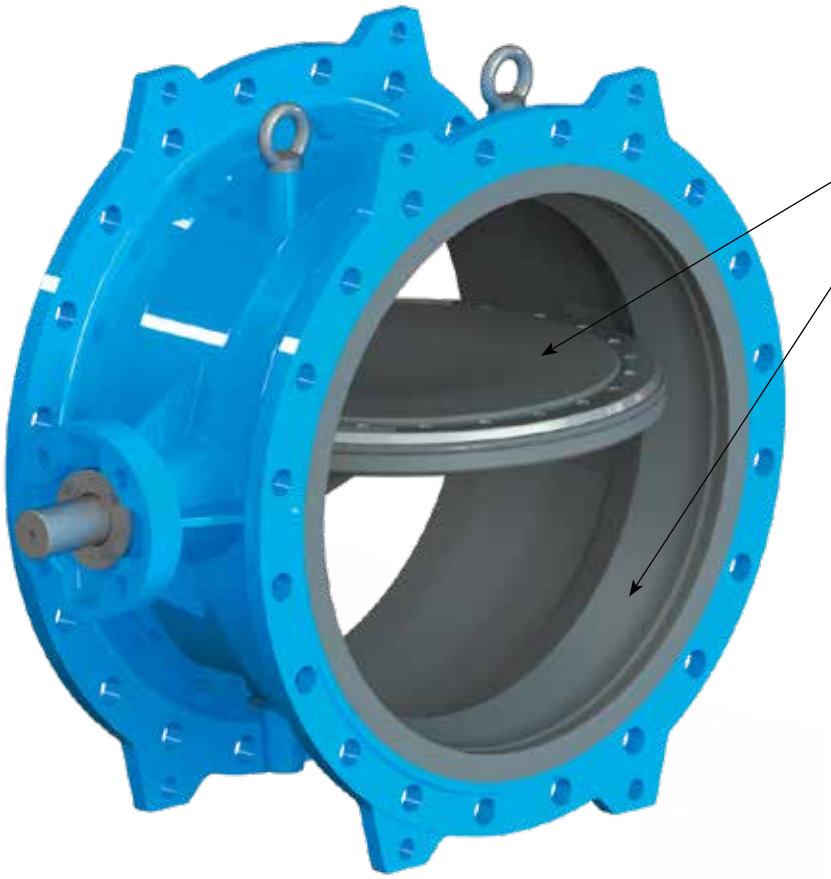
PN10: 3 m/s PN16: 4 m/s PN25: 5 m/s PN40: 6 m/s

The table on the right, which shows the maximum flow velocity allowed according to the differential pressure, allow the correct valve pressure value to be calculated based on the pipeline pressure (bar) and the flow velocity inside it (m/s). For example, with a differential pressure of 7 bar and a flow velocity of 6 m/s, the hydraulic moment of the flow around the disk is so high that a PN16 double flanged double eccentric butterfly valve.

NUOVAL LINE

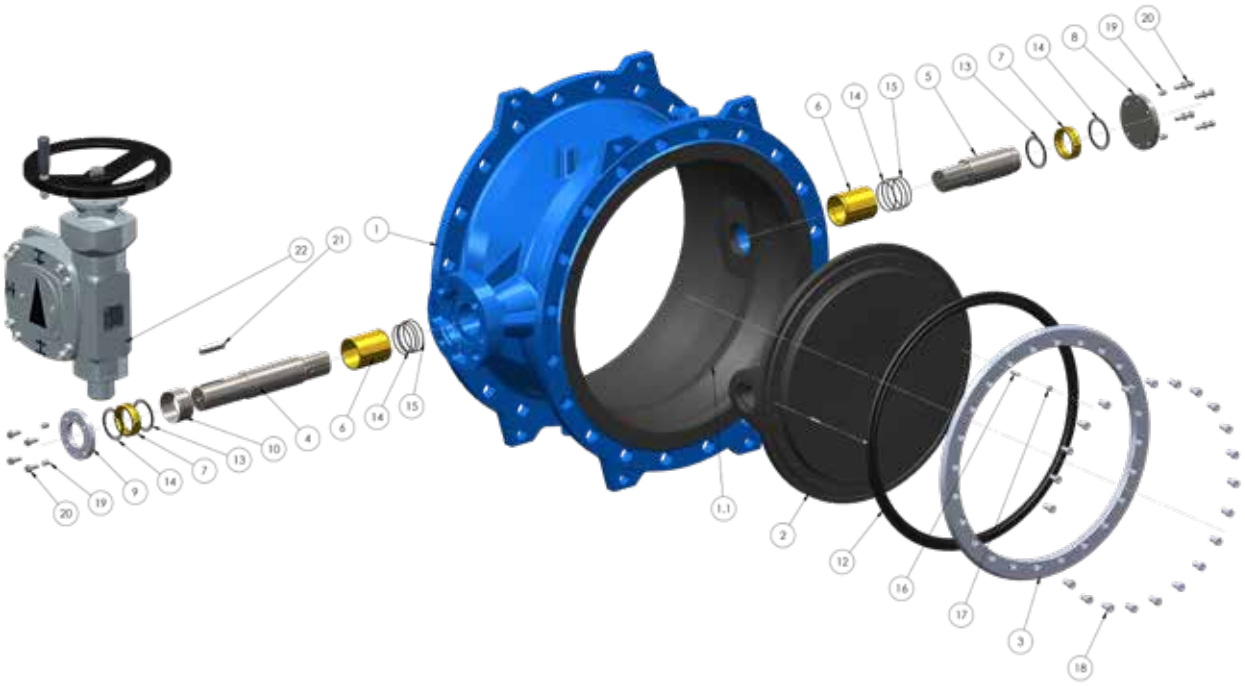
DOUBLE FLANGED DOUBLE ECCENTRIC BUTTERFLY VALVE WITH VULCANIZED HARD RUBBER LINING

TIS double flanged double eccentric butterfly valve with vulcanized hard rubber lining for saline media (seawater or well-desalination) or corrosive media is designed to withstand the chemical attack of chloride ions.
Due to the fluid aggressivity, standard epoxy coated valve surfaces will be rapidly abraded or corroded. The best possible solution, in order to guarantee valves longevity and safe operation of the plants, is to protect the inner surface of the valve with 3 mm of hard rubber lining: in this way, the disc and the internal surface of the body are protected from the aggressive fluids.
Other parts of the valve in contact with water (shaft and retaining seal ring) are made of duplex stainless steel, with high resistance to corrosion.
Typical applications of double flanged double eccentric butterfly valves with vulcanized hard rubber lining are: water treatment plants, desalination plants, mines, industrial water and treatment plants in minerals.



Body and disc surface, in contact with the fluid, is completely lined with a rubber layer which allows additional protection to the corrosion due to brackish waters and significantly increases lifespan of the valve.

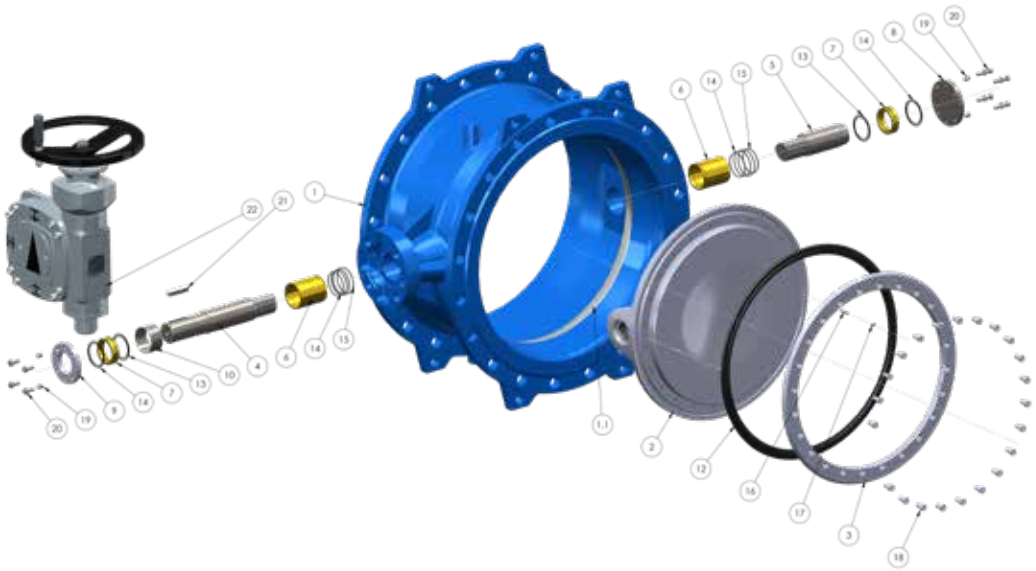
COMPONENTS AND MATERIALS



ITEM	COMPONENT	MATERIAL	NOTE
1	Body	Ductile iron EN GJS 400-15	Internal coating made by vulcanized hard rubber, external coating epoxy powder 300 µm
2	Disc	Ductile iron EN GJS 400-15	Coating made by vulcanized hard rubber
3	Retaining seal ring	Stainless steel AISI 316Ti (EN 1.4571)	
4	Driven shaft	Stainless steel DUPLEX (EN 1.4462)	
5	Shaft (free end)	Stainless steel DUPLEX (EN 1.4462)	
6	Bearing bushing	Aluminum bronze*	
7	Sealing bushing	Aluminum bronze	
8	Cover	Stainless steel AISI 304 (EN 1.4301)	
9	Sealing bush flange	Stainless steel AISI 304 (EN 1.4301)	
10	Spacer	Stainless steel AISI 304 (EN 1.4301)	
12	Disc sealing ring	EPDM rubber	
13	O-ring	EPDM rubber	
14	O-ring	EPDM rubber	
15	O-ring	EPDM rubber	
16	Anti-blow out for shaft	Stainless steel	
17	Grub screw	Stainless steel A4-70	
18	Retaining ring screw	Stainless steel A4-70	
19	Grub screw	Stainless steel A4-70	
20	Screw and washer	Stainless steel A4-70	
21	Parallel key	Steel	
22	Gearbox	According to data sheet	

* PN25 - PN40, from DN600 and above, with additional PTFE low friction lining.

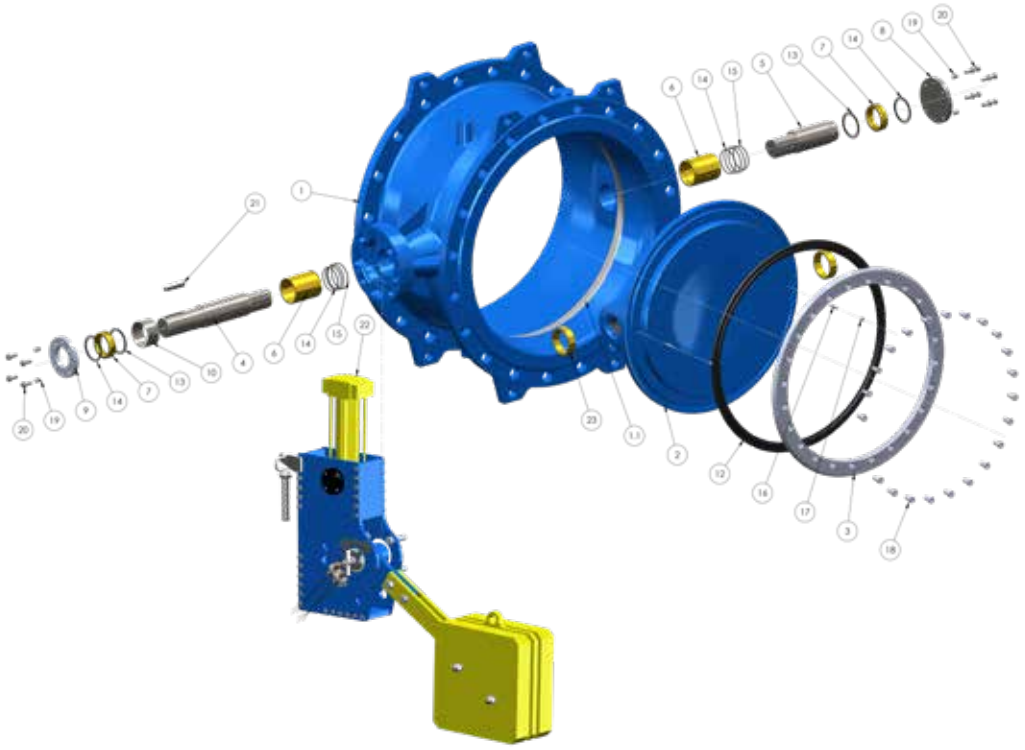
DOUBLE FLANGED DOUBLE ECCENTRIC BUTTERFLY VALVE WITH HIGH CORROSION-RESISTANT MATERIALS



ITEM	COMPONENT	MATERIAL	NOTE
1	Body	Ductile iron EN GJS 400-15	Epoxy coating 300 µm
1.1	Body seat ring	Stainless steel AISI 316L (EN 1.4404)	
2	Disc	Stainless steel AISI 316 (EN 1.4408)	
3	Retaining seal ring	Stainless steel AISI 316Ti (EN 1.4571)	
4	Driven shaft	Stainless steel DUPLEX (EN 1.4462)	
5	Shaft (free end)	Stainless steel DUPLEX (EN 1.4462)	
6	Bearing bush	Aluminum bronze*	
7	Sealing bush	Aluminum bronze	
8	Cover	Stainless steel AISI 316 (EN 1.4401)	
9	Sealing bush flange	Stainless steel AISI 316 (EN 1.4401)	
10	Spacer	Stainless steel AISI 316 (EN 1.4401)	
12	Disc sealing ring	EPDM rubber	
13	O-ring	EPDM rubber	
14	O-ring	EPDM rubber	
15	O-ring	EPDM rubber	
16	Anti-blow out for shaft	Stainless steel	
17	Grub screw	Stainless steel A4-70	
18	Retaining ring screw	Stainless steel A4-70	
19	Grub screw	Stainless steel A4-70	
20	Screw and washer	Stainless steel A4-70	
21	Parallel key	Steel	
22	Gearbox	According to data sheet	

* PN25-PN40, from DN600 and above, with additional PTFE low friction lining.

DOUBLE FLANGED DOUBLE ECCENTRIC BUTTERFLY VALVE WITH COUNTERWEIGHT AND HYDRAULIC CYLINDER FOR RESET



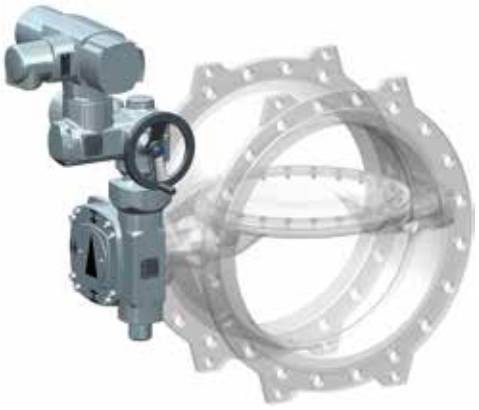
ITEM	COMPONENT	MATERIAL	NOTE
1	Body	Ductile iron EN GJS 400-15	Epoxy coating 250 µm
1.1	Body seat ring	Stainless steel	Welded and microfinished
2	Disc	Ductile iron EN GJS 400-15	Epoxy coating 250 µm
3	Retaining seal ring	Stainless steel AISI 304 (EN 1.4301)	
4	Driven shaft	Stainless steel AISI 420 (EN 1.4021)	
5	Shaft (free end)	Stainless steel AISI 420 (EN 1.4021)	
6	Bearing bush	Aluminum bronze	PTFE low friction lining.
7	Sealing bush	Aluminum bronze	
8	Cover	Stainless steel AISI 304 (EN 1.4301)	
9	Sealing bush flange	Stainless steel AISI 304 (EN 1.4301)	
10	Spacer	Stainless steel AISI 304 (EN 1.4301)	
12	Disc sealing ring	EPDM rubber	
13	O-ring	EPDM rubber	
14	O-ring	EPDM rubber	
15	O-ring	EPDM rubber	
16	Anti-blow out for shaft	Stainless steel	
17	Grub screw	Stainless steel A2-70	
18	Retaining ring screw	Stainless steel A2-70	
19	Grub screw	Stainless steel A2-70	
20	Screw and washer	Stainless steel A2-70	
21	Parallel key	Steel	
22	Actuator	According to data sheet	
23	Distant bush	Aluminum bronze	

NUOVAL LINE

OPERATING DEVICES

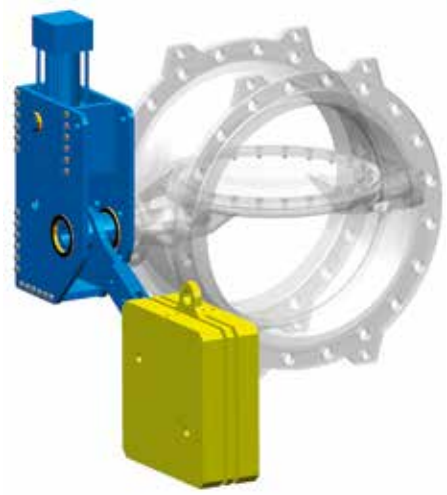
BURIED SERVICE

WORM GEARBOX
AND HANDWHEEL

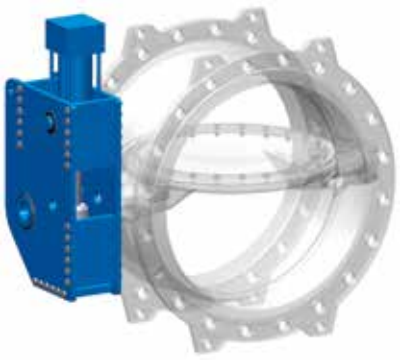


ELECTRIC ACTUATOR

BARESHAFT
VALVE



HYDRAULIC CYLINDER
AND COUNTERWEIGHT

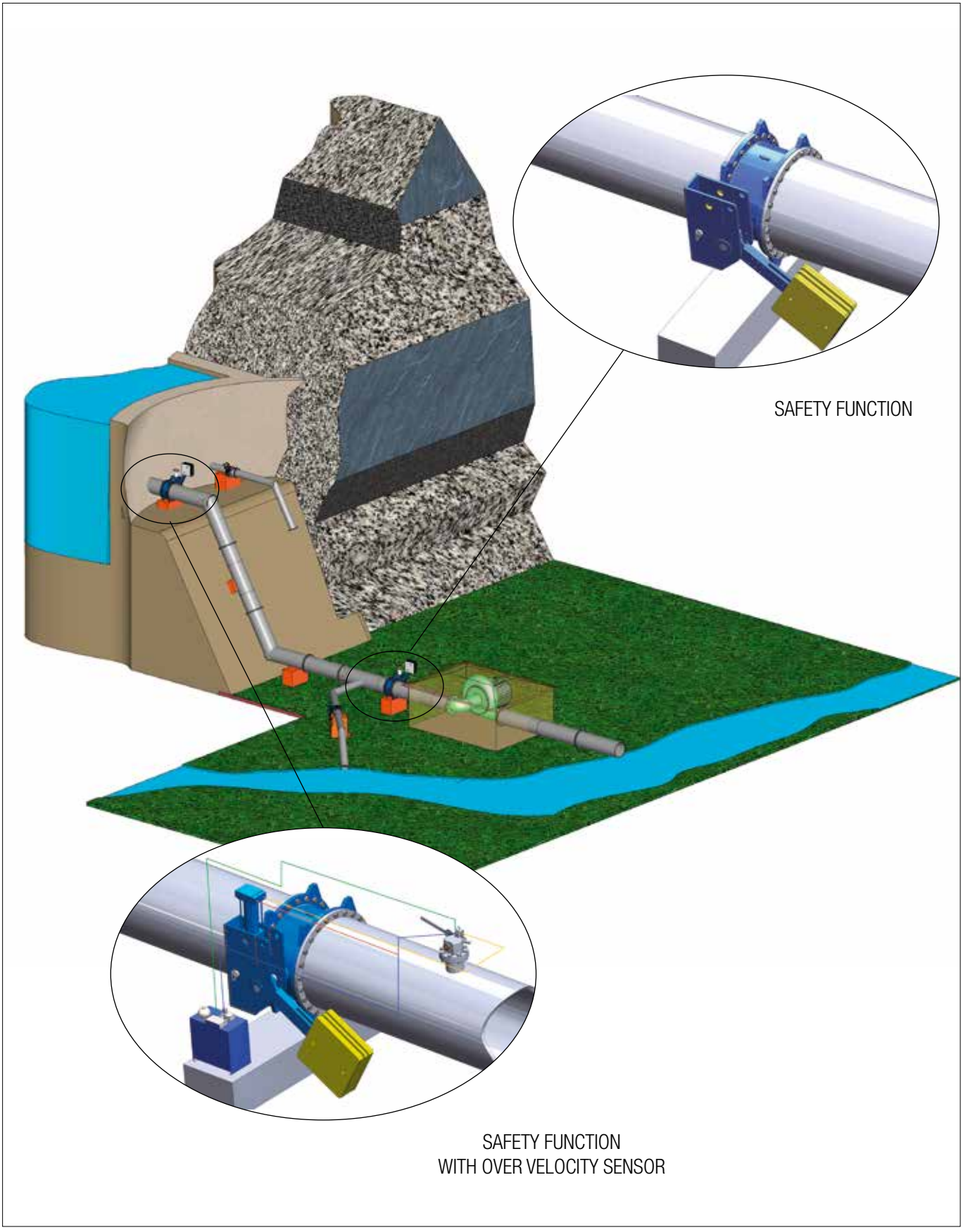


DOUBLE ACTING
HYDRAULIC CYLINDER

PNEUMATIC ACTUATOR

MAIN APPLICATION

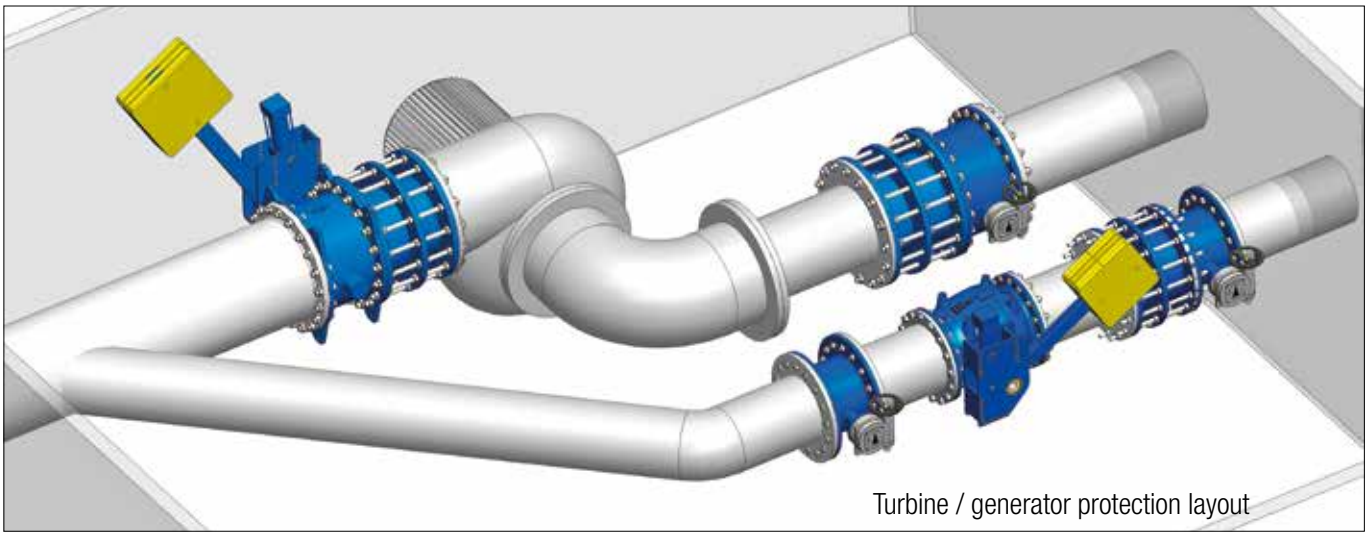
HYDRO POWER PLANTS APPLICATION



SAFETY FUNCTION

Safety hydraulic cylinder and counterweight butterfly valves are generally used in hydroelectric power plants (see figure below), water supply, irrigation. The main functions are:

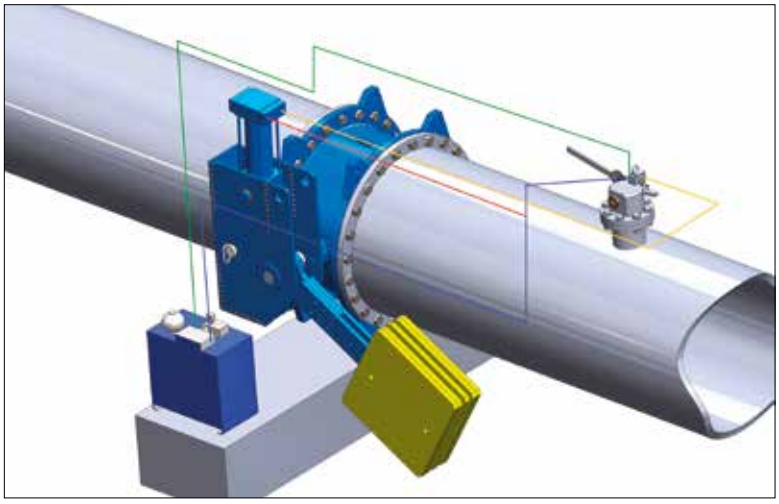
- to protect turbines/generators;
- to prevent damage caused by pipeline failure;
- to shut off the supply line in case of power failure;
- as a check valve in case of pipe backflow.



Turbine / generator protection layout

SAFETY FUNCTION WITH PADDLE FLOW DETECTION SYSTEM

The butterfly valve with hydraulic cylinder and counterweight is equipped with a mechanical device for fluid speed detection in case of applications as turbine (or generator) protection or to prevent possible leakage of fluid due to pipeline breakage.
The paddle system detects the fluid speed in the pipeline: if the pre-set limit speed exceeds, the paddle triggers the hydraulic cylinder, which will operate the valve (opening or closing the valve according to the safety function).



A typical application of hydraulic cylinder (provided with the hydraulic unit) and the counterweight butterfly valve with paddle flow detection system.