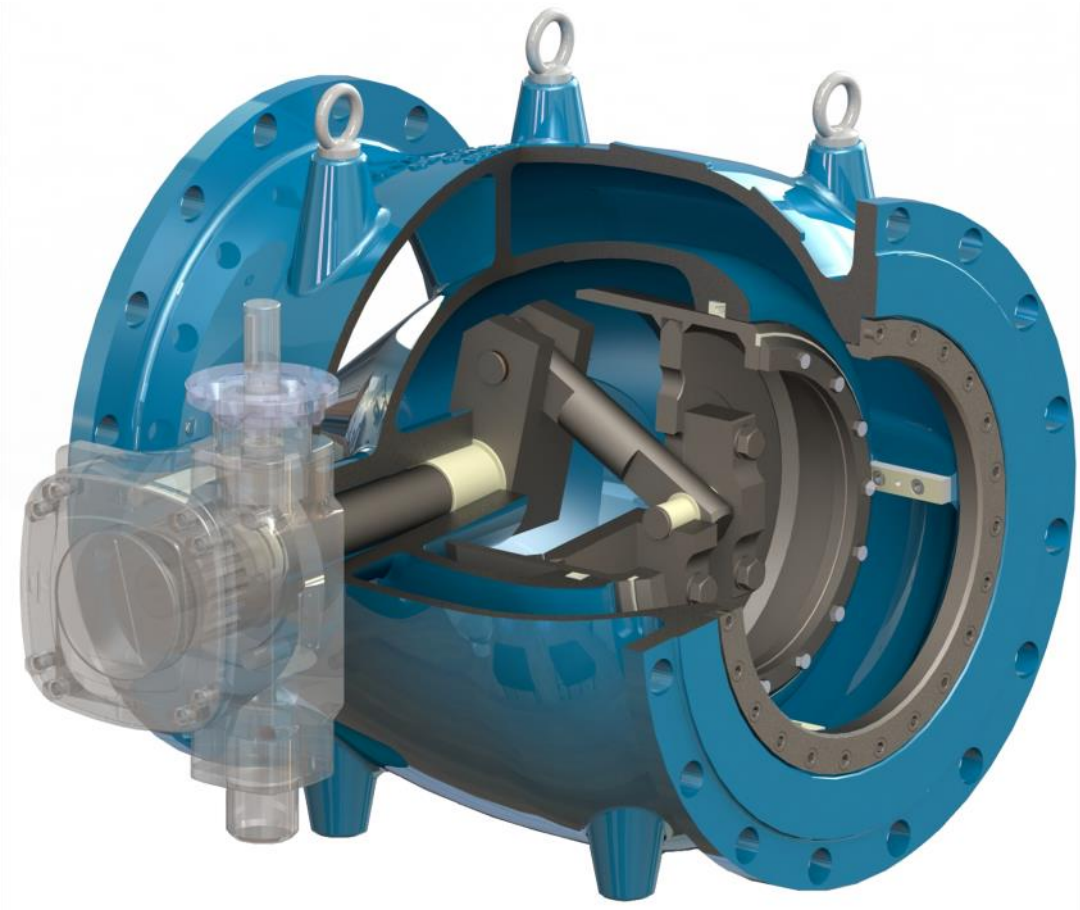
PLUNGER VALVES
F560 / F500 / F550



PLUNGER VALVES DN80 - DN1800

INDEX

MAIN CHARACTERISTICS

The plunger valve is designed mainly for regulating flow rate and pressure in water pipelines. Regulation is achieved by an axial movement of a plunger, operated by a shaft-rod-crank mechanism.

The plunger is positioned in the center of the valve, in a chamber specially shaped to protect it from the water flow and avoid noise and cavitation damage, while also ensuring vibrations-free operation.

The water flow is guided through a ring-shaped chamber around the central body of the valve. The cross section of this chamber diminishes constantly from the inlet to the outlet, causing the flow speed to rise and the pressure to drop.

This ideal geometric shape protects the pipe from cavitation bubbles, which are directed towards the center of the down-stream outlet flange.

DESIGN DATA

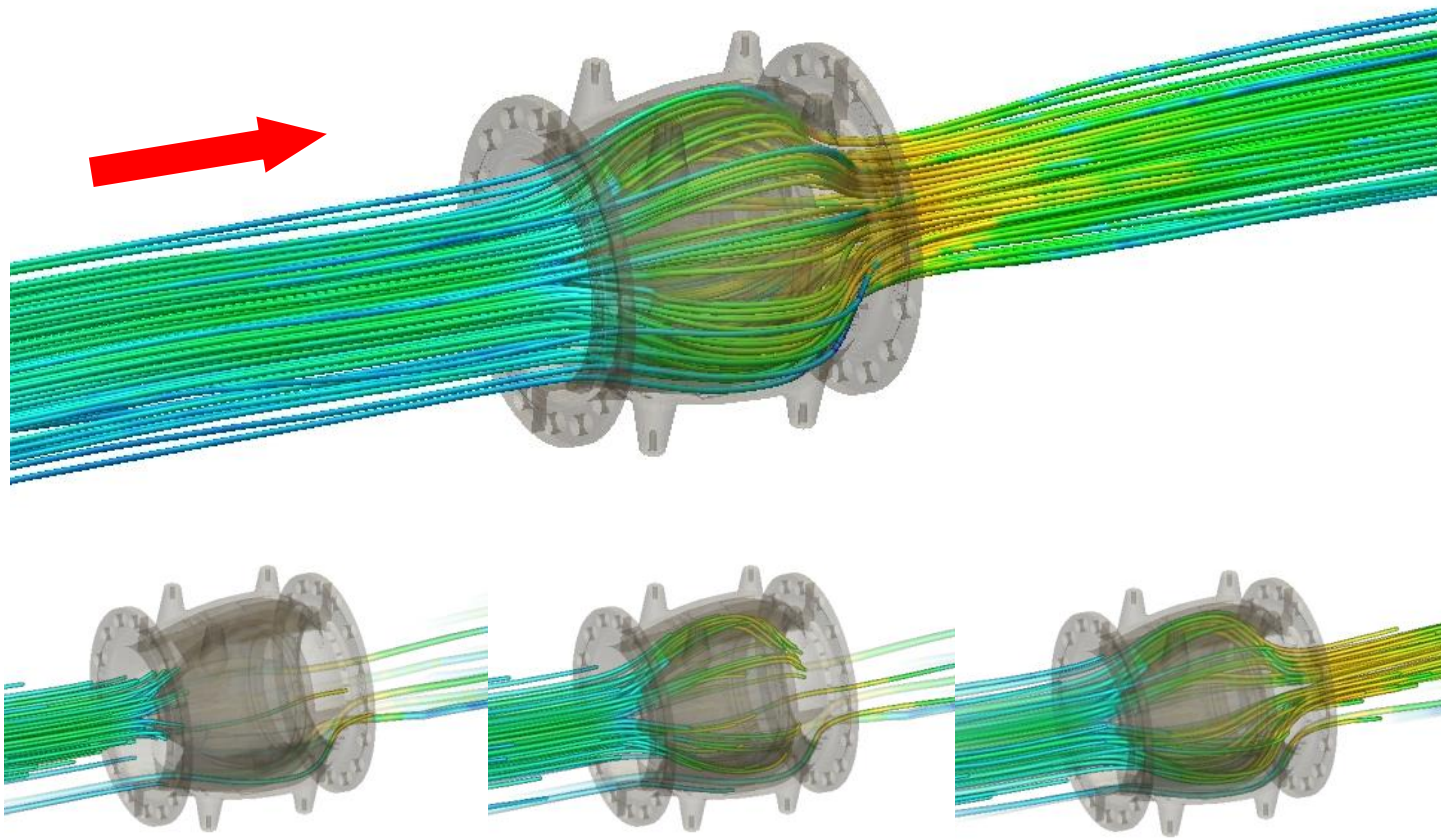
A perfect balance between the upstream and downstream chambers allows the plunger valve to be operated under low torque levels.

The operating mechanism consists of a link, shaft, and connecting rod made of stainless steel. All the moving parts are supported by marine bronze bushings.

The plunger's sliding surface is entirely in stainless steel and is guided by sliding blocks which ensure stability in all operating conditions. The sliding blocks are screwed to the valve body for very easy maintenance.

A stainless steel seating ring is screwed onto the valve body. It is designed to ensure a perfect seal and easy maintenance of the interior valve components.

The seals are made of polyurethane rubber, with the main seal inserted directly into the top of the piston and the lip seal, with a special anti-extrusion profile, inserted into a matching seat formed in the valve body.



The special design directs the fluid towards the axis of the valve where the outflow collides, dissipating energy and protecting the walls of the downstream pipe.

F560: TECHNICAL SPECIFICATIONS

DESIGN CHARACTERISTICS:

- Hydraulic test according to EN 1074-5;
- Compliant with EN 1074-5;
- The parts in contact with water are compliant with DM 174 of 6/04/2004, KTW, DVGW W270, WRAS;
- One-piece body made of ductile cast iron type EN GJS 400-15 EN 1563 (GS 400-15);
- Face to face dimension according to EN 558 Series 15 (if not differently indicated);
- Flange dimensions according to EN 1092-2;
- All screws, washers, and nuts made of stainless steel A2-70 EN ISO3506-1 (interior);
- Pressure-balanced piston movable with minimal torque made of stainless steel 1.4301 EN10088-3 (AISI304) or 1.4306 EN10088-3 (AISI304L);
- Seating box in 1.4408+AT EN10283 (AISI316);
- Seal retaining ring made of 1.4301 EN10088-3 (AISI304);
- Rod-link mechanism:
  - link made of 1.4028 EN10088-3 (AISI420B);
  - expulsion-safe shaft made of 1.4028 EN10088-3 (AISI420B);
  - connecting rod made of 1.4301 EN10088-3 (AISI304);
- All rotating parts of the rod-link mechanism are supported by solid maintenance-free bronze bearings;
- Main seal protected from the water stream, made of HPU (polyurethane);
- Piston seal obtained with a low friction lip-type seal made of HPU (polyurethane);
- The gearbox is suitable for coupling to an electrical actuator with an ISO 5211 flange;
- Interior and exterior corrosion protection obtained with FBE (fusion bounded epoxy) coating, colour blue RAL 5015, thickness 300µm;

ACCESSORIES:

- Depending on the operating conditions, dissipating cylinders made of 1.4301 EN10088-3 (AISI304) or 1.4306 EN10088-3 (AISI304L) can be supplied
- Depending on the operating conditions, an air-intake device made of FBE coated structural steel can be supplied

OPERATING LIMITS:

- Operating temperature: (water temp.) min.+0°C (without freezing) max. + 90°C.
- Storage temperature: (Room temp.) min. - 20°C max. + 70°C.
- Minimum permitted differential pressure: 0.2 bar

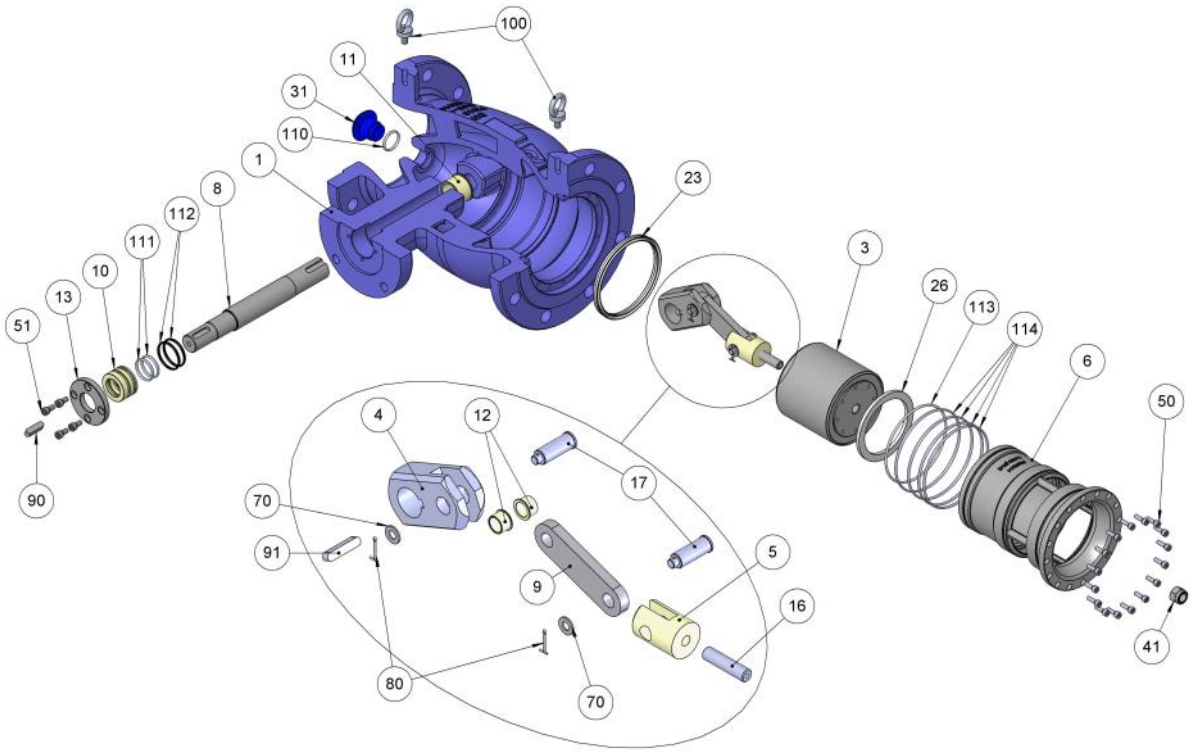
OPTIONAL HIGH CORROSION-RESISTANT MATERIALS

On request, some parts can be made in high corrosion-resistant materials:

* piston, seat ring, and seal retaining ring made of **1.4401 EN10088-3 (AISI316)**

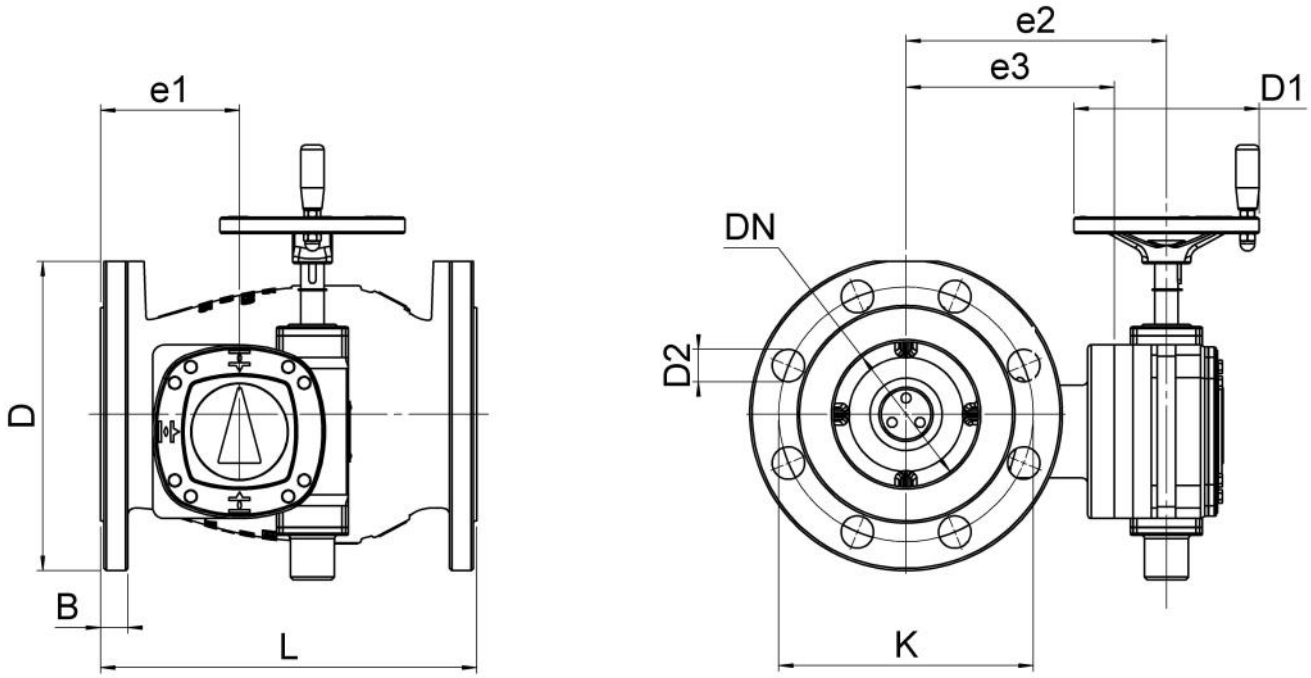
  or **1.4404 EN10088-3 (AISI316L)** stainless steel;
* rod-link mechanism made of **1.4462 EN10088-3 DUPLEX** stainless steel;
* screws, washers, and nuts made of **A4-70 EN ISO3506-1** stainless steel ;
* anticavitation cylinder made of **1.4401 EN10088-3 (AISI316)** or **1.4404 EN10088-3 (AISI316L)** stainless steel.

F560: DN80 ÷ 150 - EXPLODED VIEW AND VALVE DESCRIPTION



ITEM	DESCRIPTION	MATERIAL	NOTES
1	Body	EN-GJS 400-15 EN1563 (GS 400 - 15)	*FBE Coated*
3	Obturator	1.4301 EN10088-3 (AISI 304)	
4	Link	1.4028 EN10088-3 QT850 (AISI420 B)	
5	Fork	CC 333 G EN 1982 CuAl10Fe5Ni5-C	
6	Seating box	1.4408+AT EN10283 (AISI 316)	
8	Shaft	1.4028 EN10088-3 QT850 (AISI420 B)	
9	Piston rod	1.4301 EN10088-3 (AISI304)	
10	Outer bearing	CC 333 G EN 1982 CuAl10Fe5Ni5-C	
11	Inner bearing	CC 333 G EN 1982 CuAl10Fe5Ni5-C	
12	Link bearing	CC 333 G EN 1982 CuAl10Fe5Ni5-C	
13	Actuator coupling disk	1.4028 EN10088-3 QT850 (AISI420 B)	
16	Screw fork	1.4301 EN10088-3 (AISI 304)	
17	Connecting pins	1.4028 EN10088-3 QT850 (AISI420 B)	
23	Lip seal	C-HPU Rubber	
26	Main seal	C-HPU Rubber	
31	Nose cone	1.4301 EN10088-3 (AISI 304)	
41	Nuts	1.4301 EN10088-3 (AISI 304)	
50	Bolts	A2-70 EN ISO3506-1	
51	Bolts	A2-70 EN ISO3506-1	
70	Washers	A2-70 EN ISO3506-1	
80	Cotter pins	A2-70 EN ISO3506-1	
90	Tongue	1.0511 EN10083-2 + QT(C40B)	
91	Tongue (internal)	1.4028 EN10088-3 QT850 (AISI420 B)	
100	Eyebolt	--	
110 ÷ 114	O-ring	EPDM	

F560: DIMENSIONS AND WEIGHTS (PN10/PN16/PN25)



PN10

DN		80	100	125	150
D	[mm]	200	220	250	285
D1	[mm]	175	175	200	200
D2	[mm]	19	19	19	23
B(3)	[mm]	19	19	19	19
e1	[mm]	109	120	120	127
e2	[mm]	170	185	225	237
e3	[mm]	130	145	180	195
K	[mm]	160	180	210	240
L(1)	[mm]	280	300	325	350
Holes	[nr]	8	8	8	8
Weight(2)	[kg]	31	38	41	78

PN16

DN		80	100	125	150
D	[mm]	200	220	250	285
D1	[mm]	175	175	200	200
D2	[mm]	19	19	19	23
B(3)	[mm]	19	19	19	19
e1	[mm]	109	120	120	127
e2	[mm]	170	185	225	237
e3	[mm]	130	145	180	195
K	[mm]	160	180	210	240
L(1)	[mm]	280	300	325	350
Holes	[nr]	8	8	8	8
Weight(2)	[kg]	31	38	41	78

PN25

DN		80	100	125	150
D	[mm]	200	235	270	300
D1	[mm]	175	175	200	200
D2	[mm]	19	23	28	28
B(3)	[mm]	19	19	19	26
e1	[mm]	109	120	120	127
e2	[mm]	170	185	225	237
e3	[mm]	130	145	180	195
K	[mm]	160	190	220	250
L(1)	[mm]	280	300	325	350
Holes	[nr]	8	8	8	8
Weight(2)	[kg]	30,5	38	46	82

1: face to face dimension according to EN558 series 15
2: gearbox included
3: PN10-16 seal surface type B (raised face); PN25-40-64 seal surface type A (flat)

F560: DIMENSIONS AND WEIGHTS (PN40/PN64)

PN40

DN		80	100	125	150
D	[mm]	200	235	270	300
D1	[mm]	175	200	200	200
D2	[mm]	19	23	28	28
B(3)	[mm]	19	19	23,5	26
e1	[mm]	109	120	120	127
e2	[mm]	170	185	225	237
e3	[mm]	130	145	180	195
K	[mm]	160	190	220	250
L(1)	[mm]	280	300	325	350
Holes	[nr]	8	8	8	8
Weight(2)	[kg]	31	43	46	82

PN64

DN		80	100	125	150
D	[mm]	215	250	295	345
D1	[mm]	175	200	200	200
D2	[mm]	23	28	31	34
B(3)	[mm]	31	33	37	39
e1	[mm]	109	120	120	127
e2	[mm]	175	190	237	262
e3	[mm]	130	145	180	205
K	[mm]	170	200	240	280
L(1)	[mm]	280	300	325	350
Holes	[nr]	8	8	8	8
Weight(2)	[kg]	35	55	80	108

1: face to face dimension according to EN558 series 15
2: gearbox included
3: PN10-16 seal surface type B (raised face); PN25-40-64 seal surface type A (flat)

F500: TECHNICAL SPECIFICATIONS

DESIGN CHARACTERISTICS:

- Hydraulic test according to EN 1074-5;
- Compliant with EN 1074-5;
- The parts in contact with water are compliant with DM 174 of 6/04/2004, KTW, DVGW W270, WRAS;
- One-piece body made of ductile cast iron:
  - EN GJS 500-7 EN 1563 (GS 500-7) up to PN25 included;
  - EN GJS 400-15 EN 1563 (GS 400-15) for PN≥40 ;
- Face to face dimension according to EN 558 Series 15 (if not differently indicated);
- Flange dimensions according to EN 1092-2;
- All screws, washers, and nuts made of stainless steel A2-70 EN ISO3506-1 (interior);
- Pressure-balanced piston movable with minimal torque:
  - from DN150 to DN1000 made of stainless steel 1.4301 EN10088-3 (AISI304) or 1.4306 EN10088-3 (AISI304L);
  - from DN1200 to DN1400 made of stainless steel and FBE coated structural steel;
- Piston guides screwed to the valve body, made of friction and corrosion resistant bronze;
- Seat ring made of 1.4301 EN10088-3 (AISI304);
- Seal retaining ring made of 1.4301 EN10088-3 (AISI304);
- Rod-link mechanism:
  - link:
    - from DN200 to DN700 made of 1.4028 EN10088-3 (AISI420B);
    - from DN800 to DN1400 made of FBE coated structural steel;
  - expulsion-safe shaft made of 1.4028 EN10088-3 (AISI420B);
  - connecting rod made of 1.4028 EN10088-3 (AISI420B);
- All rotating parts of the rod-link mechanism are supported by solid maintenance-free bronze bearings;
- Main seal protected from the water stream, made of HPU (polyurethane);
- Piston seal obtained with a low friction lip-type seal made of HPU (polyurethane);
- The gearbox is suitable for coupling to an electrical actuator with an ISO 5211 flange;
- Interior/exterior corrosion protection with FBE coating (fusion bounded epoxy), blue colour RAL 5015, thickness 300µm.

ACCESSORIES:

- Depending on the operating conditions, dissipating cylinders made of 1.4301 EN10088-3 (AISI304) or 1.4306 EN10088-3 (AISI304L) can be supplied;
- Depending on the operating conditions, an air-intake device made of FBE coated structural steel can be supplied.

OPERATING LIMITS:

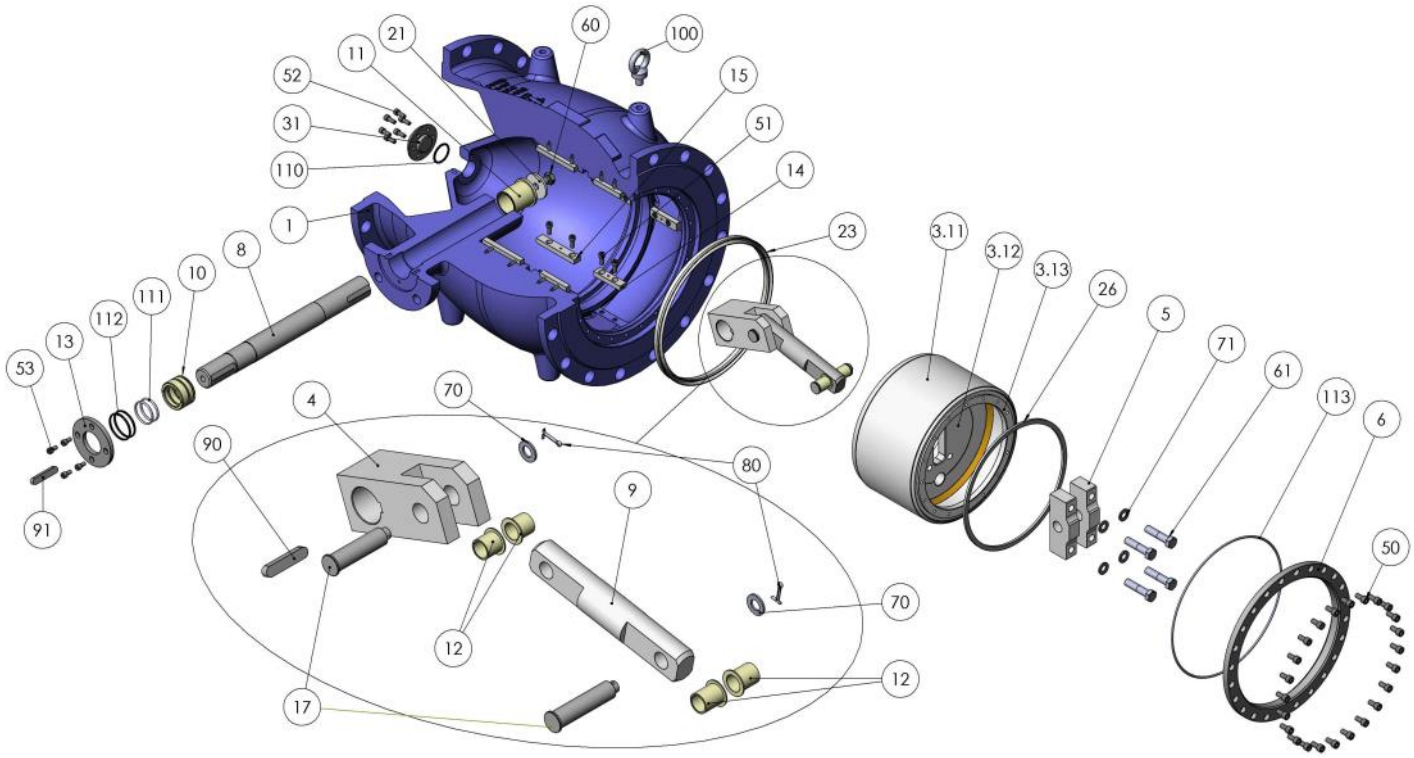
- Operating temperature: (water temp.) min.+0°C (without freezing) max. + 90°C.
- Storage temperature: (Room temp.) min. - 20°C max. + 70°C.
- Minimum permitted differential pressure: 0.2 bar

OPTIONAL HIGH CORROSION-RESISTANT MATERIALS

On request, some parts can be made in high corrosion-resistant materials:

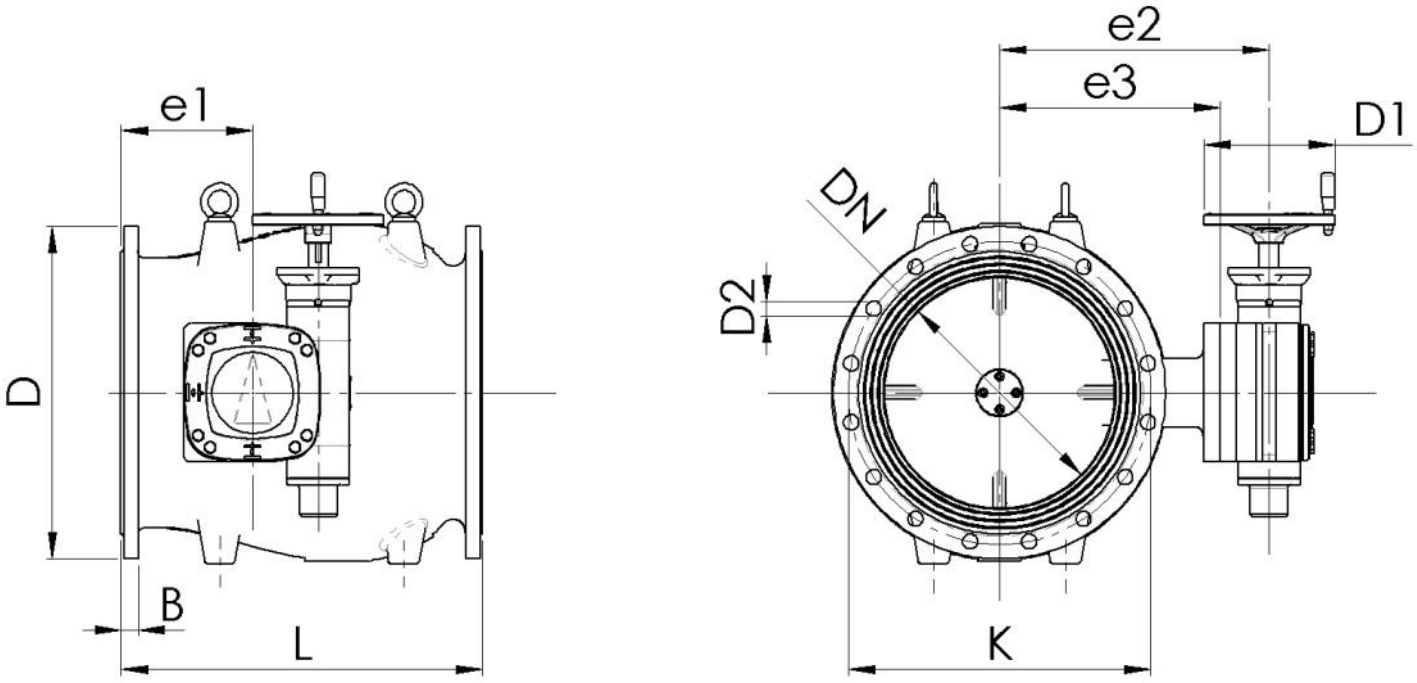
* piston, seat ring, and seal retaining ring made of **1.4401 EN10088-3 (AISI316)** or **1.4404 EN10088-3 (AISI316L)** stainless steel;
* rod-link mechanism made of **1.4462 EN10088-3 DUPLEX** stainless steel;
* screws, washers, and nuts made of **A4-70 EN ISO3506-1** stainless steel ;
* anticavitation cylinder made of **1.4401 EN10088-3 (AISI316)** or **1.4404 EN10088-3 (AISI316L)** stainless steel.

F500: DN200 ÷ 1400 - EXPLODED VIEW AND VALVE DESCRIPTION



ITEM	DESCRIPTION	MATERIAL	NOTES
1	Body	EN-GJS 500 - 7 EN1563 (GS 500 - 7)	*FBE Coated*
	Body (for PN ≥ 40)	EN-GJS 400 - 15 EN1563 (GS 400 - 15)	*FBE Coated*
3	Obturator	1.4301 EN10088-3 (AISI304) / 1.4306 EN10088-3 (AISI304L)	
4	Link (DN200… DN700)	1.4028 EN10088-3 (AISI420 B)	
	Link (DN800 … DN1400)	Structural steel	*FBE Coated*
5	Fork (DN200 … DN300)	1.4028 EN10088-3 (AISI420 B)	
	Bracket-fork (DN350 … DN1400)	Stainless steel	
6	Seating ring	1.4301 EN10088-3 (AISI304) / 1.4306 EN10088-3	
8	Shaft	1.4028 EN10088-3 (AISI420 B)	
9	Connecting rod	1.4028 EN10088-3 (AISI420 B)	
10 / 11 / 12	Outer/Inner bearing / Link bearing	CC 333 G EN 1982 CuAl10Fe5Ni5-C (Bronze)	
13	Actuator coupling disk	Stainless steel	
14/15	Sliding blocks	CC 333 G EN 1982 CuAl10Fe5Ni5-C (Bronze)	
17	Connecting pins	1.4028 EN10088-3 (AISI420 B)	
21	Stop washer	Stainless steel	
23	Lip Seal	C-HPU Rubber	
26	Main Seal	C-HPU Rubber	
41/50/51/52/53/ 60/61/70/71/80	Screws	A2-70 EN ISO3506-1	
90	Tongue (internal)	1.4028 EN10088-3 QT850 (AISI420 B)	
91	Tongue	1.0511 EN10083-2 + QT(C40B)	
110…113	O-Ring	EPDM	
31	Nose cone (DN200 … DN800)	Stainless steel	
	Nose cone (DN900 … DN1400)	Polymer POM	

F500: DIMENSIONS AND WEIGHTS (PN10)



DN		200	250	300	350	400	450	500	600	700	800	900	1000	1200	1400
D	[mm]	340	395	445	505	565	615	670	780	895	1015	1115	1230	1455	1675
D1	[mm]	200	200	200	250	250	250	250	250	250	250	250	250	250	250
D2	[mm]	23	23	23	23	28	28	28	31	31	34	34	37	41	44
B (3)	[mm]	20	22	24,5	24,5	24,5	25,5	26,5	30	32,5	35	37,5	40	45	46
e1	[mm]	160	164	185	200	230	235	245	318	310	325	350	360	425	475
e2	[mm]	273	300	352	410	440	470	500	563	647	700	753	815	1015	1128
e3	[mm]	228	255	295	335	365	395	425	488	572	625	678	740	900	1013
K	[mm]	295	350	400	460	515	565	620	725	840	950	1050	1160	1380	1590
L (1)	[mm]	400	450	500	550	600	650	700	800	900	1000	1100	1200	1400	1600
Holes	[nr]	8	12	12	16	16	20	20	20	24	24	28	28	32	36
Weight (2)	[kg]	106	145	195	290	335	495	470	700	1000	1330	1725	2265	3530	5020

1: face to face dimension according to EN558 series 15 up to DN1000
2: gearbox included
3: PN10-16-25 seal surface type B (raised face); PN40-64 seal surface type A (flat)

F500: DIMENSIONS AND WEIGHTS (PN16)

DN		200	250	300	350	400	450	500	600	700	800	900	1000	1200	1400
D	[mm]	340	405	460	520	580	640	715	840	910	1025	1125	1255	1485	1685
D1	[mm]	200	200	200	250	250	250	250	250	250	250	250	250	250	250
D2	[mm]	23	28	28	28	31	31	34	37	37	41	41	44	50	50
B (3)	[mm]	20	22	24,5	26,5	28	30	31,5	36	39,5	43	46,5	50	57	60
e1	[mm]	160	164	185	200	230	235	245	318	310	325	350	360	425	475
e2	[mm]	273	300	352	410	440	470	500	563	647	700	753	815	1015	1128
e3	[mm]	228	255	295	335	365	395	425	488	572	625	678	740	900	1013
K	[mm]	295	355	410	470	525	585	650	770	840	950	1050	1170	1390	1590
L (1)	[mm]	400	450	500	550	600	650	700	800	900	1000	1100	1200	1400	1600
Holes	[nr]	12	12	12	16	16	20	20	20	24	24	28	28	32	36
Weight (2)	[kg]	106	145	195	290	335	495	510	750	1005	1330	1770	2290	3575	5030

F500: DIMENSIONS AND WEIGHTS (PN25)

DN		200	250	300	350	400	450	500	600	700	800	900	1000
D	[mm]	360	425	485	555	620	670	730	845	960	1085	1185	1320
D1	[mm]	200	200	250	250	250	250	250	250	250	250	250	250
D2	[mm]	28	31	31	34	37	37	37	41	44	50	50	57
B (3)	[mm]	22	24,5	27,5	30	32	34,5	36,5	42	46,5	51	55,5	60
e1	[mm]	160	164	185	200	230	235	245	318	310	325	350	360
e2	[mm]	273	300	370	410	440	470	500	563	682	735	778	840
e3	[mm]	228	255	295	335	365	395	425	488	607	660	703	725
K	[mm]	310	370	430	490	550	600	660	770	875	990	1090	1210
L (1)	[mm]	400	450	500	550	600	650	700	800	900	1000	1100	1200
Holes	[nr]	12	12	16	16	16	20	20	20	24	24	28	28
Weight (2)	[kg]	113	152	248	324	404	501	593	768	1190	1575	2160	2850

1: face to face dimension according to EN558 series 15 up to DN1000
2: gearbox included
3: PN10-16-25 seal surface type B (raised face); PN40-64 seal surface type A (flat)

F500: DIMENSIONS AND WEIGHTS (PN40)

DN		200	250	300	350	400	500	600
D	[mm]	375	450	515	580	660	755	890
D1	[mm]	250	250	250	250	250	250	250
D2	[mm]	31	34	34	37	41	44	50
B (3)	[mm]	30	34,5	39,5	43,5	48	52	58
e1	[mm]	160	164	185	200	200	245	275
e2	[mm]	262	287	345	440	470	555	610
e3	[mm]	205	240	270	390	420	480	535
K	[mm]	320	385	450	510	585	670	795
L (1)	[mm]	400	450	500	550	600	700	800
Holes	[nr]	12	12	16	16	16	20	20
Weight (2)	[kg]	122	165	265	350	435	880	1020

F500: DIMENSIONS AND WEIGHTS (PN64)

DN		200	250	300	350	400
D	[mm]	415	470	530	600	670
D1	[mm]	250	250	250	250	250
D2	[mm]	37	37	37	41	44
B (3)	[mm]	46	50	57	61	65
e1	[mm]	160	164	185	218	238
e2	[mm]	280	315	345	465	495
e3	[mm]	205	240	270	390	420
K	[mm]	345	400	460	525	585
L (1)	[mm]	400	450	500	585	636
Holes	[nr]	12	12	16	16	16
Weight (2)	[kg]	150	195	285	490	640

1: face to face dimension according to EN558 series 15 (DN350 PN64 e DN400 PN64 excluded)
2: gearbox included
3: PN10-16-25 seal surface type B (raised face); PN40-64 seal surface type A (flat)

F550: TECHNICAL SPECIFICATIONS

DESIGN CHARACTERISTICS:

- Hydraulic test according to EN 1074-5;
- Compliant with DM 174 of 6/04/2004;
- Compliant with EN 1074-5;
- The parts in contact with water are compliant with KTW, DVGW W270, WRAS;
- One-piece body made of ductile cast iron according to EN GJS 500-7 EN 1563 (GS 500-7);
- Flange dimensions according to EN 1092-2;
- All screws, washers, and nuts made of stainless steel A2-70 EN ISO3506-1 (interior);
- Pressure-balanced piston movable with minimal torque made of stainless steel;
- Piston guides screwed to the valve body, made of friction and corrosion resistant bronze;
- Seat ring made of 1.4301 EN10088-3 (AISI304);
- Seal retaining ring made of 1.4301 EN10088-3 (AISI304);
- Rod-link mechanism:
  - link made of FBE coated structural steel;
  - expulsion-safe shaft made of 1.4028 EN10088-3 (AISI420B);
  - connecting rod made of 1.4028 EN10088-3 (AISI420B);
- All rotating parts of the rod-link mechanism are supported by solid maintenance-free bronze bearings;
- Main seal protected from the water stream, made of HPU (polyurethane);
- Piston seal obtained with a low friction lip-type seal made of HPU (polyurethane);
- The gearbox is suitable for coupling to an electrical actuator with an ISO 5211 flange;
- Interior and exterior corrosion protection obtained with FBE (fusion bounded epoxy) coating, colour blue RAL 5015, Thickness 300µm;

ACCESSORIES:

- Depending on the operating conditions, anticavitation cylinders made of 1.4301 EN10088-3 (AISI304) or 1.4306 EN10088-3 (AISI304L) can be supplied;
- Depending on the operating conditions, an air-sucking device made of FBE coated structural steel can be supplied;

OPERATING LIMITS:

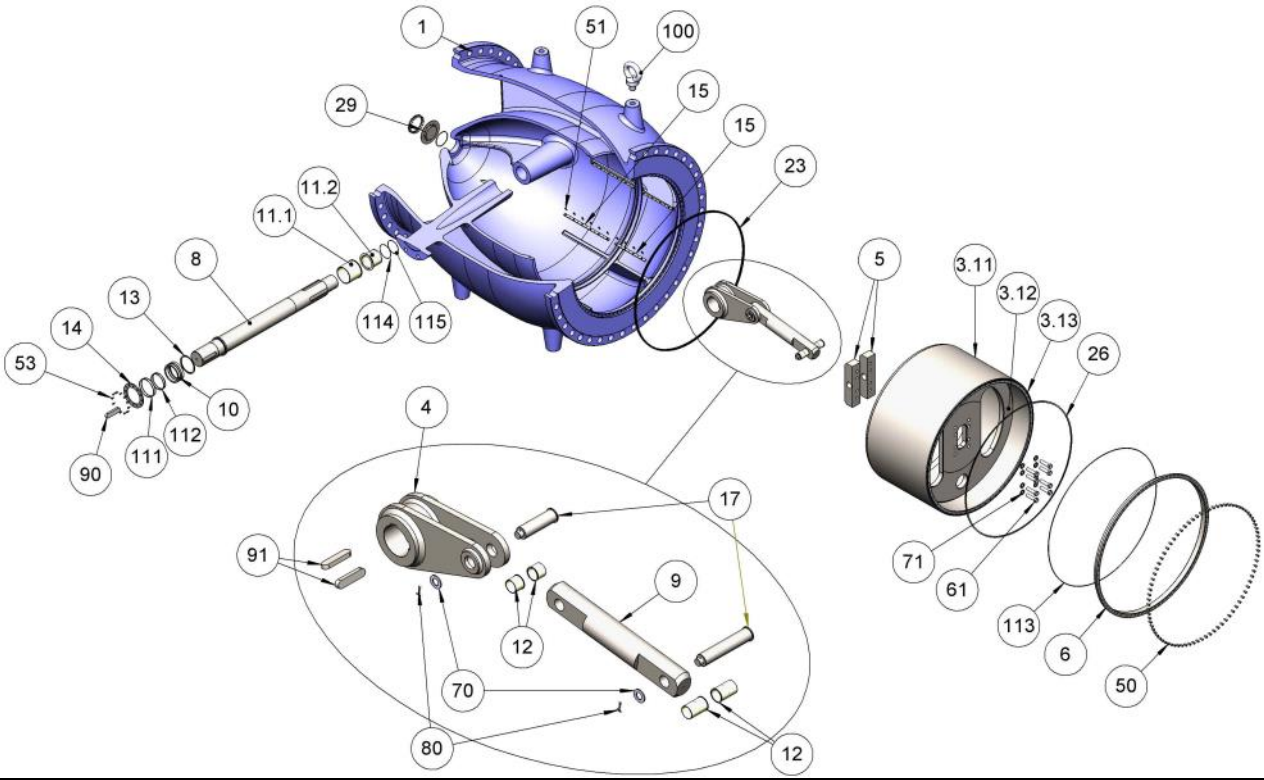
- Operating temperature: (water temp.) min.+0°C (without freezing) max. + 90°C.
- Storage temperature: (Room temp.) min. - 20°C max. + 70°C.
- Minimum permitted differential pressure: 0.2 bar

OPTIONAL HIGH CORROSION-RESISTANT MATERIALS

On request, some parts can be made in high corrosion-resistant materials:

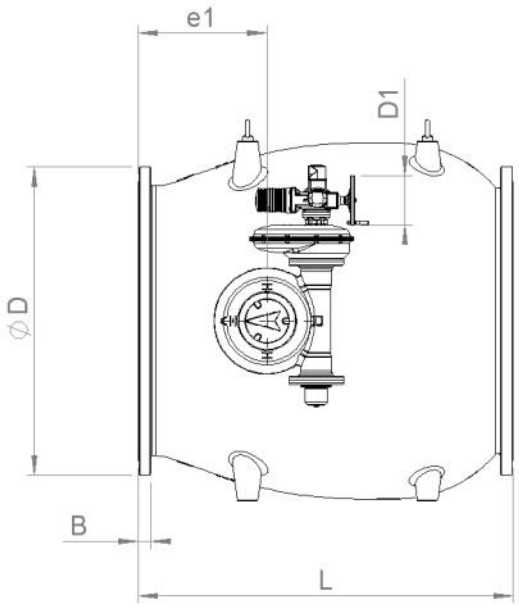
* piston, seat ring, and seal retaining ring made of **1.4401 EN10088-3 (AISI316)** or **1.4404 EN10088-3 (AISI316L)** stainless steel;
* rod-link mechanism made of **1.4462 EN10088-3 DUPLEX** stainless steel;
* screws, washers, and nuts made of **A4-70 EN ISO3506-1** stainless steel ;
* anticavitation cylinder made of **1.4401 EN10088-3 (AISI316)** or **1.4404 EN10088-3 (AISI316L)** stainless steel.

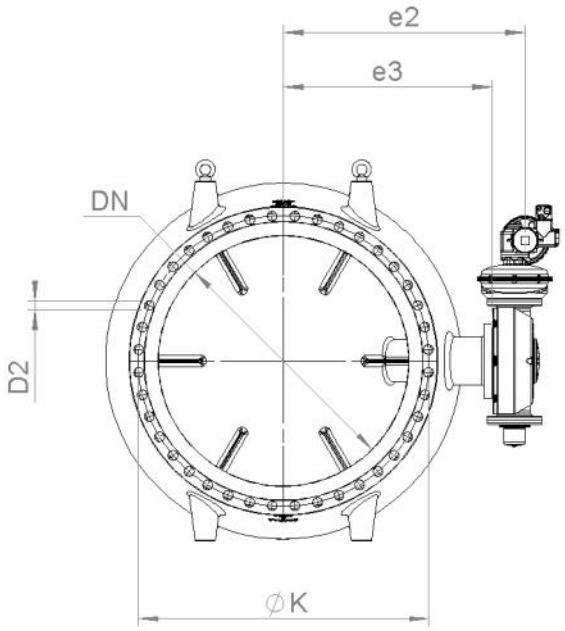
F550: DN1600 ÷ 1800 - EXPLODED VIEW AND VALVE DESCRIPTION



ITEM	DESCRIPTION	MATERIAL	NOTES
1	Body	EN-GJS 500-7 EN1563 (GS500)	*FBE Coated*
3.11 / 3.12 / 3.13	Obturator (pipe, frontal ring and frontal plate)	1.4306 EN10088-3 (AISI 304L)	
4	Link	S275JR EN1025-2 (Fe430B)	*FBE Coated*
5	Bracket-fork	S275JR EN1025-2 (Fe430B)	*FBE Coated*
6	Seating ring	1.4301 EN10088-3 (AISI 304)	
8	Shaft	1.4028 EN10088-3 QT850 (AISI420 B)	
9	Piston rod	1.4028 EN10088-3 QT850 (AISI420 B)	
10	Outer bearing	CC 333 G EN 1982 CuAl10Fe5Ni5-C	
11.1 / 11.2	Inner bearing	CC 333 G EN 1982 CuAl10Fe5Ni5-C	
12	Bearing	CC 333 G EN 1982 CuAl10Fe5Ni5-C	
13	Thrust bearing bushing	CC 333 G EN 1982 CuAl10Fe5Ni5-C	
14	Actuator coupling disk	1.4301 EN10088-3 (AISI 304)	
15/16	Guides	CC 333 G EN 1982 CuAl10Fe5Ni5-C	
17	Connecting rod	1.4028 EN10088-3 QT850 (AISI420 B)	
23	Lip seal	C-HPU Rubber	
26	Main seal	C-HPU Rubber	
29	Nose cone	1.4301 EN10088-3 (AISI 304)	
50/51 53 61	Bolts	A2-70 EN ISO3506-1	
70/71	Washers	A2-70 EN ISO3506-1	
80	Cotter pins	A2-70 EN ISO3506-1	
90	Tongue	1.0511 EN10083-2 +QT (C40B)	
91	Tongue (internal)	1.4028 EN10088-3 QT850 (AISI420 B)	
100	Eyebolt	--	
111...115	O-ring	EPDM	

F550: DIMENSIONS AND WEIGHTS





PN10

DN		1600	1800
D	[mm]	1915	2115
D1	[mm]	320	500
D2	[mm]	50	50
B (2)	[mm]	49	52
e1	[mm]	855	855
e2	[mm]	1610	1740
e3	[mm]	1365	1410
K	[mm]	1820	2020
L	[mm]	2300	2600
Holes	[nr]	40	44
Weight (1)	[kg]	10480	13850

PN16

DN		1600	1800
D	[mm]	1930	2130
D1	[mm]	320	500
D2	[mm]	57	57
B (2)	[mm]	65	70
e1	[mm]	855	855
e2	[mm]	1610	1740
e3	[mm]	1365	1410
K	[mm]	1820	2020
L	[mm]	2300	2600
Holes	[nr]	40	44
Weight (1)	[kg]	10500	14000

PN25

DN		1600	1800
D	[mm]	1975	2195
D1	[mm]	320	500
D2	[mm]	62	70
B (2)	[mm]	81	88
e1	[mm]	855	855
e2	[mm]	1610	1740
e3	[mm]	1365	1410
K	[mm]	1860	2070
L	[mm]	2300	2600
Holes	[nr]	40	44
Weight (1)	[kg]	11000	16000

1: gearbox included
2: seal surface type B (raised face).

PRESSURE DROPS

Pressure drops in plunger valves can be evaluated using equation (1.a) or equation (1.b):

$\Delta P = \xi * v^2 / (2\,g)$ [mhw] (1.a)

$\Delta P = (Q / K_v)^2$ [bar] (1.b)

Where:

- ΔP = pressure drop [unit: see formula above]
- ξ = pressure drop coefficient
- v = fluid speed referred to valve's DN [m/s]
- K_v = flow coefficient [m^3/h]
- g = 9.81 [m/s^2]
- Q = flow rate [m^3/h]

The pressure drop coefficient ξ can be calculated using (2.a) and the flow coefficient K_v can be calculated using (2.b):

$\xi = \xi^* \times \xi_{100}$ (2.a)

$K_v = K_{v\%} \times K_{vs}$ (2.b)

Where:

- ξ_{100} is the pressure drop coefficient of the fully open valve. It is listed in Table_1 for standard valves (**no dissipating cylinder**). For valves equipped **with dissipating cylinders,** ξ_{100} is the distinctive value of the cylinder (e.g.: for a valve equipped with a K20 dissipating cylinder, it will be $\xi_{100} = 20$).
- ξ^* expresses the percentage change in the pressure drop as the degree of valve aperture varies ($\xi^* = \xi / \xi_{100}$). ξ^* is shown in Diagram_1.
- K_{vs} is the flow coefficient of the fully open valve and is listed in Table_1.
- $K_{v\%}$ expresses the percentage change of Kv as the degree of valve aperture varies. $K_{v\%} = K_v / K_{vs}$. $K_{v\%}$ is shown in Diagram_2.

Plunger Valves - Hydraulic specifications																				
	F560				F500														F550	
DN	**80**	**100**	**125**	**150**	**200**	**250**	**300**	**350**	**400**	**450**	**500**	**600**	**700**	**800**	**900**	**1000**	**1200**	**1400**	**1600**	**1800**
Kvs [m³/h]	145	203	310	430	678	1070	1550	2120	2785	3540	4395	6380	8750	11480	14580	18010	26020	35430	64100	81200
ξ_{100}	3,1	3,8	4,0	4,3	5,5	5,4	5,3	5,2	5,2	5,1	5,1	5,0	4,9	4,9	4,8	4,8	4,8	4,8	2,5	2,5

Table 1

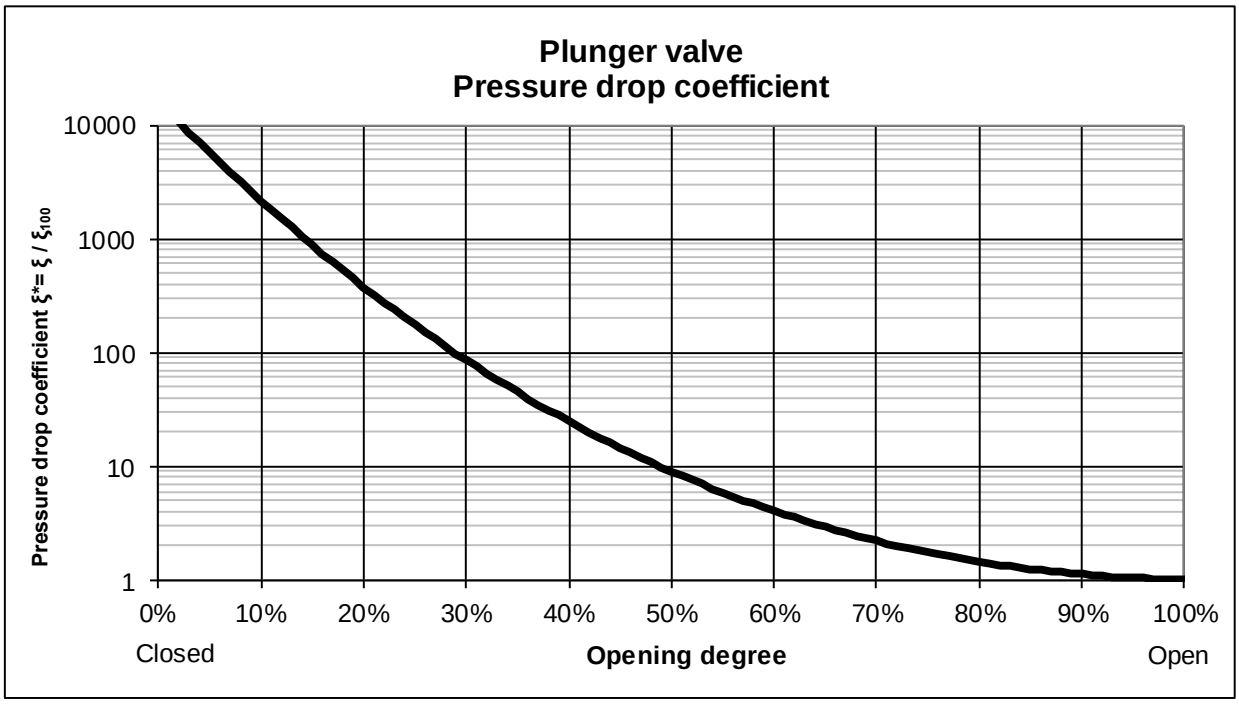


Diagram 1

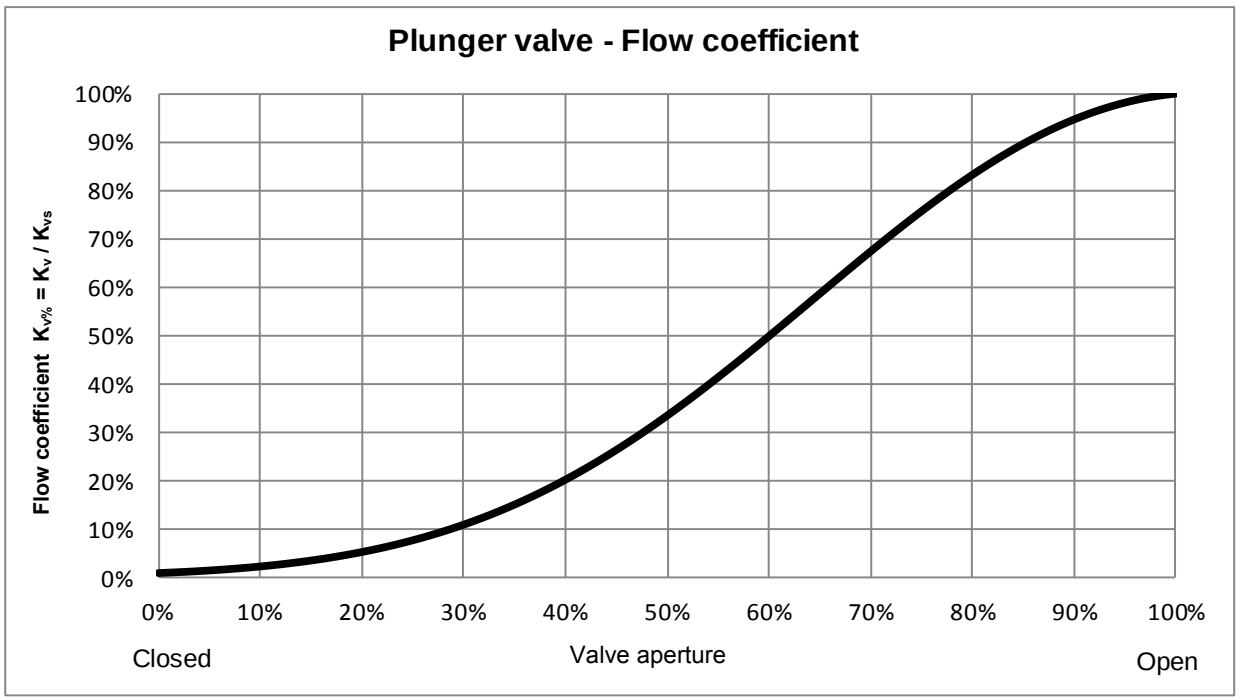


Diagram 2

CAVITATION

Cavitation risk in plunger valves can be evaluated by using equation (3):

$$\sigma > \sigma_L \qquad (3)$$

Where:

Cavitation number $\sigma = Pout / (\Delta P + v^2/2g)$ (4)

Cavitation limit σ_L is given in the diagram below

ΔP = pressure drop [mhw]

P_{out} = valve outlet pressure

v = fluid velocity referred to valve's DN [m/s]

g = 9.81 m/s^2

The valve will not cavitate as long as $\sigma > \sigma_L$.

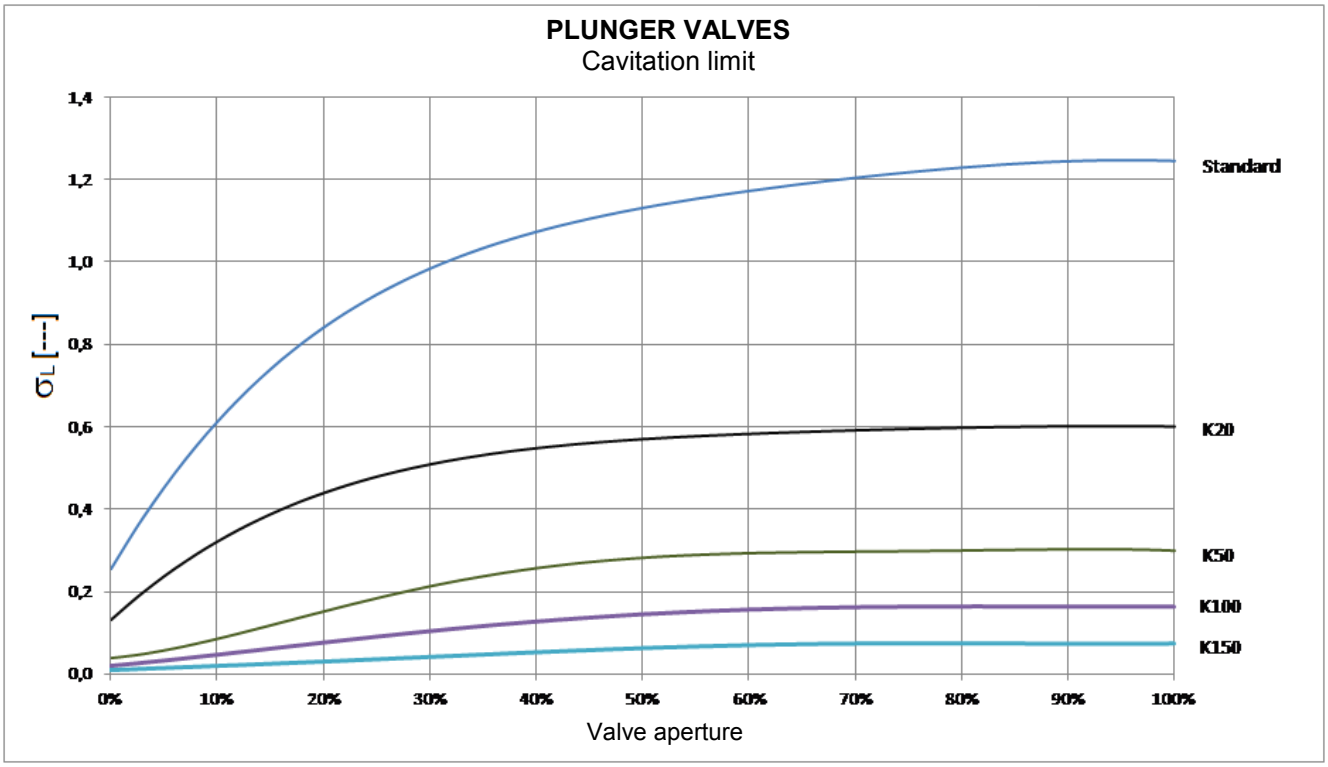
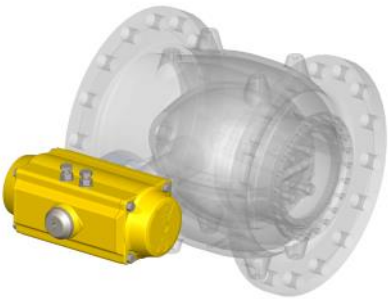


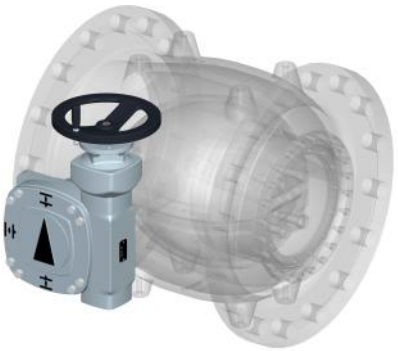
Diagram 3

MAIN OPERATING DEVICES

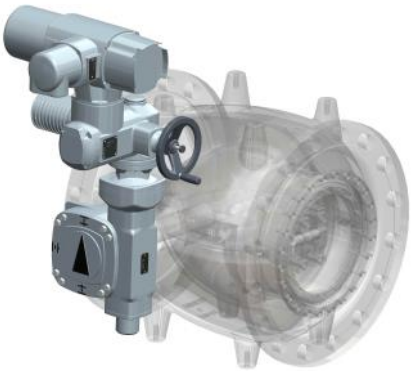
PNEUMATIC ACTUATOR



WORM GEARBOX
AND HAND WHEEL

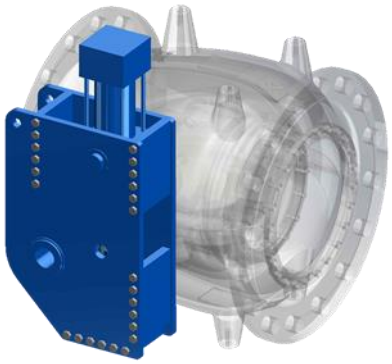


ELECTRIC ACTUATOR

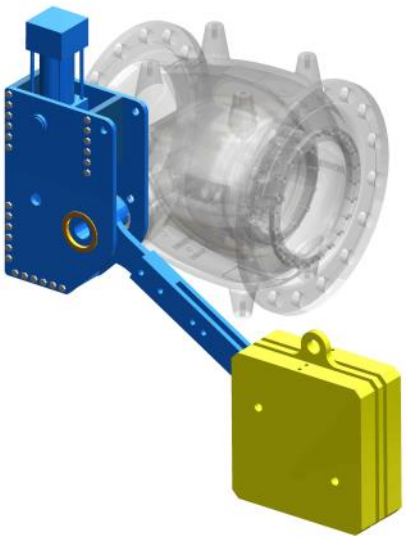


MAIN
VALVE

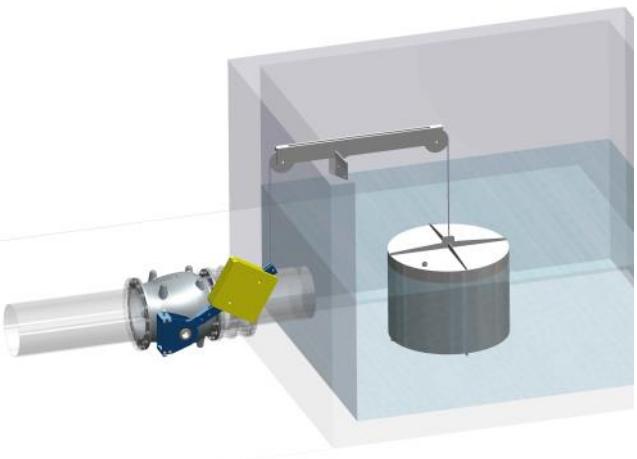
DOUBLE-ACTING HYDRAULIC
ACTUATOR



HYDRAULIC CYLINDER
AND COUNTERWEIGHT



FLOAT ACTUATOR



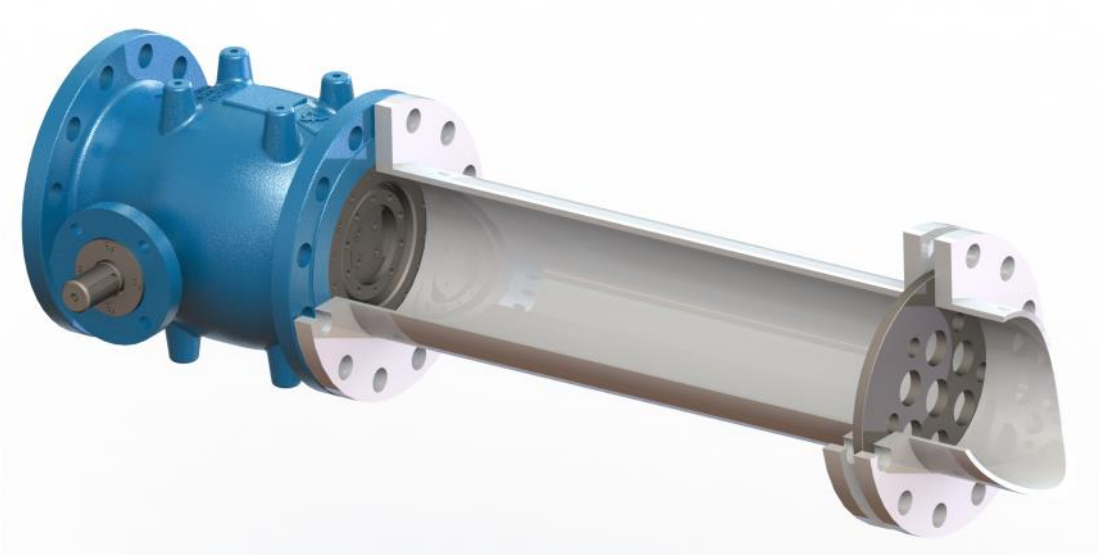
ACCESSORIES

DISSIPATING CYLINDER

VENTING DEVICE

MAIN VALVE

DISSIPATING PLATE



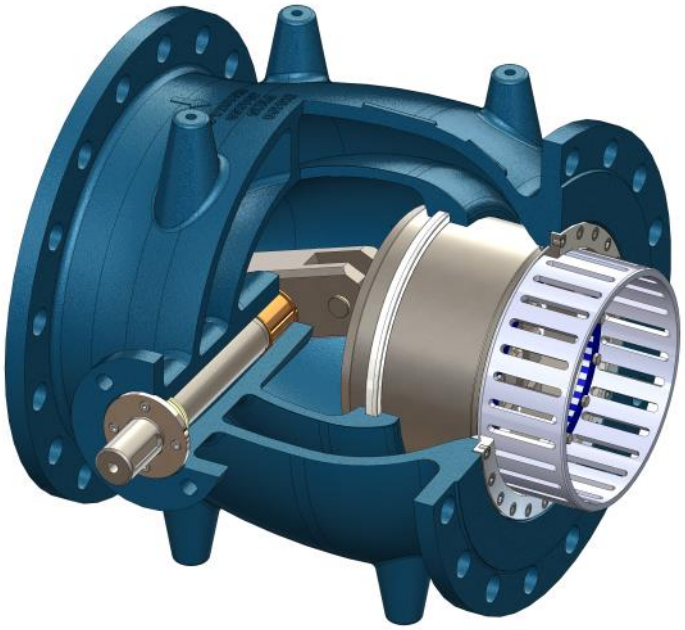
DISSIPATING CYLINDERS

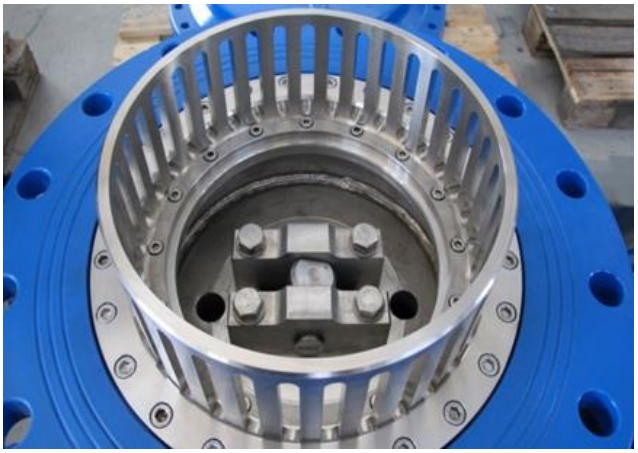
The valve can be equipped with a stainless steel **dissipating cylinder** specially slotted to divide the outlet flow into radial fluid jets that collide at the valve centre axis.

This device offers an energy dissipation curve adjusted to the real operating conditions of the valve and based on the plant's effective requirements.

Standard slotted cylinders are available for progressively greater resistance to cavitation and increasing pressure drops.

Special slotted cylinders can be fitted with the dimension, shape, and aperture calculated on the basis of the valve's effective operating conditions. For example, it is possible to limit headloss at higher valve apertures, and ensure high cavitation resistance at small apertures.





DIFFERENT TYPES OF DISSIPATING CYLINDERS

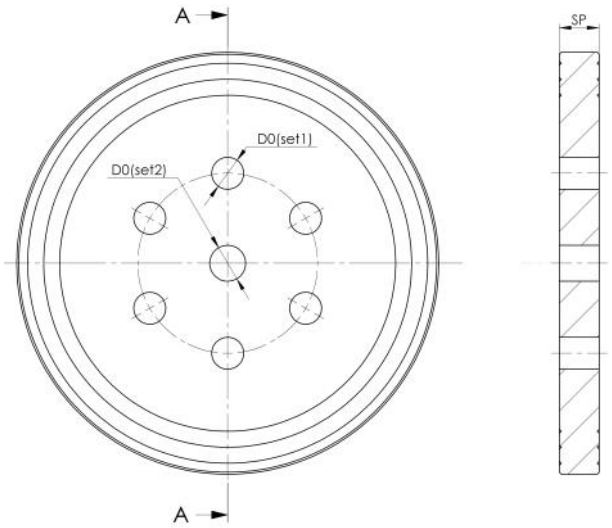
SPECIAL DISSIPATING CYLINDERS

DISSIPATING PLATE

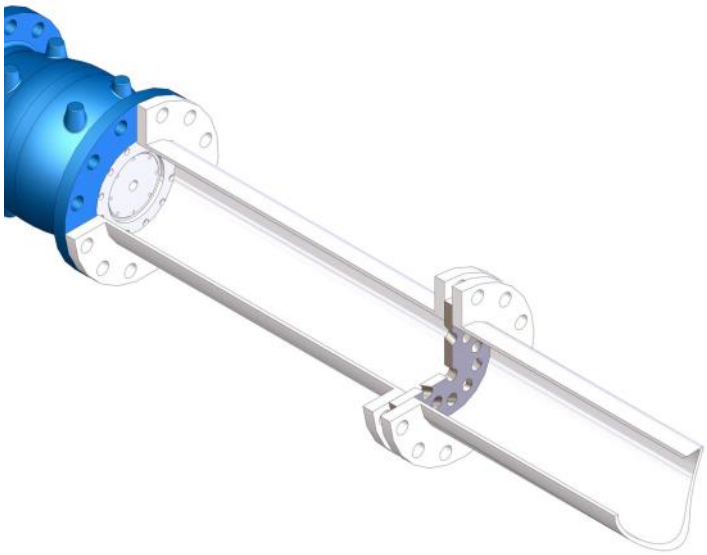
In the case of high hydraulic heads, when a dissipating cylinder is not enough to ensure adequate dissipation it should be combined with a perforated **dissipating plate** mounted downstream of the valve. A suitably designed plate will reduce the hydraulic head and support the dissipating action of the dissipating cylinder.

Depending on the number, size, and inclination of the holes, a dissipating plate provides different load dissipation values, improving the overall performance of the valve.

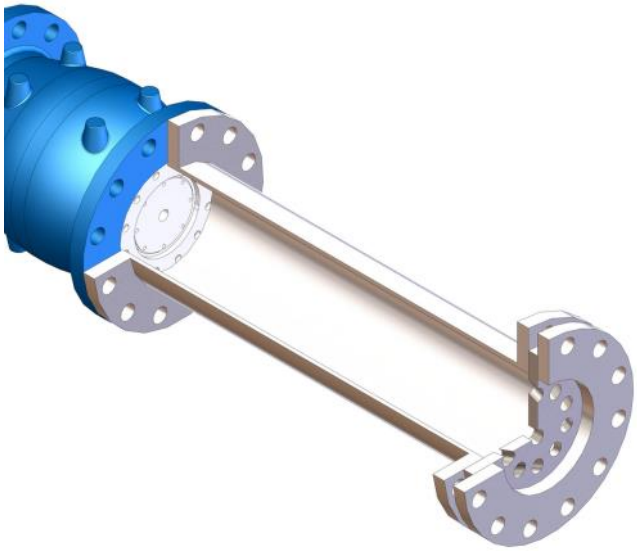
The recommended minimum pipe length upstream of a dissipating plate is $L_{PIPE} \geq 3$ X Valve DN. The outside diameter of a dissipating plate is suitable for connection using a flange according to EN1092-2. The recommended seal is flat type (on request, a dissipating plate can be made with O-ring seats).



DISSIPATING PLATE DUCTED



DISSIPATING PLATE - FREE DISCHARGE



AIR INTAKE

Cavitation can occur due to depression in proximity to a flange or pipe downstream of a valve. This can be avoided by fitting the valve with an adequate **air intake device** to intake air and compensate the fluid depression, thus reducing the risk of cavitation, ensuring extended safe operation of the valve, and protecting the downstream section of the plant.

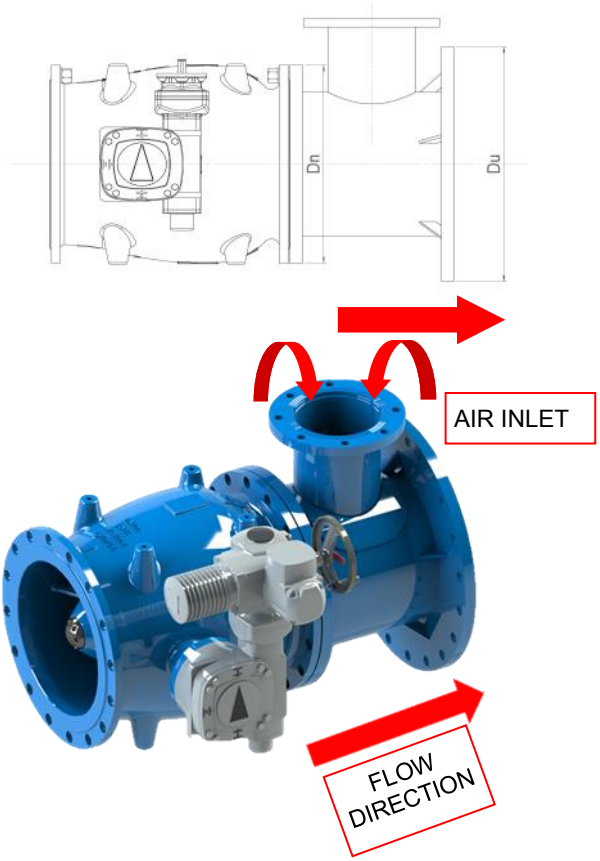
ATTENTION: The maximum working pressure allowed for an air intake is 2 bar.

When an air intake is fitted, the Silencer AS accessory can be useful to limit noise emissions.
The Silencer AS is fitted directly onto the air intake:

- ✓ Low noise emission, Silences AS is able to reduce noise down up to 30 decibels;
- ✓ Easy to install;
- ✓ Cost saving, no need for piping to connect the air intake to the exterior.

We recommend providing the maneuver chamber with a ventilation opening to avoid occurrence of under pressure.

DN 400 PN16 PLUNGER VALVE WITH AIR INTAKE DEVICE



	Air intake standard dimensions				
DN valve	*= DOUBLE AIR INLET / **= TO BE CONFIRMED				
[PN10/16]	Dn	Du	DN air inlet	Face to face	Weight [kg]
150	DN150	DN200	DN65	280	30
200	DN200	DN250	DN80	340	45
250	DN250	DN300	DN100	350	60
300	DN300	DN400	DN125	360	95
350	DN350	DN450	DN150	420	130
400	DN400	DN500	DN200	460	185
450	DN450	DN600	DN200	550	215
500	DN500	DN600	DN200	600	255
600	DN600	DN700	DN250	680	340
700	DN700	DN800	DN300	850	420
800	DN800	DN900	DN300	865	530
900	DN900	DN1000	DN350	900	720
1000	DN1000	DN1200	DN400	1000	940
1200*	DN1200	DN1400	DN400	1200 (**)	1550
1400*	DN1400	DN1600	DN400	1400 (**)	1950

DN 1200 PLUNGER VALVE WITH AIR INTAKE DEVICE

PLUNGER VALVE WITH AIR INTAKE DEVICE AND SILENCER "AS"

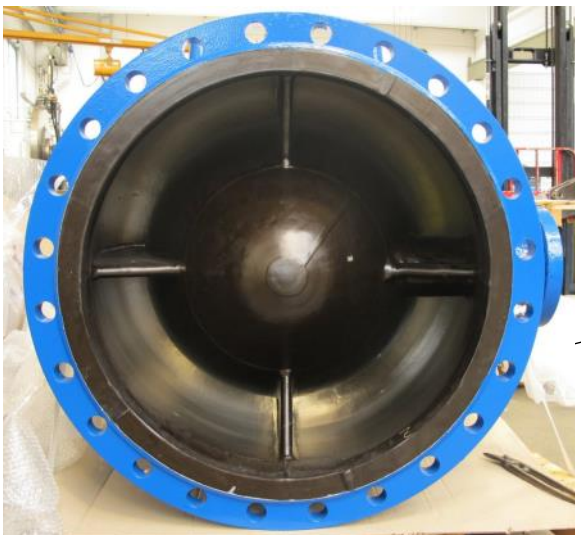
SPECIAL VERSIONS

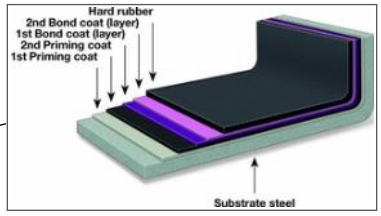
VULCANIZED HARD RUBBER LINED VALVE

Valves for saline media (seawater or well-desalination) or corrosive media have to resist chemical attack from chloride ions. Standard epoxy coated valve surfaces will be rapidly abraded due to the fluid aggressivity. The best possible solution to ensure extended valve life and safe operation of plants, is to entirely protect the internal valve surfaces with a **hard rubber lining** of 3 mm which ensures no metal parts come into contact with the aggressive fluids. The linings are applied by heating the elements to around 135°-145°C and vulcanizing rubber sheets onto the surfaces at a pressure of about 4.5 bar.

Other parts of the valve in contact with the fluids are made in duplex and AISI316 stainless steel, offering high resistance to corrosion in the presence of ions dissolved in water.

Typical applications for these valves are: water treatment plants, desalination plants, mines, industrial water handling, mineral treatment plants.





The valve body is internally covered with a rubber layer which provides additional protection to corrosion from brackish water and significantly increases the life of the valve.

F600: STEEL VALVE - PN100

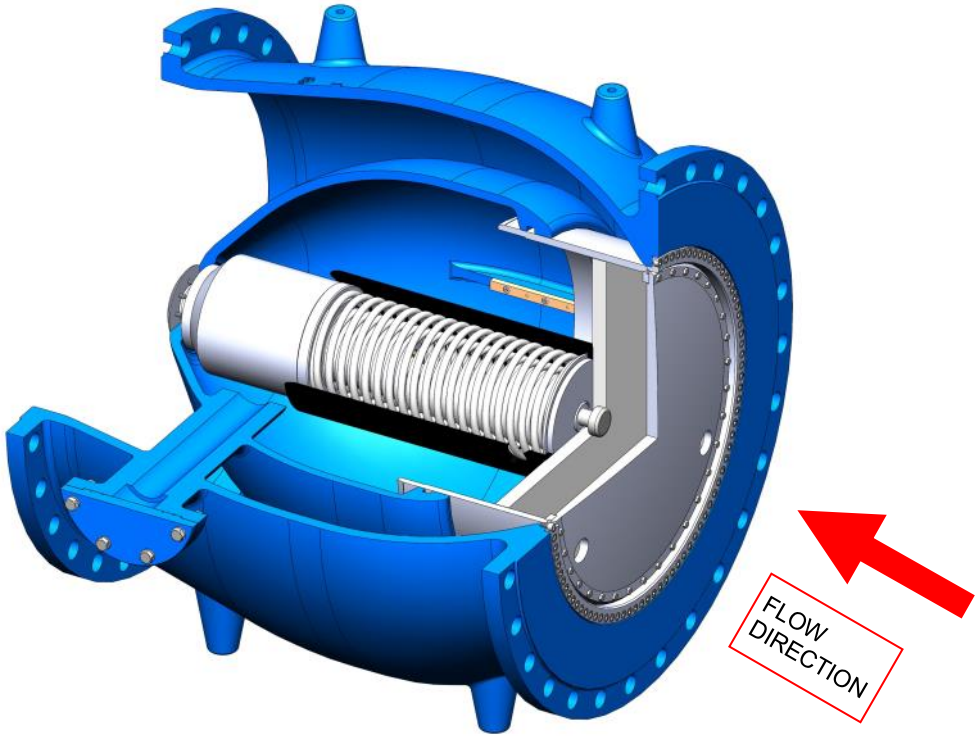
In high pressures applications (PN ≥ 64 bar) the valve body is made of welded steel P355N (high mechanical strength) and suitable welding material.

Typical applications include hydroelectric power plants with high hydraulic heads, snowmaking systems, testing systems, and systems subject to high pressure testing.

F600 PN100 HYDRAULIC TEST
(PRESSURE TEST = 150 BAR)

CHECK VERSION

Check valves are designed to perform a retaining function, typically downstream of pumping stations.



In the case of pump stoppage, a check valve provides rapid closure of the plunger by a spring system before the flow can reverse into the pump with a risk of damage.The seal is secured by the pressure generated in the inner barrel under backflow pressure, augmenting the action of the springs. The valve plunger is supported by four external self-lubricating guides, which guarantee a smooth sliding action. These features ensure the check valve high strength and reliability.
Available two standard versions, to satisfy most customer needs:

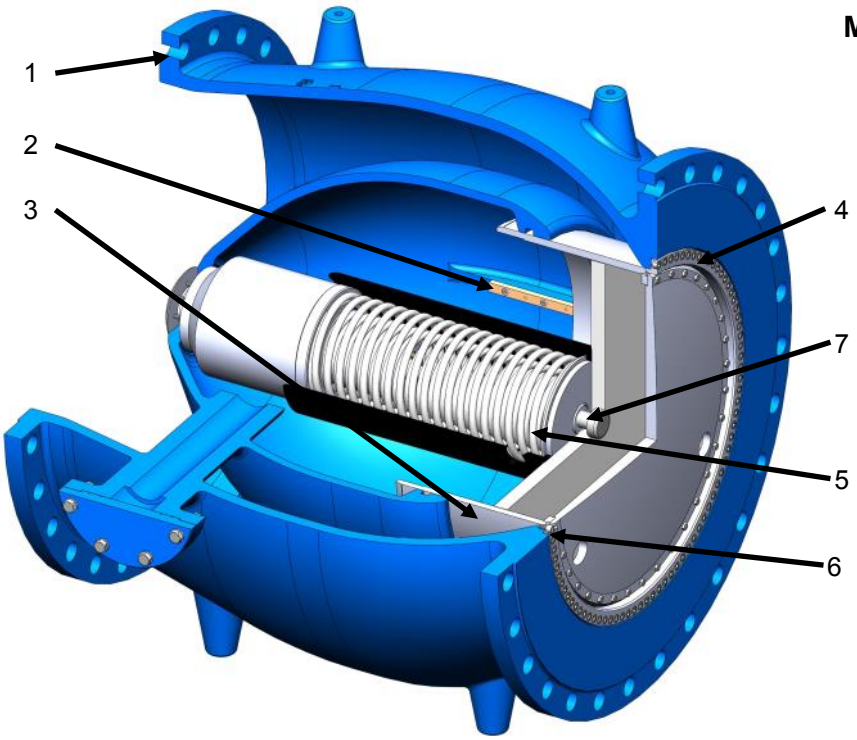
- **TYPE “A” with operating circuit;**

- **TYPE “B” without operating circuit.**

Other versions available on request.

CHECK VERSION

MATERIALS AND COMPONENTS



N.	DESCRIPTION	MATERIAL
1	Body	Cast iron
2	Guides	Marine Bronze
3	Plunger (shutter)	Stainless steel (AISI 304)
4	Seating ring	Stainless steel (AISI 304)
5	Springs	Stainless steel for springs
6	Main seal	C-HPU Polyurethane
7	Spring guide components	Stainless steel (AISI 304)
	Main components of the pilot circuit (when present - optional)	Stainless steel (AISI 304)

VALVE RANGE*				
PN	**10/16**	**25**	**40**	**64**
DN	80...1000	80...600	80...500	80...150

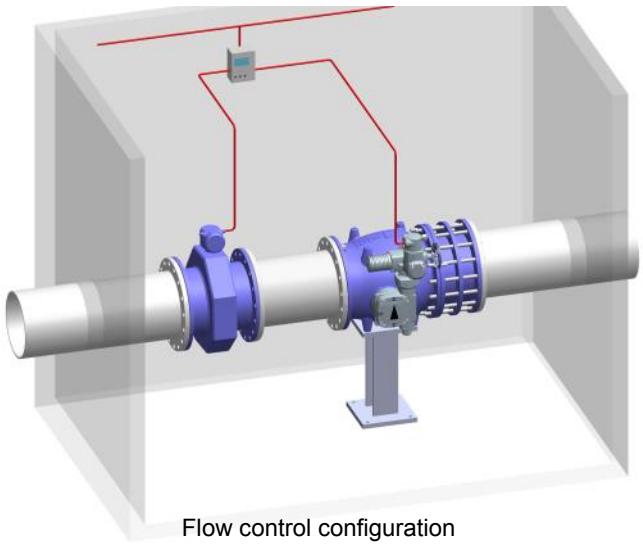
*: For the overall dimensions of check valves, refer to those of the plunger valves previously mentioned.

TYPICAL INSTALLATIONS

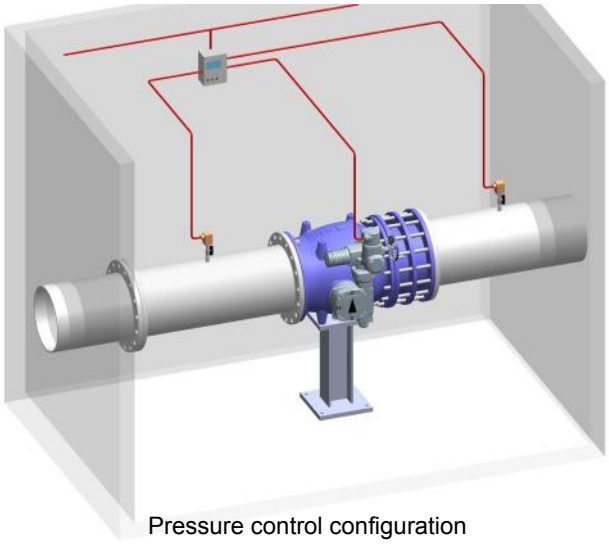
1. Flow and pressure control

The most frequently used valves for pressure reduction or flow control are diaphragm valves, but these have limitations as regards hydraulic behaviour and size.

Plunger valves are also perfectly suited for precise and reliable control of pressure and flow, and they have the advantage of nominal diameters ranging from DN 80 to DN 1800. Unlike diaphragm valves (only operated hydraulically), plunger valves require an external actuator, which can be operated manually, electrically, pneumatically, hydraulically, by float devices, or by gravity (cylinder with counterweight). Pressure or flow can be controlled using external actuators to reduce or increase the inner cross-section of the valve, commanded by an external unit (PLC) connected to pressure gauges (fitted upstream and downstream of the plunger valve) or a flow meter (mounted upstream of the plunger valve).



Flow control configuration

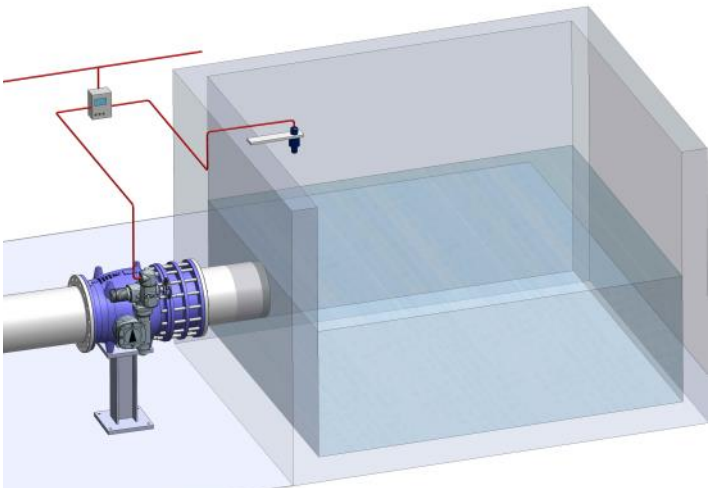


Pressure control configuration

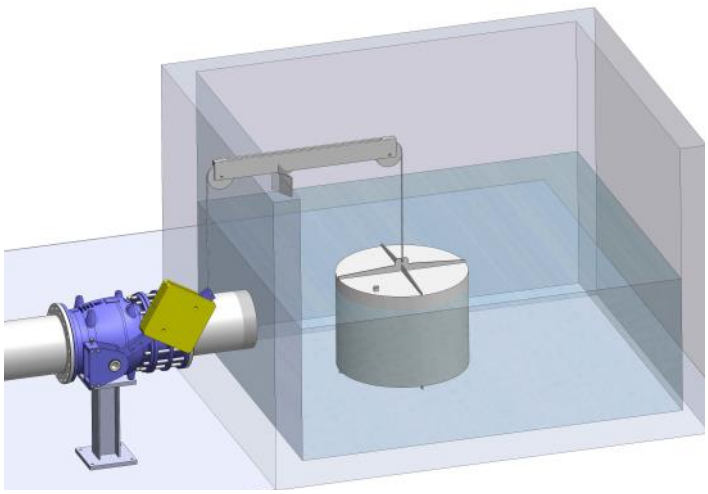
2. Level control

Plunger valves can control reservoir filling to maintain a constant water level regardless water demand.

It is important to carefully select the valve diameter according to the system's hydraulic parameters: if the valve is oversized, there could be fluctuations in tank level or the time needed to reach the desired level may be too long.

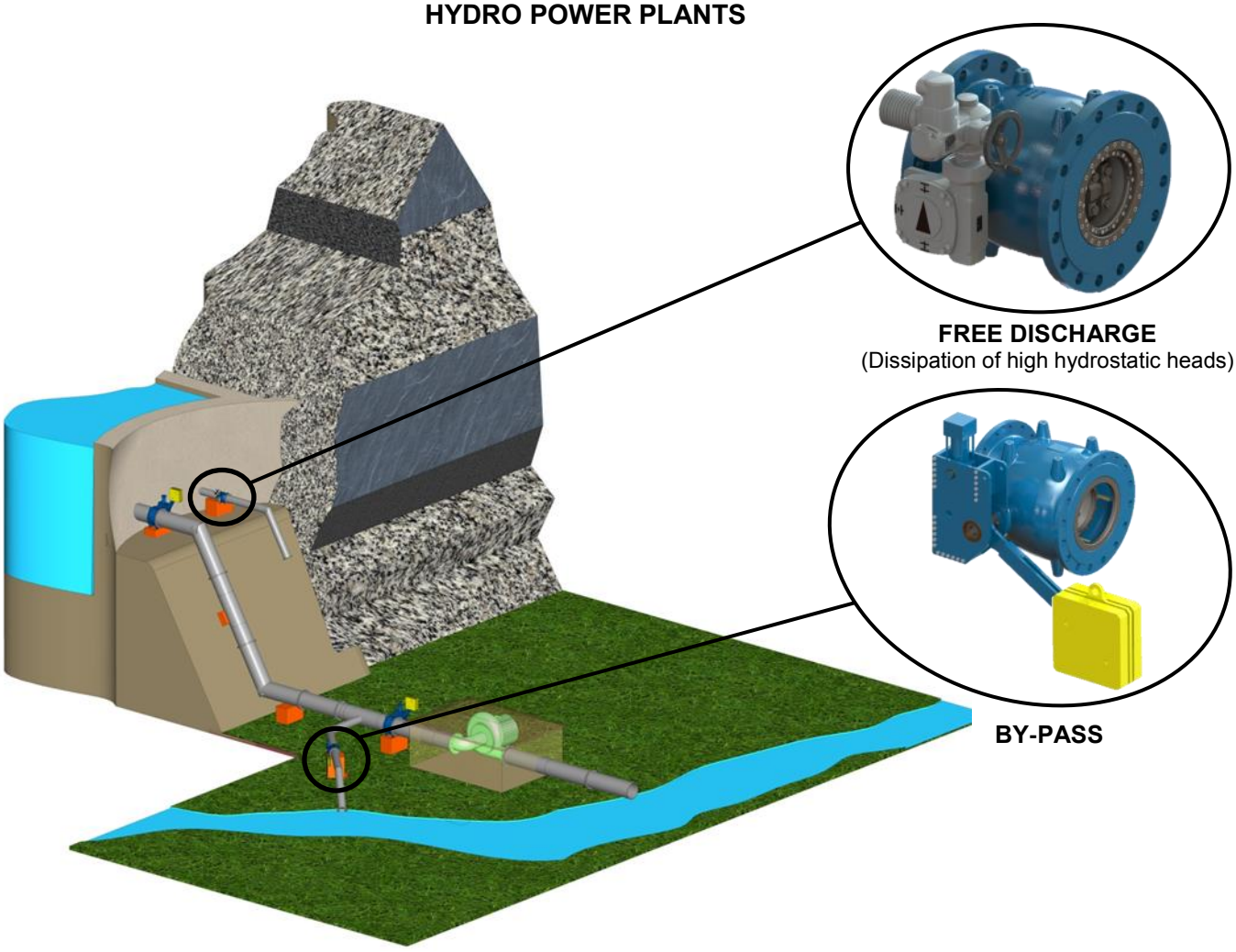


With electric type actuator and level sensor



With counterweight system and float

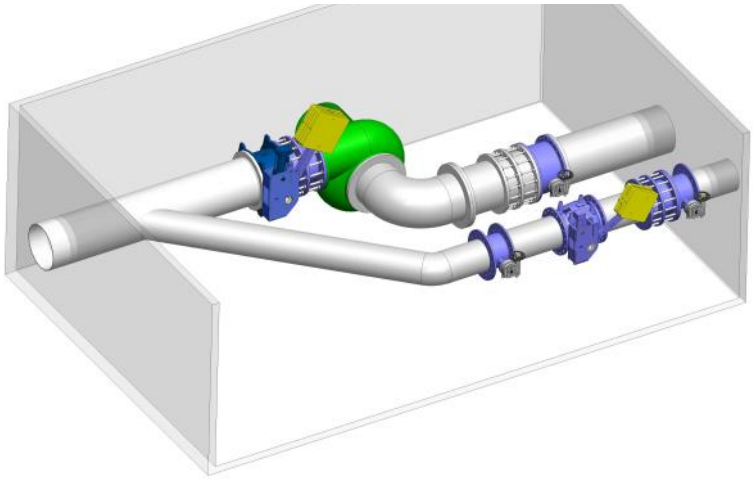
HYDRO POWER PLANTS



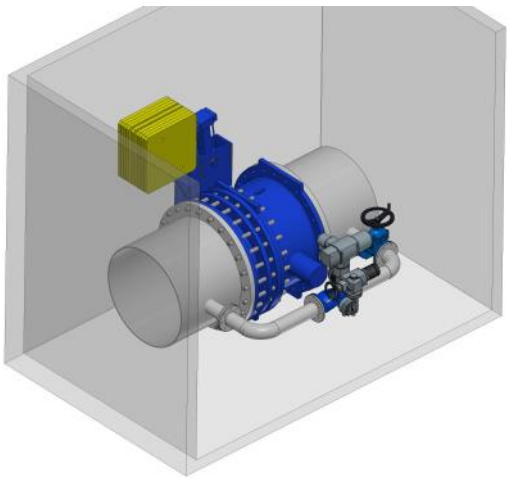
3. By-pass valve

A plunger valve can be used as a:

- By-pass valve for hydroelectric installations for the protection of the turbine-generator or when servicing the turbine;
- By-pass valve for filling large pipelines.



By-pass for turbine-generator

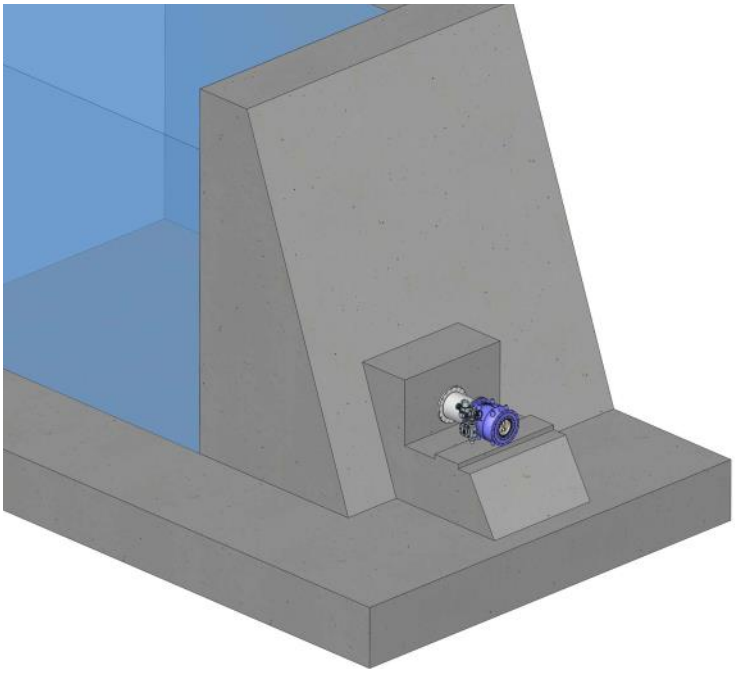


By-pass for filling large pipelines

TYPICAL INSTALLATIONS - HYDRO POWER PLANTS

4. Dissipation of high hydrostatic heads

Plunger valves are used for free discharge outlets.
A typical example is a dam base discharge valve.



AIR APPLICATIONS

Plunger valves can be used to regulate the rate of air flow into water treatment plants.

Figs. 1 & 2 — Plunger valve for regulating air flow into a nitrification tank: the valve is equipped with an electrical actuator.

MAIN FEATURES:

- Precise adjustment to regulate the rate of air flow based on the tank's dissolved oxygen concentration parameters.
- Optimized blower operation with resulting overall energy savings for the plant.

TECHNICAL SPECIFICATIONS:

Valve pressure drop: up to 1 bar

Operating temperature: +0°C to 90°C / (+0°C to 110°C on request)

Typical applications:
In water treatment plants, downstream of blowers for the input of air into tanks (nitrification, preliminary treatments, etc.).

Valves can be used with various gasses including: air, nitrogen, carbon dioxide. NOT for flammable, corrosive or hazardous gasses.

In air applications, the use of a *slotted cylinder* permits optimization of valve performance, modifying the adjustment curve on the basis of effective requirements. This makes it possible to adjust the shutter travel on the basis of flow variation.

Slotted cylinders are available for progressively greater pressure drops.

Plunger valve for air with slotted cylinder

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