

PLUNGER FLOW CONTROL VALVES

VALVES DEDICATED TO THE WATER DISTRIBUTION NETWORK
AND HYDROPOWER SECTOR

WE DO NOT SELL JUST VALVES, WE SELL A SOLUTION
FOR THE EFFICIENCY OF THE WATER NETWORK

MADE IN EUROPE

TIS SERVICE

TIS POLSKA

TIS ASIA

TIS AMERICA

Ti.S GROUP



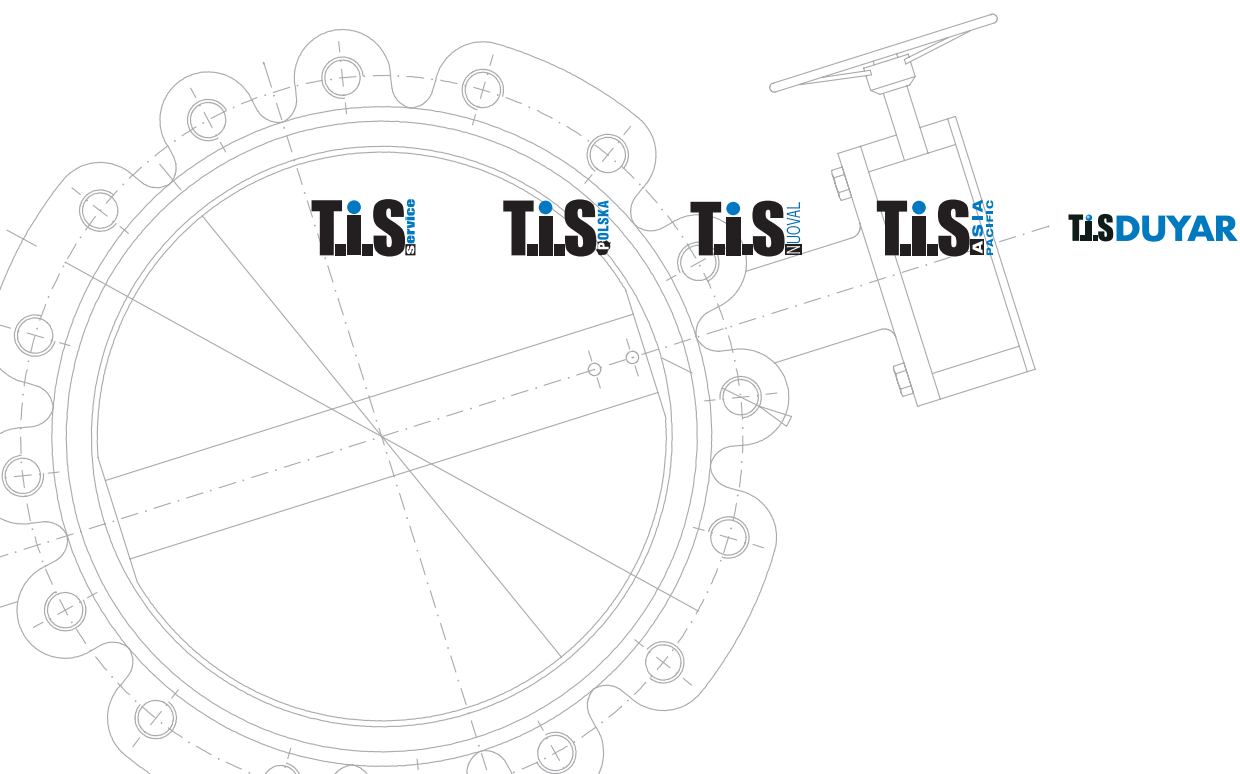
T.I.S. SERVICE S.p.A., is a leading international company specializing in the production and sale of equipment for water networks services and for hydroelectric power plants. One of its core products are safety valves.

Thanks to its partners, the company is able to produce a wide range of high technology valves and fittings, both in cast iron and plastic; butterfly valves, gate valves, air release valves, automatic control valves, plunger flow control valves and dismantling joints. These products can be controlled by electric motors or pneumatic actuators.

The T.i.S. system guarantees a complete solution package: from individual equipment supplies to engineering consultations on the more complex problems of water systems. The company's main activities are: supply of hydraulic equipment, automation, hydraulic network modelling and model calibration, leak detection, controlled pressure management, energy efficiency, white certificate management.

T.i.S. Service offers customers a personalized service, from the equipment selection stage right through to after-sales support.

All T.i.S. companies are certified ISO 9001. The company has held the prestigious Group certification since 2011.



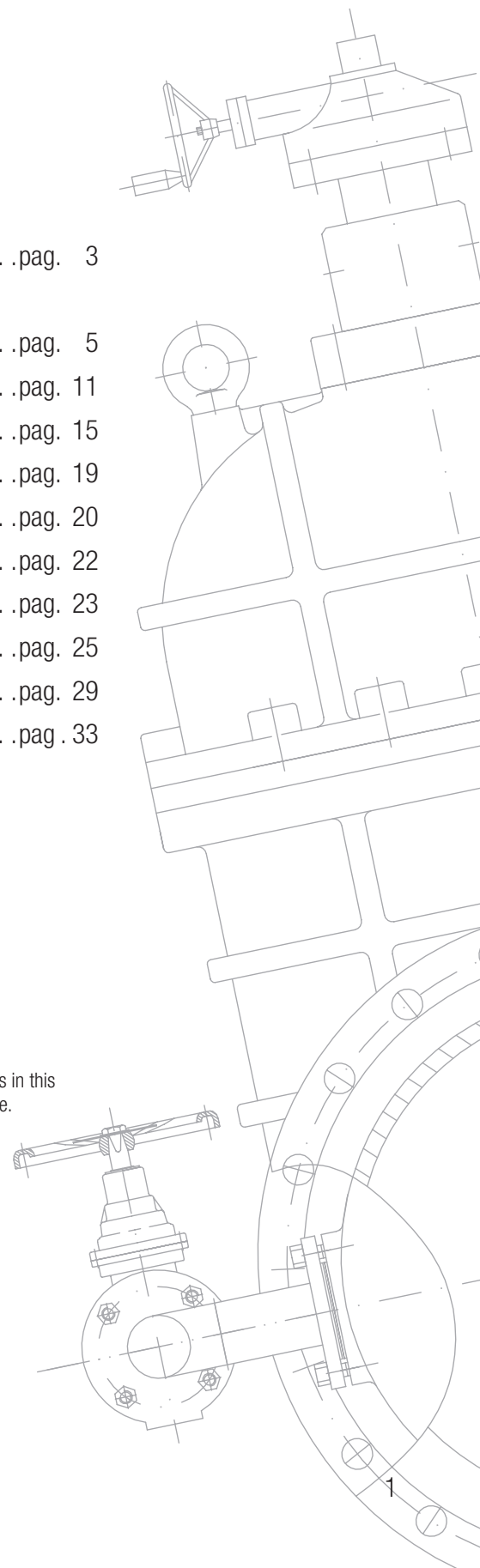


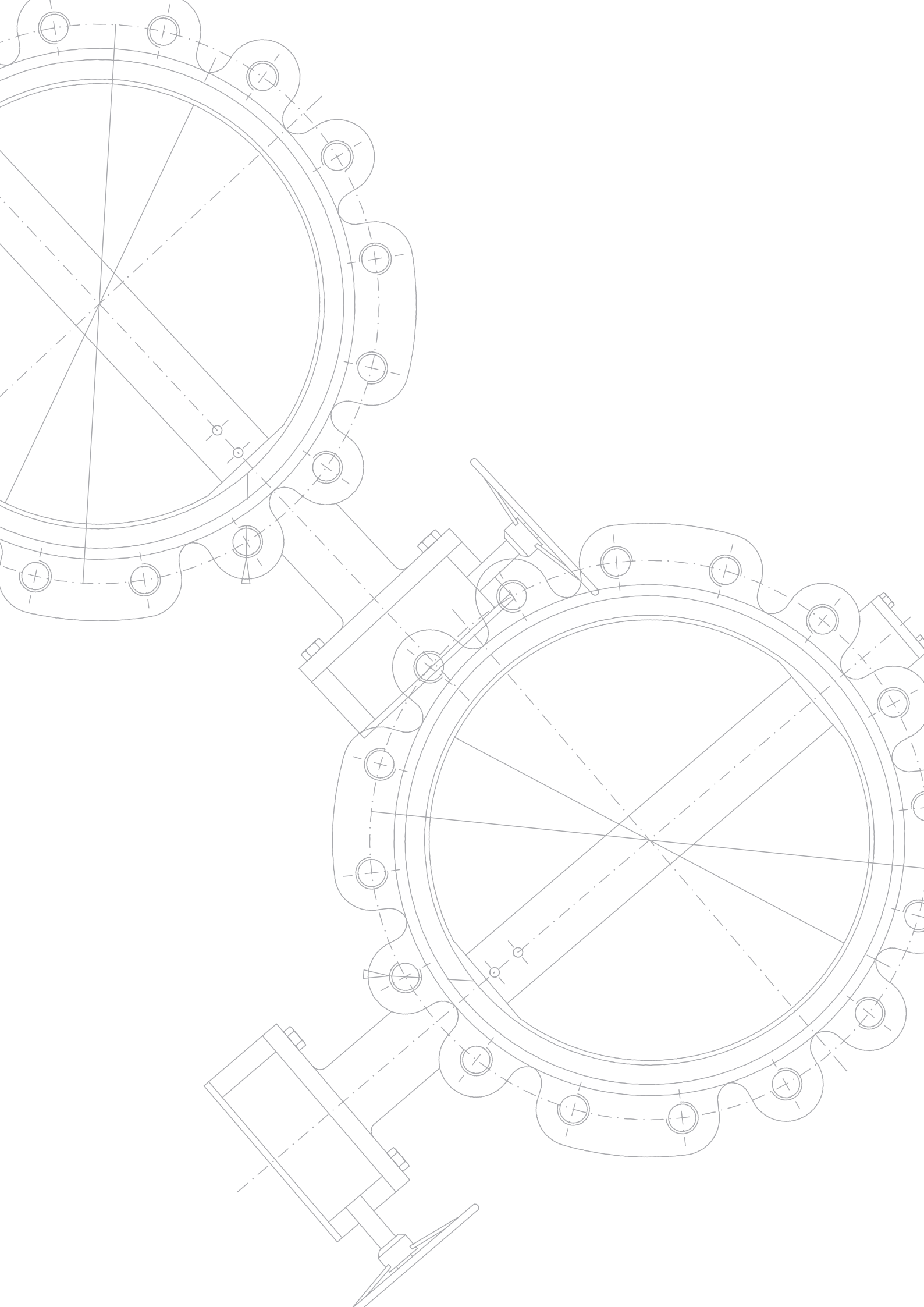
PLUNGER FLOW CONTROL VALVES

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Data, photographs, illustrations and drawings concerning the products in this catalogue are merely indicative and could be varied without any notice.







INTRODUCTION

INTRODUCTION



Plunger flow control valve is mainly designed for water flow rate and pressure regulation in a pipeline. The regulation takes place through to the 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 properly shaped in order to protect the plunger from the water stream: this avoids noises and cavitation damages. This characteristic allows also vibrations-free operation.

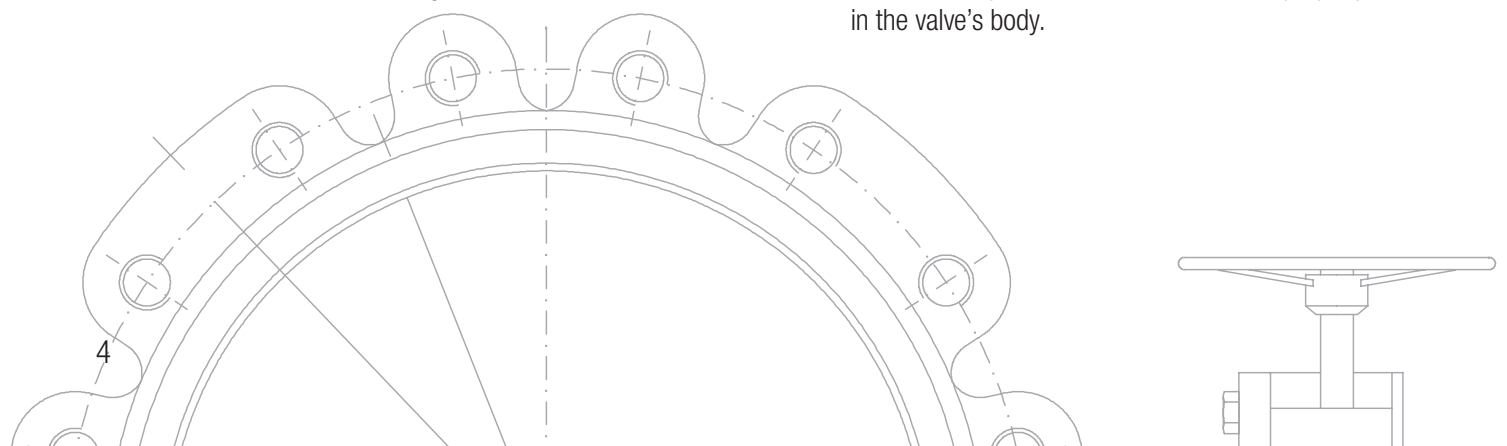
The water flow is guided in an annular chamber around the central body of the valve. The cross section of this chamber reduces continuously from the inlet up to the outlet. Because of this, the flow speed rises and the pressure decreases.

The geometrically ideal design, allows to protect the pipe from the cavitation's bubbles, which are directed towards the center of the outlet downstream flange.

Due to the perfect balance between the upstream and downstream chambers, plunger flow control valve needs a low torque to be operated. The operating mechanism consists in a link, shaft and connecting rod made of stainless steel. All the moving parts are supported by marine bronze bushings.

The sliding surfaces of the plunger is entirely made of stainless steel and is led by sliding blocks which ensure stability in all operating conditions. The sliding blocks are screwed to the valve's body, this allows a very easy maintenance. Stainless steel seating ring is screwed onto the valve's body; its design ensures a perfect seal and an easy maintenance of the parts inside the valve.

Seals are made of polyurethane rubber: the main seal is inserted directly into the top of the piston, the lip seal has a special antiextrusion profile and is inserted into a properly seat created in the valve's body.





F500

TECHNICAL SPECIFICATIONS

CONSTRUCTION CHARACTERISTICS:

Hydraulic test according to EN 1074-5;

- Conform to EN 1074-5;
- The parts in contact with water are conform to DM 174 of 6/04/2004, KTW and DVGW W270;
- One-piece body made of ductile cast iron:
 - * DN150 cast iron type EN GJS 400-15 EN 1563 (GS 400-15);
 - * from DN200 to DN1400 cast iron type EN GJS 500-7 EN 1563 (GS 500-7);
- Face to face dimension according to EN 558 Series 15 (DN + 200mm);
- Flange dimensions according to EN 1092-2;
- All screws, washers and nuts made of stainless steel A2-70 EN ISO3506-1 (inside);
- Pressure-balanced piston movable with minimum torque:
 - * from DN150 to DN900 made of stainless steel 1.4301 EN10088-3 (AISI304) or 1.4306 EN10088-3 (AISI304L);
 - * from DN1000 to DN1400 made of stainless steel and FBE coated structural steel;
- Piston guides screwed to the valve body, made of rubbing 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 DN150 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 and 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 the coupling with an electrical actuator using an ISO 5211 flange;
- Inside/outside corrosion protection with FBE coating (fusion bounded epoxy), blue colour RAL 5015, thickness 300µm.

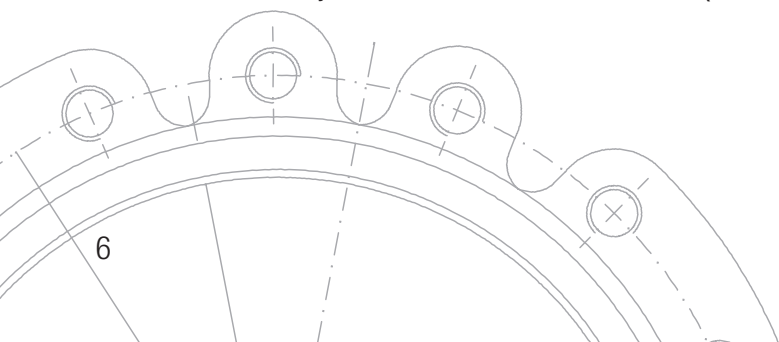
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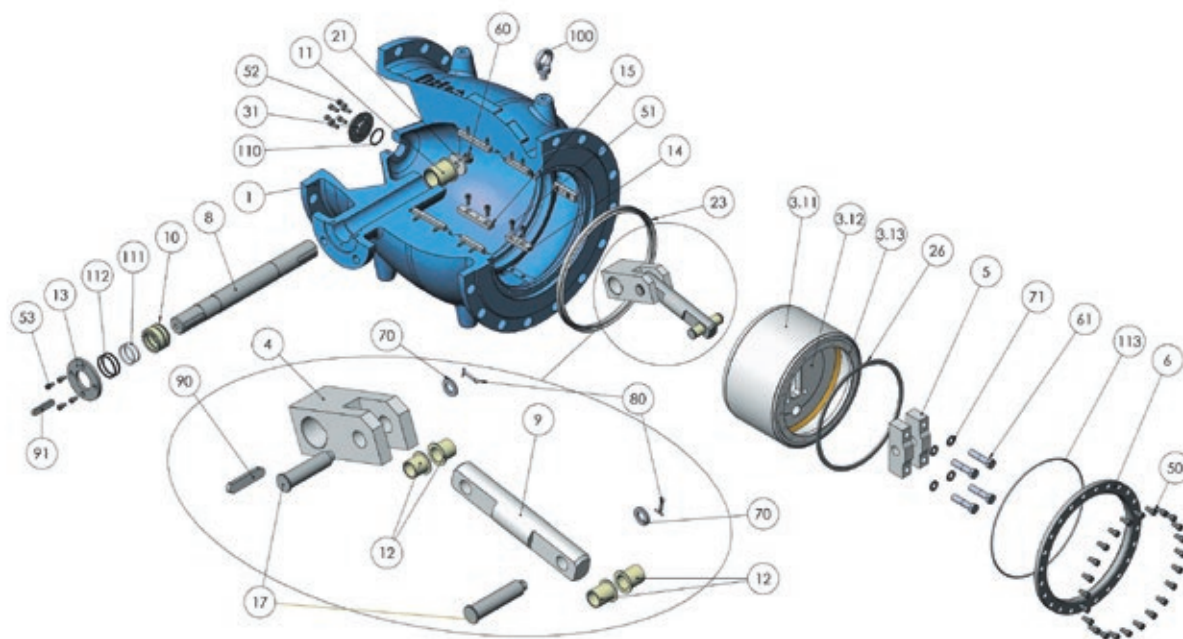
- Depending on the working conditions, dissipating cylinders made of 1.4301 EN10088-3 (AISI304) or 1.4306 EN10088-3 (AISI304L) can be supplied;
- Depending on the working conditions, an air-intake device made of FBE coated structural steel can be supplied.

HIGH CORROSION-RESISTANT MATERIALS

Upon request, some parts can be produced by high corrosion-resistant materials:

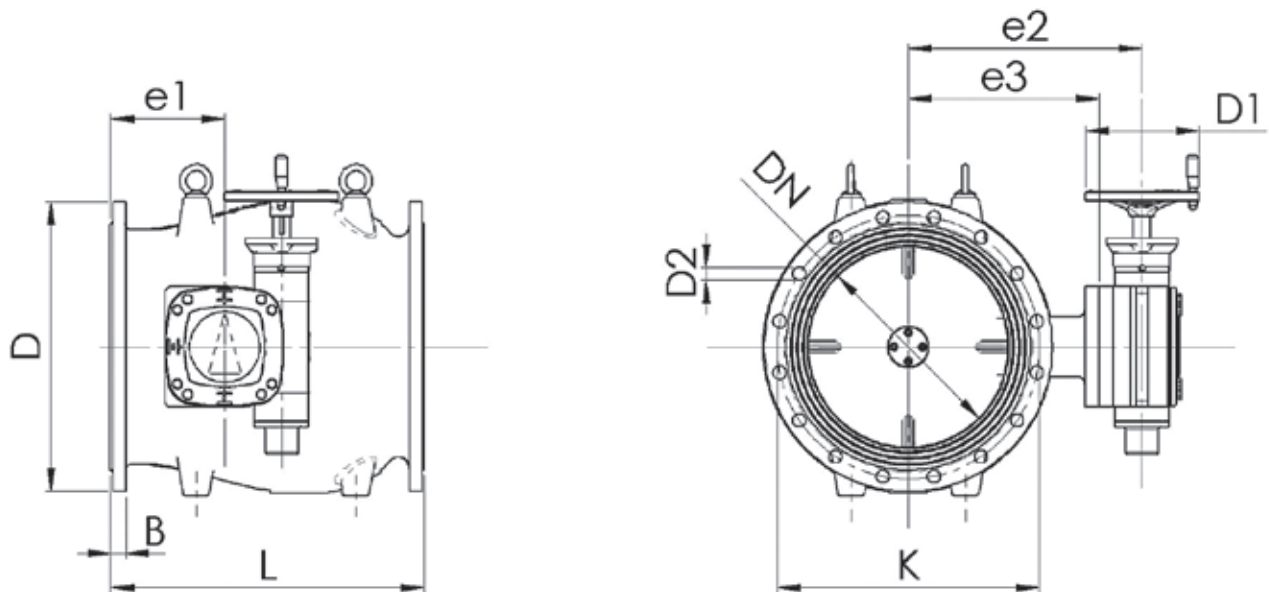
- piston, seat ring and seal retaining ring made of **1.4404 EN10088-3 (AISI316L)** or **1.4301 EN10088-3 (AISI304)** stainless steel;
- rod-link mechanism made of **1.4462 EN10088-3 DUPLEX** stainless steel;
- screws, washers and nuts made of **A4-70 EN ISO3506-1** stainless steel;
- anticavitation cylinder made of **1.4401 EN10088-3 (AISI316)** or **1.4404 EN10088-3 (AISI316L)** stainless steel;





ITEM	DESCRIPTION	MATERIAL	NOTE
1	VALVE BODY DN150	EN-GJS 400 - 15 EN1563 (GS 400 - 15)	FBE Coated
	VALVE BODY (DN200 ... DN1400)	EN-GJS 500 - 7 EN1563 (GS 500 - 7)	FBE Coated
	VALVE BODY (FOR PN ≥ 40)	EN-GJS 400 - 15 EN1563 (GS 400 - 15)	FBE Coated
3	OBTURATOR (DN150 ... DN900)	1.4301 EN10088-3 (AISI304) / 1.4306 EN10088-3 (AISI304L)	
	OBTURATOR (DN1000 ... DN1400)	1.4301 EN10088-3 (AISI304) + Structural steel	Welded+ FBE Coated
4	LINK (DN150 ... DN700)	1.4028 EN10088-3 (AISI420 B)	
	LINK (DN800 ... DN1400)	Structural steel	FBE Coated
5	FORK (DN150 ... DN300)	1.4028 EN10088-3 (AISI420 B)	
	BRACKET-FORK (DN350 ... DN900)	Stainless steel	
	BRACKET-FORK (DN1000 ... DN1400)	Structural steel	FBE Coated
6	SEATING RING	1.4301 EN10088-3 (AISI304)	
8	SHAFT	1.4028 EN10088-3 (AISI420 B)	
9	CONNECTING ROD (DN150 ... 1400)	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	HPU Rubber	
26	MAIN SEAL	HPU Rubber	
41/50/51/52/53 60/61/7/71/80	SCREWS	A2-70 EN ISO3506-1	
90	INTERNAL PARALLEL KEY	Stainless steel	
91	EXTERNAL PARALLEL KEY	Structural steel	
110...113	O-RING	EPDM	
31	NOSE CONE (DN150 ... DN800)	Stainless steel	
	NOSE CONE (DN900 ... DN1400)	Polymer POM	

DIMENSION AND WEIGHTS



PN10

DN	150	200	250	300	350	400	450	500	600	700	800	900	1000	1200	1400
D [mm]	285	340	395	445	505	565	615	670	780	895	1015	1115	1230	1455	1675
D1 [mm]	175	200/ 250	200/ 250	200/ 250	200/ 250	200/ 250	200/ 250	200/ 250	200/ 250	200/ 250	200/ 250	200/ 250	200/ 250	200/ 250	200/ 250
D2 [mm]	23	23	23	23	23	28	28	28	31	31	34	34	37	41	44
B [mm]	19	20	22	24,5	24,5	24,5	25,5	26,5	30	32,5	35	37,5	40	45	46
e1 [mm]	134	160	164	185	200	230	235	245	318	310	325	350	360	425	475
e2 [mm]	205	273	300	352	410	440	470	500	563	647	700	753	815	1015	1128
e3 [mm]	165	228	255	295	335	365	395	425	488	572	625	678	740	900	1013
K [mm]	240	295	350	400	460	515	565	620	725	840	950	1050	1160	1380	1590
L* [mm]	350	400	450	500	550	600	650	700	800	900	1000	1100	1200	1400	1600
Holes [nr]	8	8	12	12	16	16	20	20	20	24	24	28	28	32	36
Weight ** [kg]	67	106	145	195	290	335	495	470	700	1000	1330	1725	2265	3530	5020

*: Face to face dimension according to EN558 series 15 up to DN1000.

**: Weights include gearbox

PN16

DN	150	200	250	300	350	400	450	500	600	700	800	900	1000	1200	1400
D [mm]	285	340	405	460	520	580	640	715	840	910	1025	1125	1255	1485	1685
D1 [mm]	175	200/250	200/250	200/250	200/250	200/250	200/250	200/250	200/250	200/250	200/250	200/250	200/250	200/250	200/250
D2 [mm]	23	23	28	28	28	31	31	34	37	37	41	41	44	50	50
B [mm]	19	20	22	24,5	26,5	28	30	31,5	36	39,5	43	46,5	50	57	60
e1 [mm]	134	160	164	185	200	230	235	245	318	310	325	350	360	425	475
e2 [mm]	205	273	300	352	410	440	470	500	563	647	700	753	815	1015	1128
e3 [mm]	165	228	255	295	335	365	395	425	488	572	625	678	740	900	1013
K [mm]	240	295	355	410	470	525	585	650	770	840	950	1050	1170	1390	1590
L* [mm]	350	400	450	500	550	600	650	700	800	900	1000	1100	1200	1400	1600
Holes [nr]	8	12	12	12	16	16	20	20	20	24	24	28	28	32	36
Weight ** [kg]	67	106	145	195	290	335	495	510	750	1005	1330	1770	2290	3575	5030

PN25

DN	150	200	250	300	350	400	450	500	600	700	800	900	1000
D [mm]	300	360	425	485	555	620	670	730	845	960	1085	1185	1320
D1 [mm]	175	200/250	200/250	200/250	200/250	200/250	200/250	200/250	200/250	200/250	200/250	200/250	200/250
D2 [mm]	28	28	31	31	34	37	37	37	41	44	50	50	57
B [mm]	20	22	24,5	27,5	30	32	34,5	36,5	42	46,5	51	55,5	60
e1 [mm]	134	160	164	185	200	230	235	245	318	310	325	350	360
e2 [mm]	205	273	300	370	410	440	470	500	563	682	735	778	840
e3 [mm]	165	228	255	295	335	365	395	425	488	607	660	703	725
K [mm]	250	310	370	430	490	550	600	660	770	875	990	1090	1210
L* [mm]	350	400	450	500	550	600	650	700	800	900	1000	1100	1200
Holes [nr]	8	12	12	16	16	16	20	20	20	24	24	28	28
Weight ** [kg]	67	113	152	248	324	404	501	593	768	1190	1575	2160	2850

*: Face to face dimension according to EN558 series 15 up to DN1000.

** : Weights include gearbox

PN40

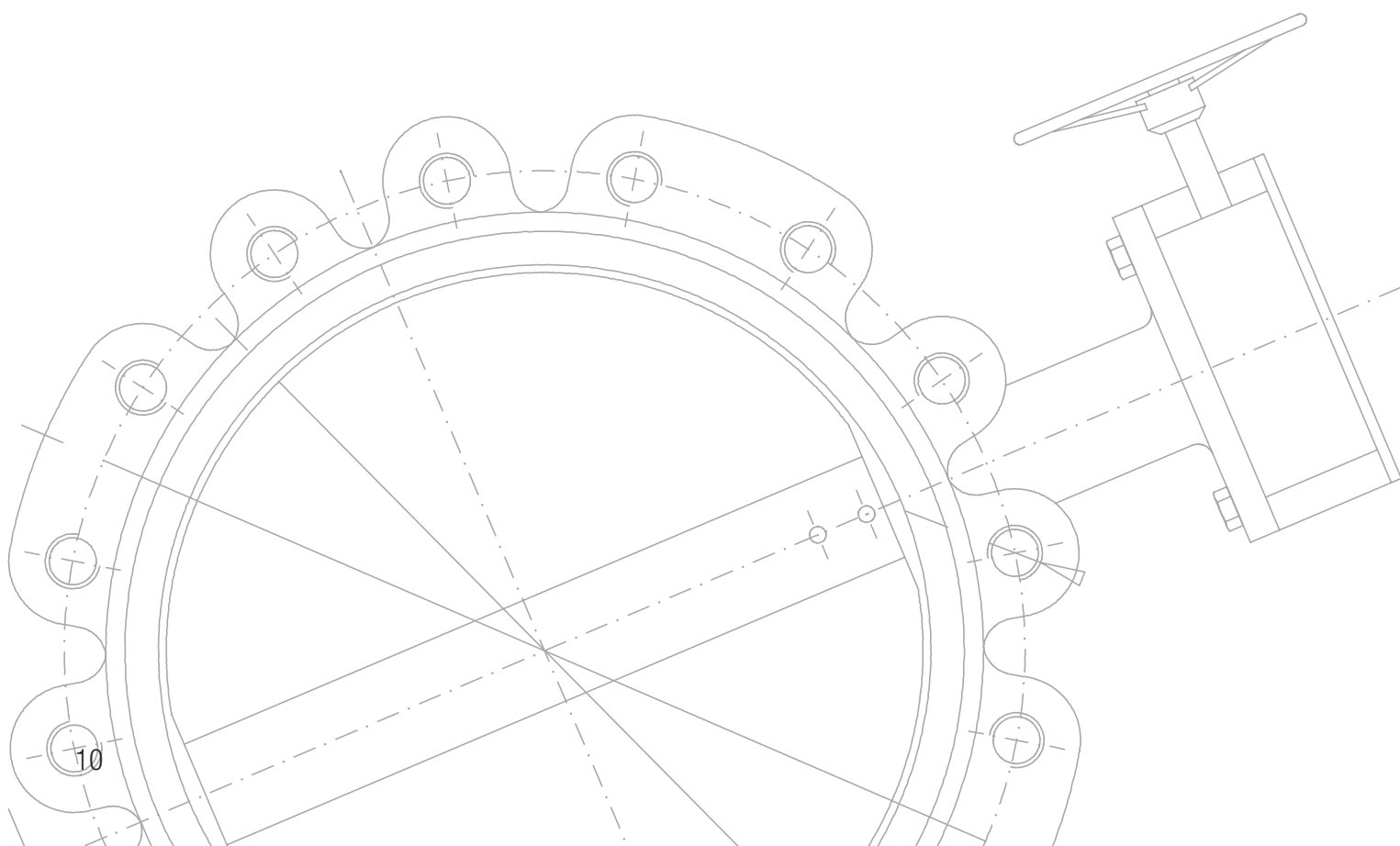
DN	150	200	250	300	400	500
D [mm]	300	375	450	515	660	755
D1 [mm]	200/250	200/250	200/250	200/250	200/250	200/250
D2 [mm]	28	31	34	34	41	44
B [mm]	26	30	34,5	39,5	48	52
e1 [mm]	134	160	164	185	200	245
e2 [mm]	207	262	287	345	412	555
e3 [mm]	165	205	240	270	337	480
K [mm]	250	320	385	450	585	670
L* [mm]	350	400	450	500	600	700
Holes [nr]	8	12	12	16	16	20
Weight ** [kg]	71	122	165	265	435	880

PN64

DN	150	200	250	300
D [mm]	345	415	470	530
D1 [mm]	200/250	200/250	200/250	200/250
D2 [mm]	34	37	37	37
B [mm]	39	46	50	57
e1 [mm]	134	160	164	185
e2 [mm]	240	280	315	345
e3 [mm]	190	205	240	270
K [mm]	280	345	400	460
L* [mm]	350	400	450	500
Holes [nr]	8	12	12	16
Weight ** [kg]	103	150	195	285

*: Face to face dimension according to EN558 series 15 up to DN1000.

**: Weights include gearbox





F560

TECHNICAL SPECIFICATIONS

CONSTRUCTION CHARACTERISTICS:

Hydraulic test according to EN 1074-5;

- Conform to EN 1074-5;
- The parts in contact with water are conform to DM 174 of 6/04/2004, KTW and DVGW W270;
- One-piece body made of ductile cast iron:
 - * DN150 cast iron type EN GJS 400-15 EN 1563 (GS 400-15);
 - * from DN200 to DN1400 cast iron type EN GJS 500-7 EN 1563 (GS 500-7);
- Face to face dimension according to EN 558 Series 15 (DN + 200mm);
- Flange dimensions according to EN 1092-2;
- All screws, washers and nuts made of stainless steel A2-70 EN ISO3506-1 (inside);
- Pressure-balanced piston movable with minimum torque:
 - * from DN150 to DN900 made of stainless steel 1.4301 EN10088-3 (AISI304) or 1.4306 EN10088-3 (AISI304L);
 - * from DN1000 to DN1400 made of stainless steel and FBE coated structural steel;
- Piston guides screwed to the valve body, made of rubbing 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 DN150 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 and 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 the coupling with an electrical actuator using an ISO 5211 flange;
- Inside and outside corrosion protection with FBE coating (fusion bounded epoxy), blue colour RAL 5015, thickness 300µm.

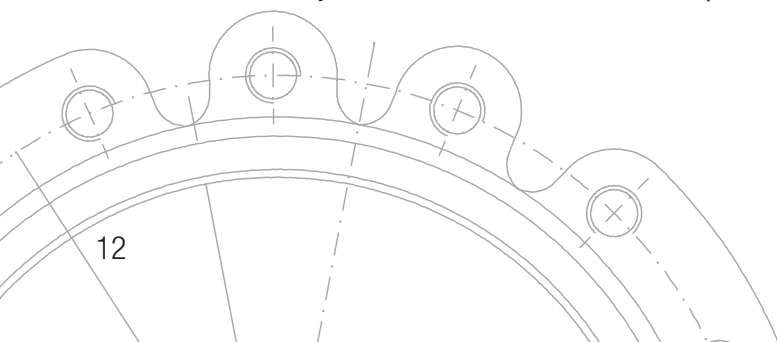
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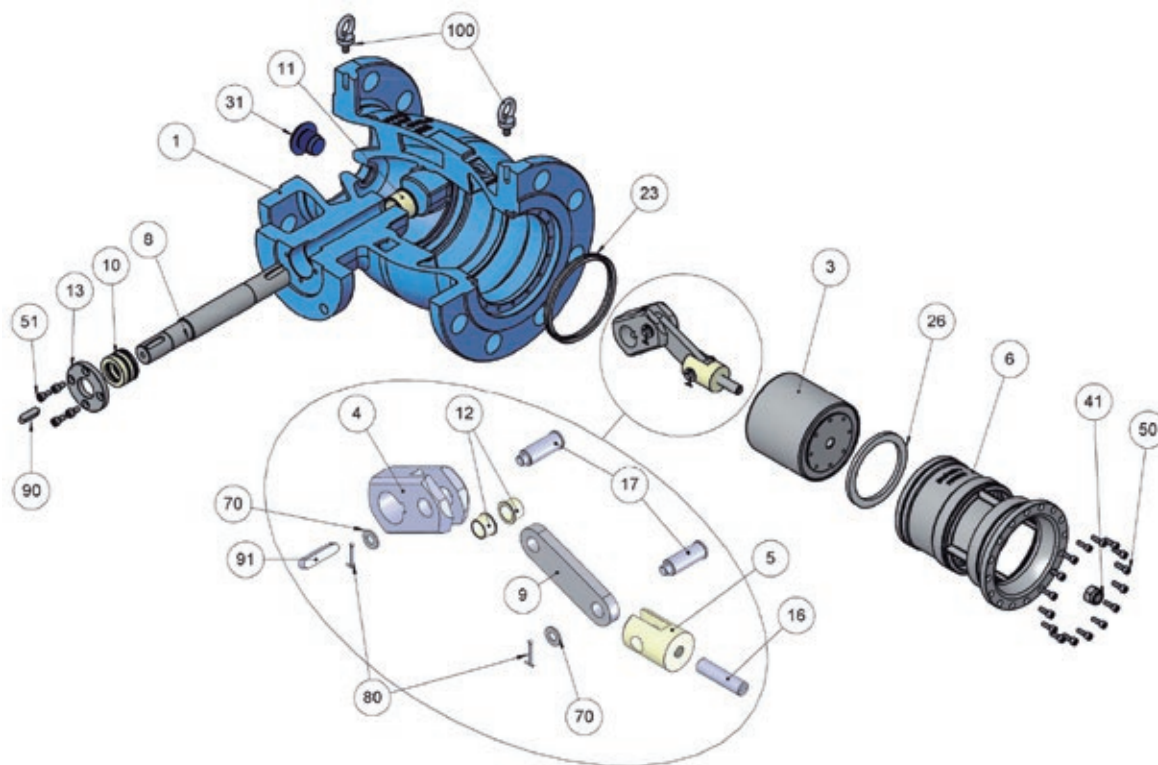
- Depending on the working conditions, dissipating cylinders made of 1.4301 EN10088-3 (AISI304) or 1.4306 EN10088-3 (AISI304L) can be supplied;
- Depending on the working conditions, an air-intake device made of FBE coated structural steel can be supplied.

HIGH CORROSION-RESISTANT MATERIALS

Upon request, some parts can be produced by high corrosion-resistant materials:

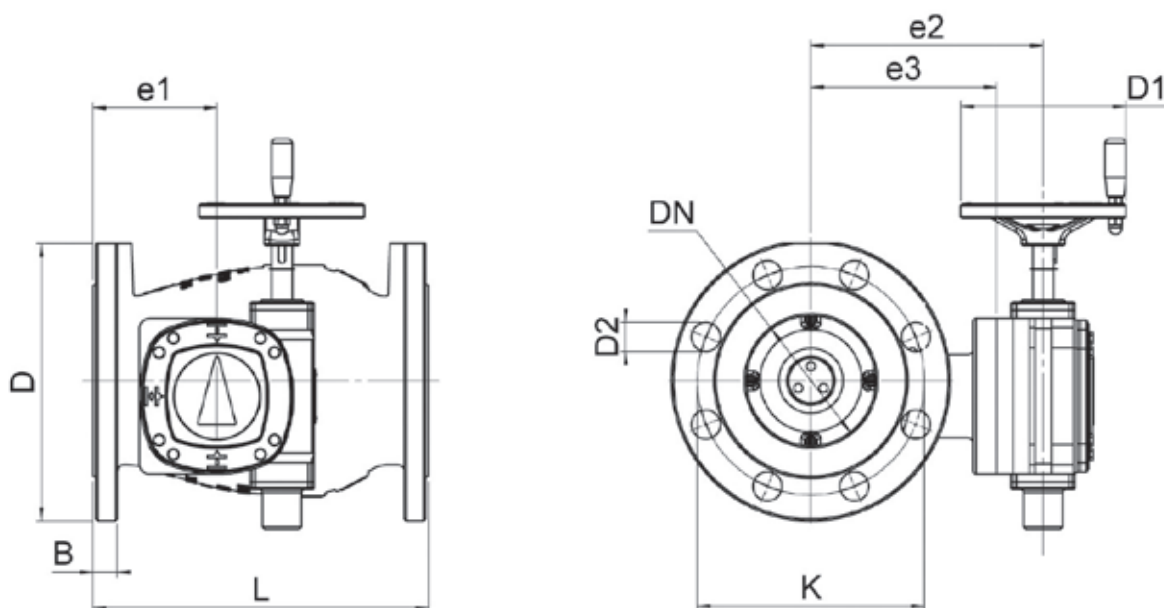
- piston, seat ring and seal retaining ring made of **1.4404 EN10088-3 (AISI316L)** or **1.4301 EN10088-3 (AISI304)** stainless steel;
- rod-link mechanism made of **1.4462 EN10088-3 DUPLEX** stainless steel;
- screws, washers and nuts made of **A4-70 EN ISO3506-1** stainless steel;
- anticavitation cylinder made of **1.4401 EN10088-3 (AISI316)** or **1.4404 EN10088-3 (AISI316L)** stainless steel;





ITEM	DESCRIPTION	MATERIAL DESIGNATION	NOTE
1	BODY	EN-GJS 400-15 EN1563 (GS 400 - 15)	FBE Coated
3	OBTURATOR PIPE	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	1.4401 EN10088-3 (AISI316)	
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	SELF-LOCKING NUT	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	--	

DIMENSION AND WEIGHTS



PN10

DN	80	100	125
D [mm]	200	220	250
D1 [mm]	175	175	175
D2 [mm]	19	19	19
B [mm]	19	19	19
e1 [mm]	109	120	120
e2 [mm]	170	185	225
e3 [mm]	130	145	180
K [mm]	160	180	210
L* [mm]	280	300	325
Holes [nr]	8	8	8
Weight ** [kg]	31	38	41

PN16

DN	80	100	125
D [mm]	200	220	250
D1 [mm]	175	175	175
D2 [mm]	19	19	19
B [mm]	19	19	19
e1 [mm]	109	120	120
e2 [mm]	170	185	225
e3 [mm]	130	145	180
K [mm]	160	180	210
L* [mm]	280	300	325
Holes [nr]	8	8	8
Weight ** [kg]	31	38	41

PN25

DN	80	100	125
D [mm]	200	235	270
D1 [mm]	175	175	175
D2 [mm]	19	23	28
B [mm]	19	19	19
e1 [mm]	109	120	120
e2 [mm]	170	185	225
e3 [mm]	130	145	180
K [mm]	160	190	220
L* [mm]	280	300	325
Holes [nr]	8	8	8
Weight ** [kg]	30,5	38	46

PN40

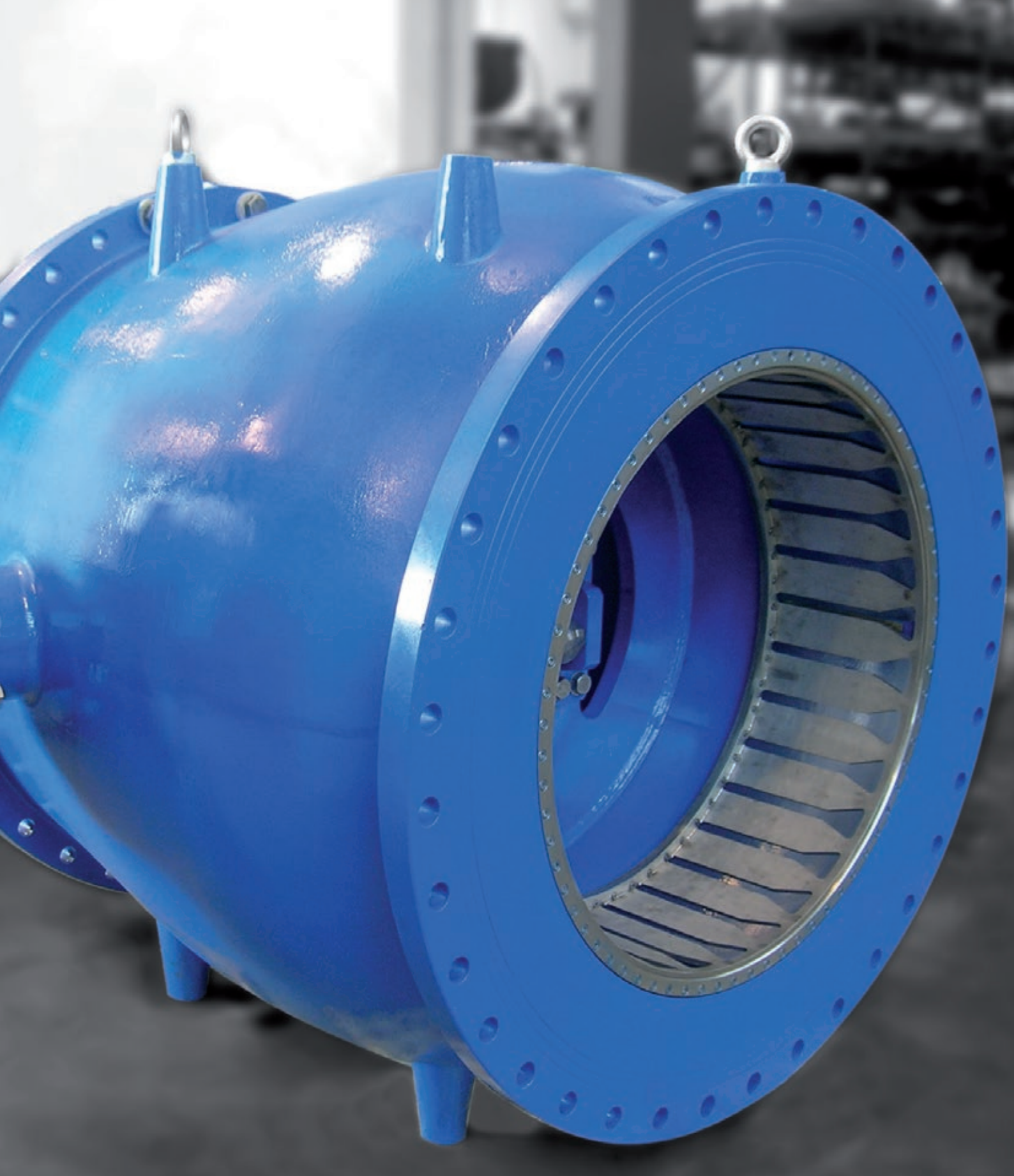
DN	80	100	125
D [mm]	200	235	270
D1 [mm]	175	175	175
D2 [mm]	19	23	28
B [mm]	19	19	23,5
e1 [mm]	109	120	120
e2 [mm]	170	185	225
e3 [mm]	130	145	180
K [mm]	160	190	220
L* [mm]	280	300	325
Holes [nr]	8	8	8
Weight ** [kg]	31	43	46

PN64

DN	80	100	125
D [mm]	215	250	295
D1 [mm]	200/250	200/250	200/250
D2 [mm]	23	28	31
B [mm]	31	33	37
e1 [mm]	109	120	120
e2 [mm]	175	190	237
e3 [mm]	130	145	180
K [mm]	170	200	240
L* [mm]	280	300	325
Holes [nr]	8	8	8
Weight ** [kg]	35	55	80

*: Face to face dimension according to EN558 series 15

**: Weights include gearbox



F550

TECHNICAL SPECIFICATIONS

CONSTRUCTION CHARACTERISTICS:

- Hydraulic test according to EN 1074-5;
- Conform to DM 174 of 6/04/2004;
- Conform to EN 1074-5;
- The parts in contact with water are conform to KTW and DVGW W270;
- 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 (inside);
- Pressure-balanced piston movable with minimum torque made of stainless steel;
- Piston guides screwed to the valve body, made of rubbing 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 and 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 the coupling with an electrical actuator using an ISO 5211 flange;
- Inside and outside corrosion protection obtained with FBE (fusion bounded epoxy) coating, colour blue RAL 5015, Thickness 300µm;

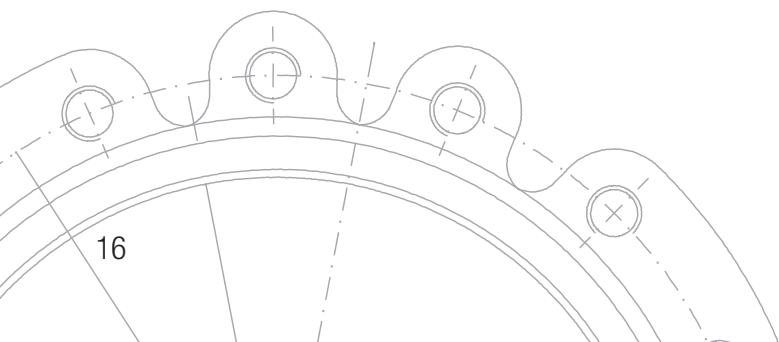
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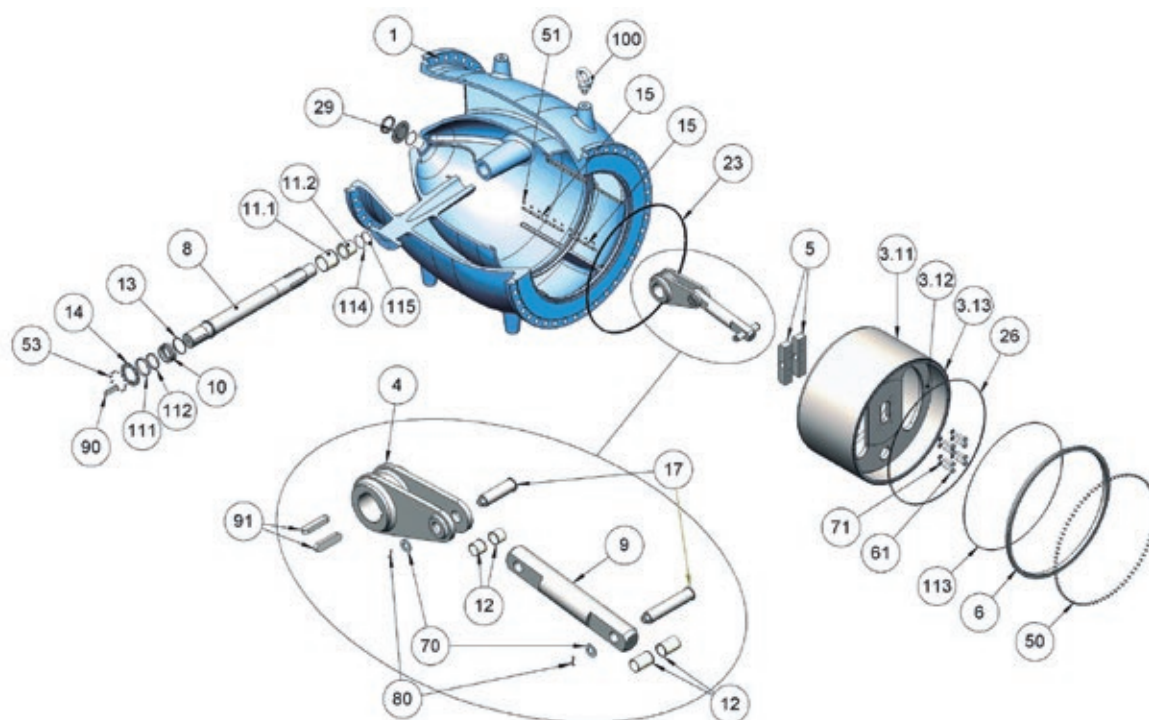
- Depending on the working conditions, dissipating cylinders made of 1.4301 EN10088-3 (AISI304) or 1.4306 EN10088-3 (AISI304L) can be supplied;
- Depending on the working conditions, a venting device made of FBE coated structural steel can be supplied.

HIGH CORROSION-RESISTANT MATERIALS

Upon request, some parts can be produced by high corrosion-resistant materials:

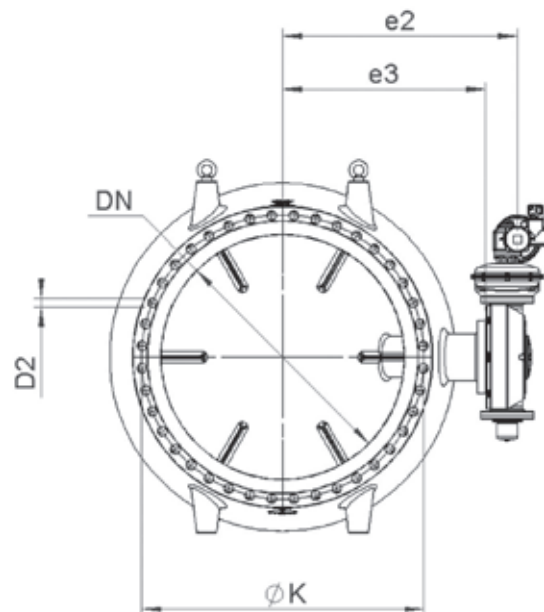
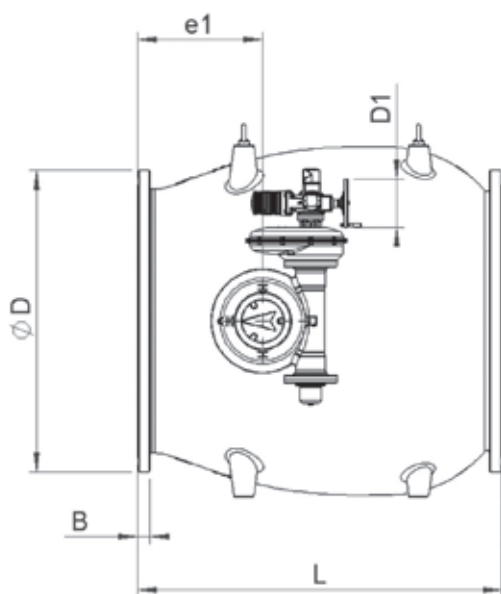
- piston, seat ring and seal retaining ring made of **1.4401 EN10088-3 (AISI316)** or **1.4404 EN10088-3 (AISI316L)** stainless steel;
- rod-link mechanism made of **1.4462 EN10088-3 DUPLEX** stainless steel;
- screws, washers and nuts made of **A4-70 EN ISO3506-1** stainless steel;
- anticavitation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





ITEM	DESCRIPTION	MATERIAL DESIGNATION	NOTE
1	BODY	EN-GJS 500-7 EN1563 (GS500)	FBE Coated
3.11	OBTURATOR PIPE	1.4306 EN10088-3 (AISI 304L)	
3.12	OBTURATOR FRONTAL RING	1.4306 EN10088-3 (AISI 304L)	
3.13	OBTURATOR FRONTAL PLATE	S275JR EN1025-2 (Fe430B)	FBE Coated
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	H-ECOPUR Elastomer	
26	MAIN SEAL	H-ECOPUR Elastomer	
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 Rubber	

DIMENSION AND WEIGHTS



PN10

DN	1600	1800
D [mm]	1950	2115
D1 [mm]	320	500
D2 [mm]	50	50
B [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 * [kg]	10500	14000

PN16

DN	1600	1800
D [mm]	1930	2130
D1 [mm]	320	500
D2 [mm]	57	57
B [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 * [kg]	10500	14000

PN25

DN	1600	1800
D [mm]	1975	2195
D1 [mm]	320	500
D2 [mm]	62	70
B [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 * [kg]	10500	14000

** : Weights include gearbox



HYDRAULIC SPECIFICATIONS

HYDRAULIC SPECIFICATIONS

PRESSURE DROPS

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

$$\Delta P = \xi * V^2 / (2 g) \text{ [mhw]} \quad (1.a)$$

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

Where:

- ΔP = pressure drop [unit: see formula above]
- ξ = pressure coefficient
- v = fluid speed referred to valve's DN [m/s]
- K_v = flow coefficient [m³/h]
- $g = 9.81 \text{ [m/s²]}$
- Q = flow rate [m³/h]

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

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

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

Where:

- ξ_{100} is the pressure drop coefficient of the fully open valve. It is given in the below Table for standard valves (**no dissipating cylinder**). For valves equipped **with dissipating cylinder**, ξ_{100} is the distinctive value of the cylinder (e.g.: for a valve equipped with a dissipating cylinder K20, it will be $\xi_{100} = 20$).
- ξ^* expresses the percentage change of the pressure drop with the variation of the valve opening degree ($\xi^* = \xi / \xi_{100}$). ξ^* is given by Diagram_1.
- K_{vs} is the flow coefficient of the fully open valve. It is given by Table.
- $K_v\%$ expresses the percentage change of the K_v with the variation of the valve opening degree.
 $K_v\% = K_v / K_{vs}$. $K_v\%$ is given by Diagram_2.

Plunger flow control Valves - Hydraulic specification																					
	F560			F500																F550	
DIN	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	379	678	1070	1550	2120	2785	3540	4395	6380	8750	11480	14580	18010	26020	35430	64100	81200	
ξ ₁₀₀	3,1	3,8	4,0	5,5	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	

DIAGRAM 1

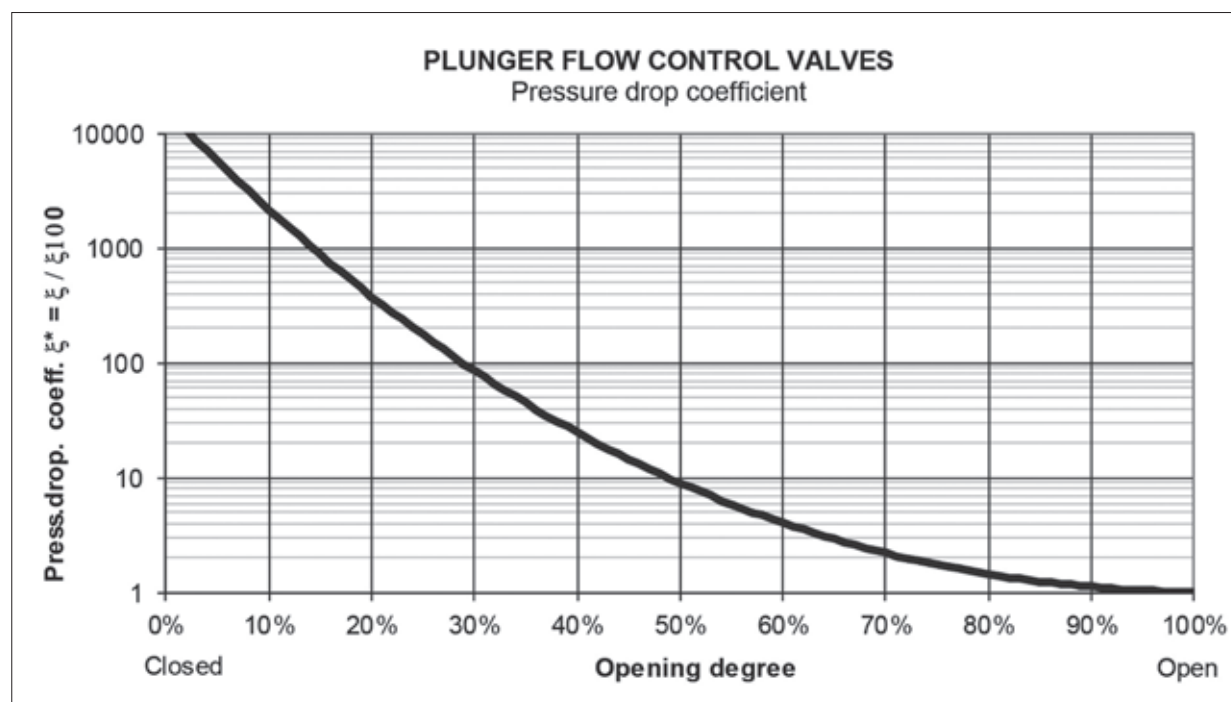
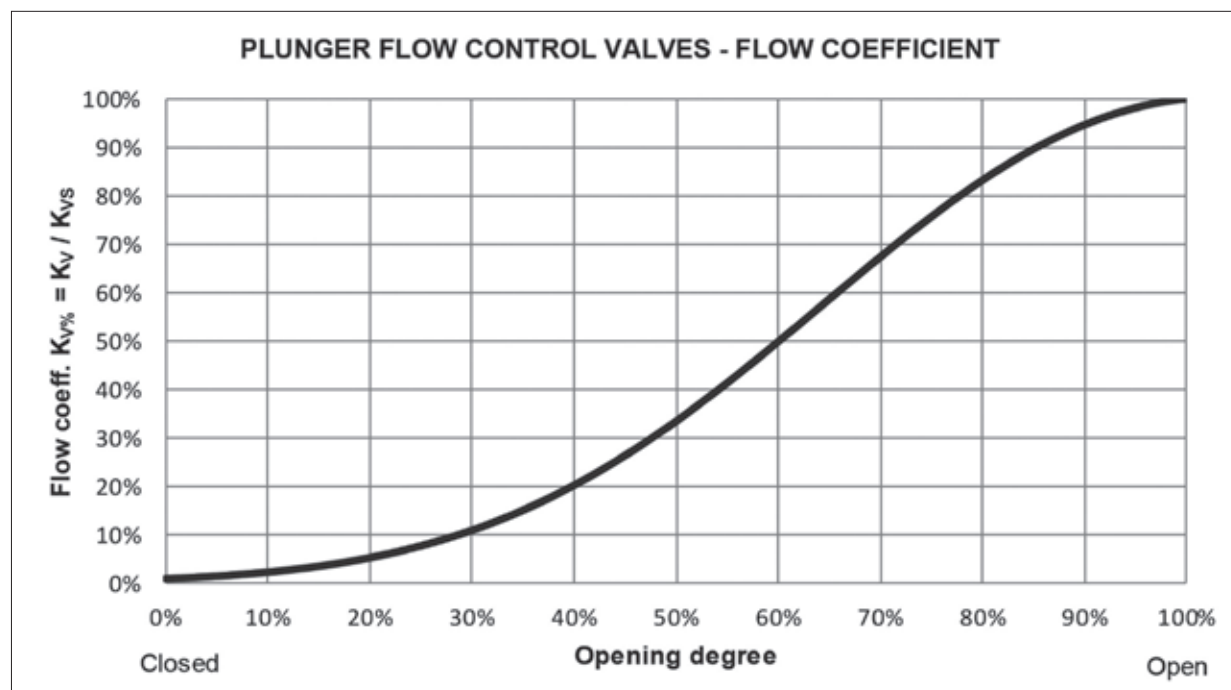


DIAGRAM 2



CAVITATION

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

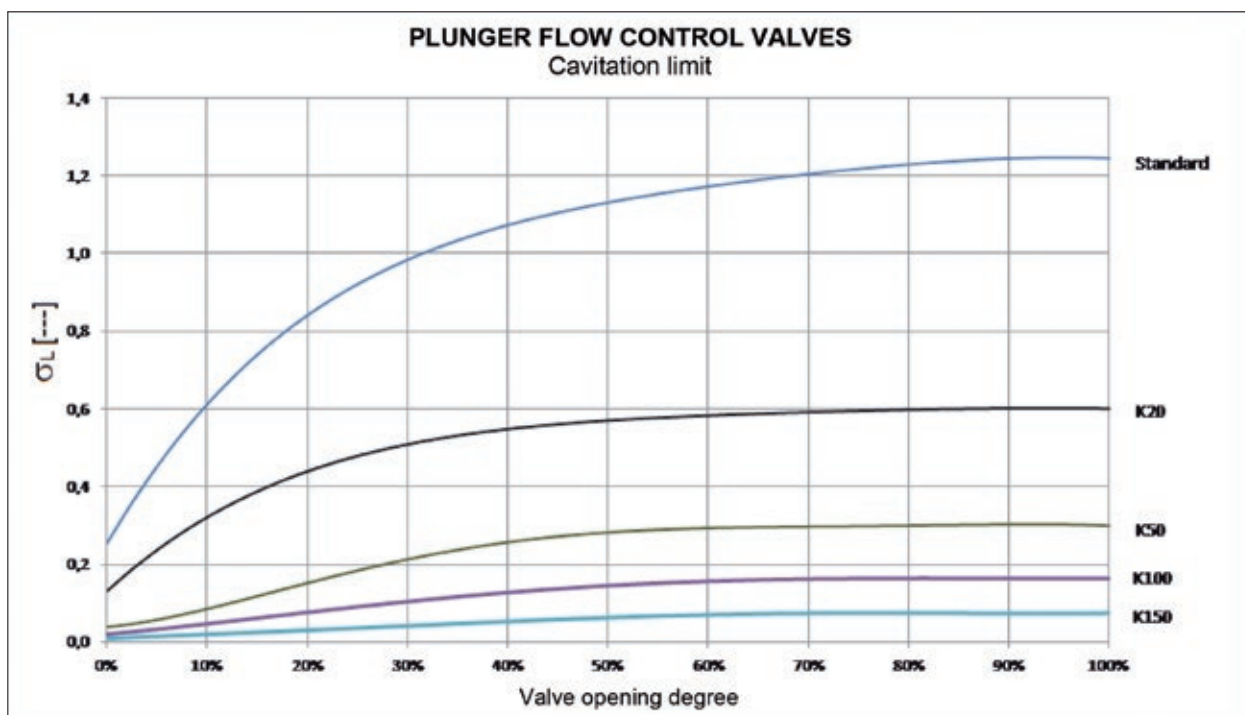
$$\sigma > \sigma_L \quad (3)$$

Where:

- Cavitation number $\sigma = P_{out} / (\Delta P + v^2/2g)$ (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]
- $g = 9.81 \text{ m/s}^2$

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

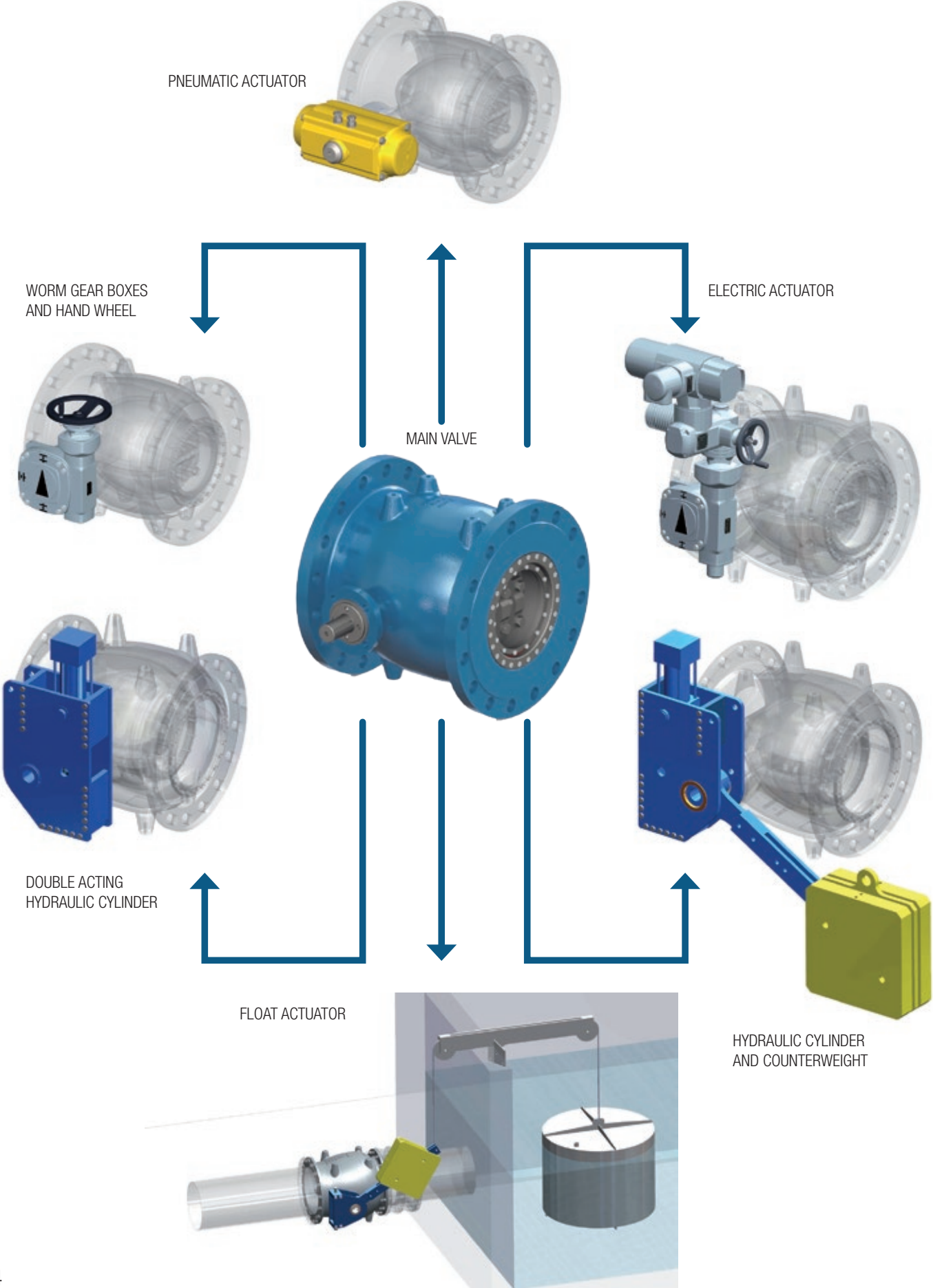
DIAGRAM 3





MAIN OPERATING DEVICES

MAIN OPERATING DEVICES





ACCESSORIES

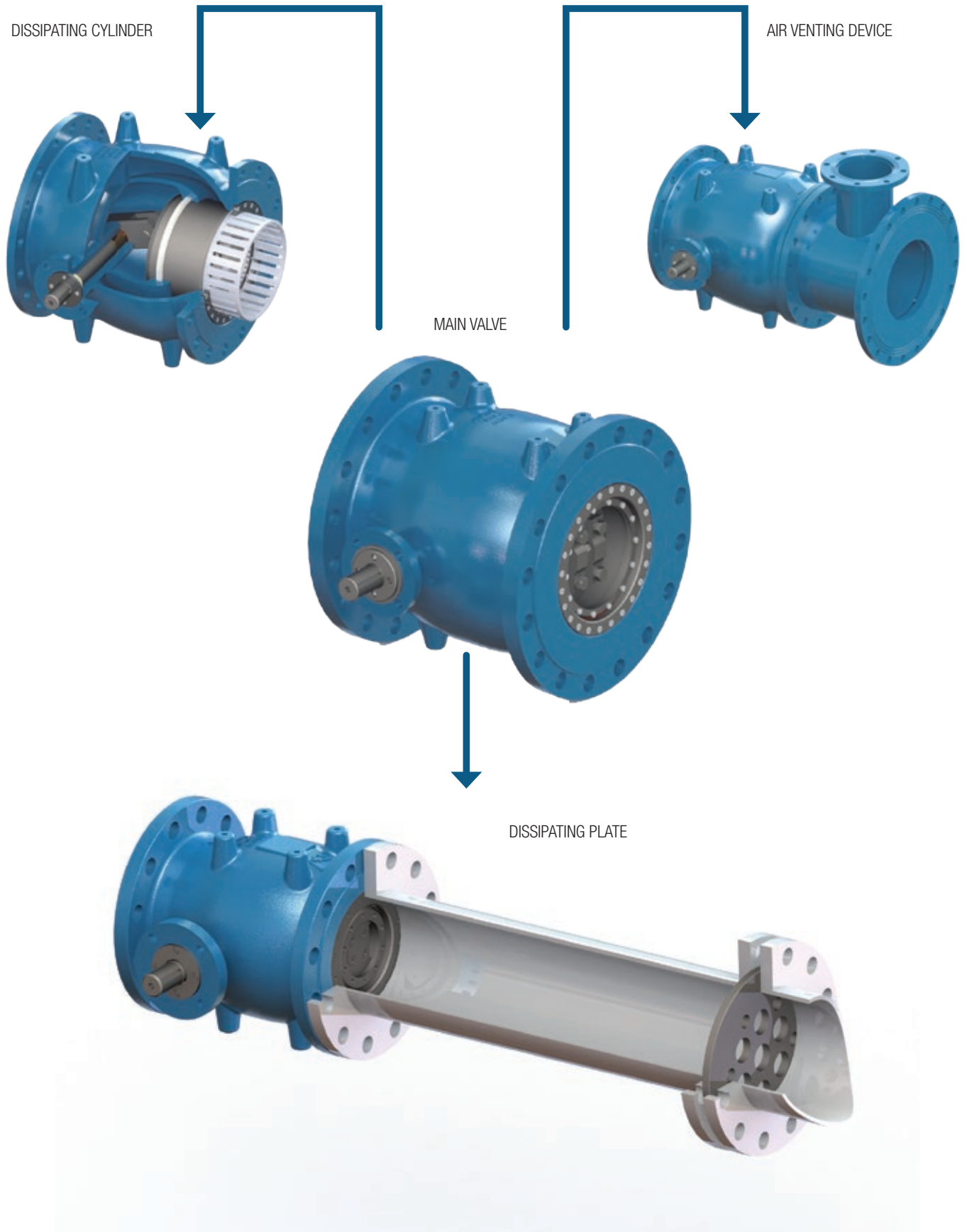
ACCESSORIES

DISSIPATING CYLINDER

AIR VENTING DEVICE

MAIN VALVE

DISSIPATING PLATE

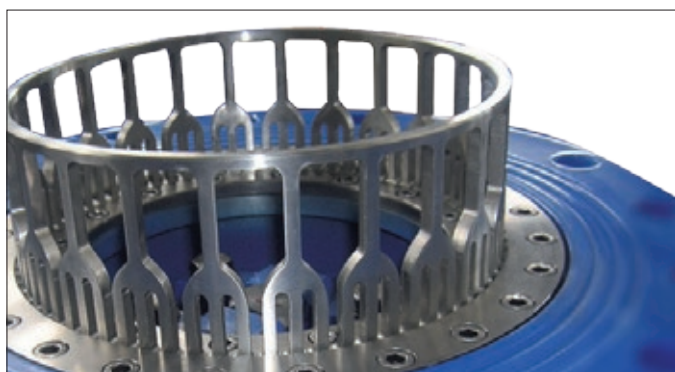


DISSIPATING CYLINDERS

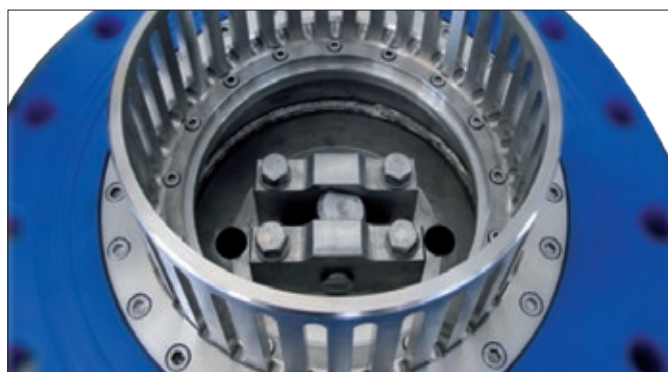
The valve can be equipped with a stainless steel DISSIPATING CYLINDER adequately slotted in order to subdivide the outlet flow into radial fluid jets colliding among themselves at the centre of the valve's axis.

This accessory allows to achieve an energy dissipation curve which is adjusted to the real working conditions of the valve, according to the plant's effective requirements.

Standard slotted cylinders are available having progressively growing resistance at the cavitation and increasing pressure drops. Special slotted cylinders can be used where the dimension, shape and the opening degree is calculated on the basis of the valve's effective operating conditions. For example, it is possible to obtain little headloss with valve higher opening degrees, and, high resistance to the cavitation at little opening degrees.



DIFFERENT TYPES OF DISSIPATING CYLINDERS



DISSIPATING CYLINDER FOR AIR SUPPLY

DISSIPATING PLATE

In case of high hydraulic heads, when dissipating cylinder will not be enough to ensure the proper dissipation it should be supported by a perforated DISSIPATING PLATE mounted downstream of the valve.

The properly designed plate will reduce the hydraulic head supporting dissipating action of the dissipating cylinder.

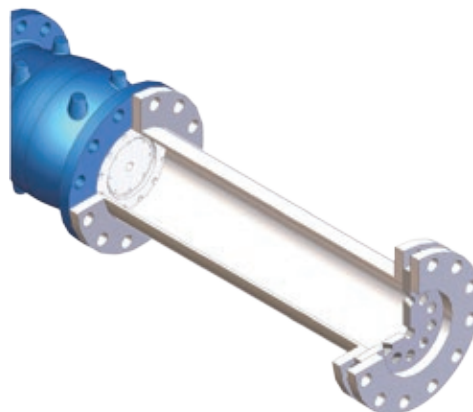
Depending on the number, size and inclination of the holes,

dissipating plate achieves different dissipation value of the load, improving the overall performance of the valve.

The recommended minimum pipe length upstream the dissipating plate is $L_{PIPE} \sim 5 \times \text{Valve DN}$. Outside diameter of dissipating plate shall be suitable for connection with flange according to EN1092-2. The recommended seal is flat type (on request, the dissipating plate, could be made with O-ring seats).



DISSIPATING PLATE DUCTED



DISSIPATING PLATE - FREE DISCHARGE

AIR VENTING DEVICE

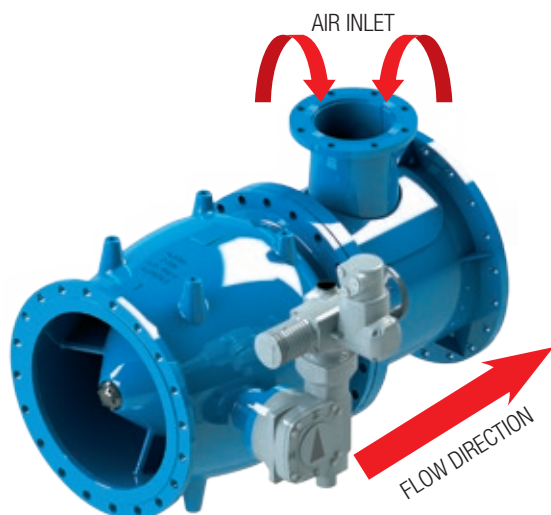
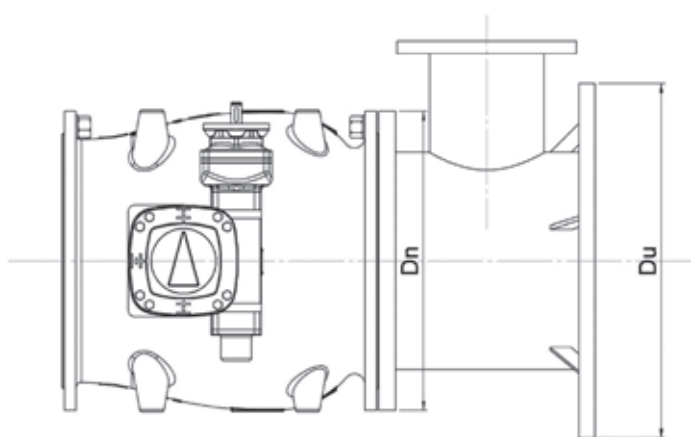
To avoid cavitation due to depression in proximity to valve downstream flange / pipe, it is possible to add to the valve a properly **venting device** that through air intake will compensate the fluid depression by adding air into it in order to reduce the risk of cavitation and guarantee valves longevity and safe operation of the downstream part of the plant.

When air intake is used, the Silencer AS accessory can be conveniently used to secure low noise emissions.

The Silencer AS is directly fitted onto the air inlet of the air intake:

- Low noise emission, Silencer AS is able to reduce noise up to 30 decibel
- Easy to install
- Cost saving, no need for piping connecting the air intake to the outdoor.

We recommend to provide the manoeuvre chamber with a ventilation opening in order to avoid any under pressure.



AIR VENTING STANDARD DIMENSIONS			
DN valve	*= DOUBLE AIR INLET		
[PN10/16]	Dn	Du	Weight [kg]
150	150	DN200	30
200	200	DN250	45
300	300	DN400	95
350	350	DN450	130
400	400	DN500	185
450	450	DN600	215
500	500	DN600	255
600	600	DN700	340
700	700	DN800	420
800	800	DN900	530
900	900	DN1000	720
1000	1 000	DN1200	940
1200*	1200	DN1400	1550
1400*	1400	DN1600	1950



PLUNGER WITH VALVE AIR VENTING DEVICE AND SILENCER "AS"



SPECIAL APPLICATIONS

SPECIAL APPLICATIONS

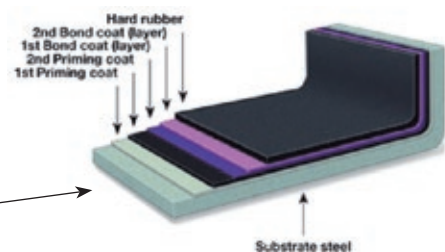
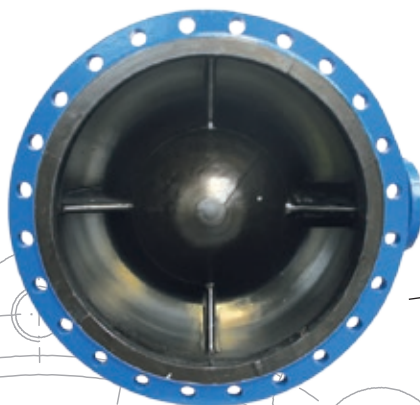
VULCANIZED HARD RUBBER LINED VALVE



Valves for saline media (seawater or well-desalination) or corrosive media have to resist against chemical attack of chloride ions. Due to the fluid aggressivity, standard epoxy coated valve surfaces will be rapidly abraded.

The best possible solution, in order to guarantee valves longevity and safe operation of the plants, is to entirely protect the valve surface with 3 mm HARD RUBBER LINING which will be able to ensure no metal parts in contact with aggressive fluids.

To apply the lining, the work piece is heated up to about 135°-145°C and rubber sheets are vulcanized on the surface at a pressure of about 4.5 bar. Other parts of the valve in contact with water (shaft, link, piston rod, bracket-fork) are made of duplex stainless steel, with high resistance to corrosion in the presence of ions dissolved in water. Typical applications of these valves are: water treatment plants, desalination plants, mines, industrial water, treatment plants in minerals.



The valve body is completely covered with a rubber layer which allows additional protection to the corrosion due to brackish waters and significantly increases the life of the valve.

CONSTRUCTION STEEL VALVE - PN 100



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

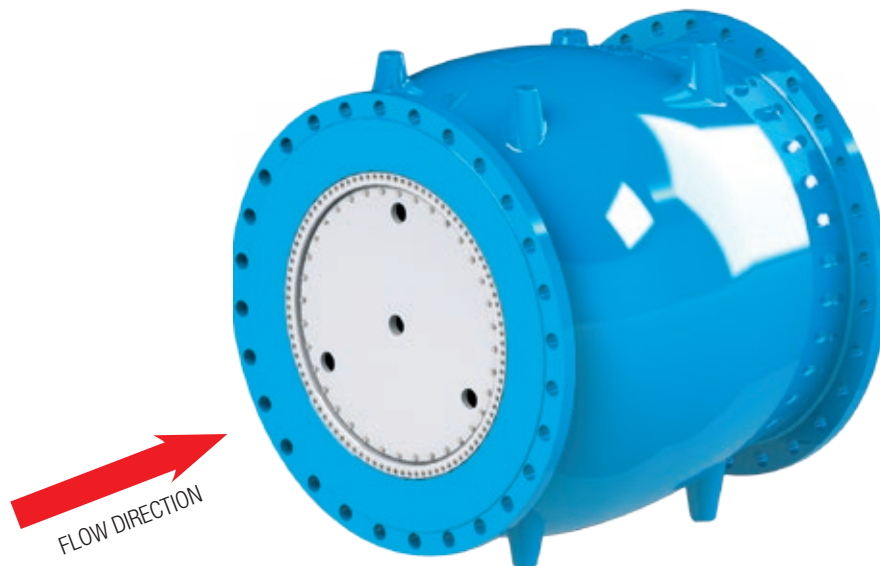
Typical applications are hydroelectric power plants with high hydraulic heads, snowmaking systems, testing systems and testing at high pressure.



PN100 HYDRAULIC TEST (PRESSURE TEST = 150 BAR)

CHECK VALVE

The check valves are designed to perform the retaining function, typically downstream of pumping stations.

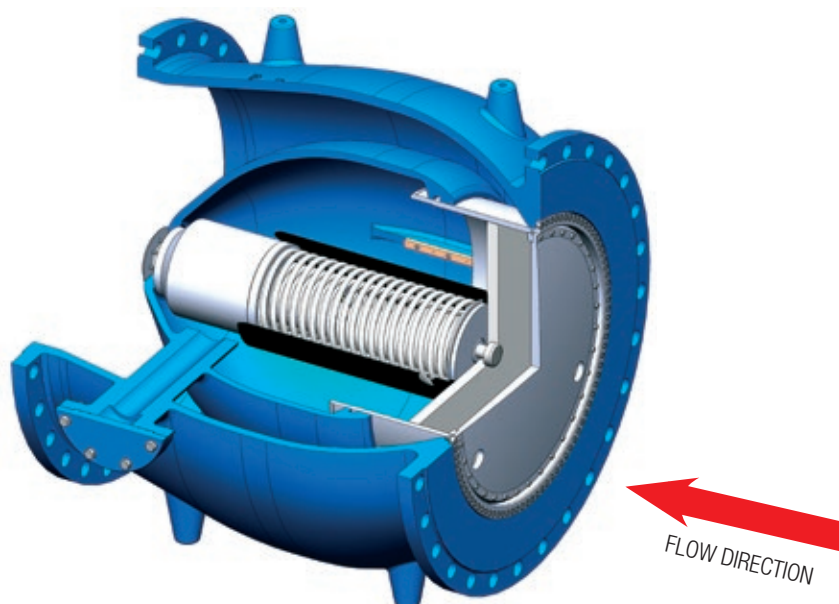


In case of pump stop, it allows a quick closing of the plunger by a system of springs, before it occurs the reversal of flow in the pump, thus avoiding possible damage.

Tightness is secured by the pressure that is created in the inner

barrel during the backflow, helping the action of the springs.

The plunger of the valve is supported by four external self-lubricating guides, which guarantee the perfect sliding. This gives to the check valve characteristics of high strength and reliability.

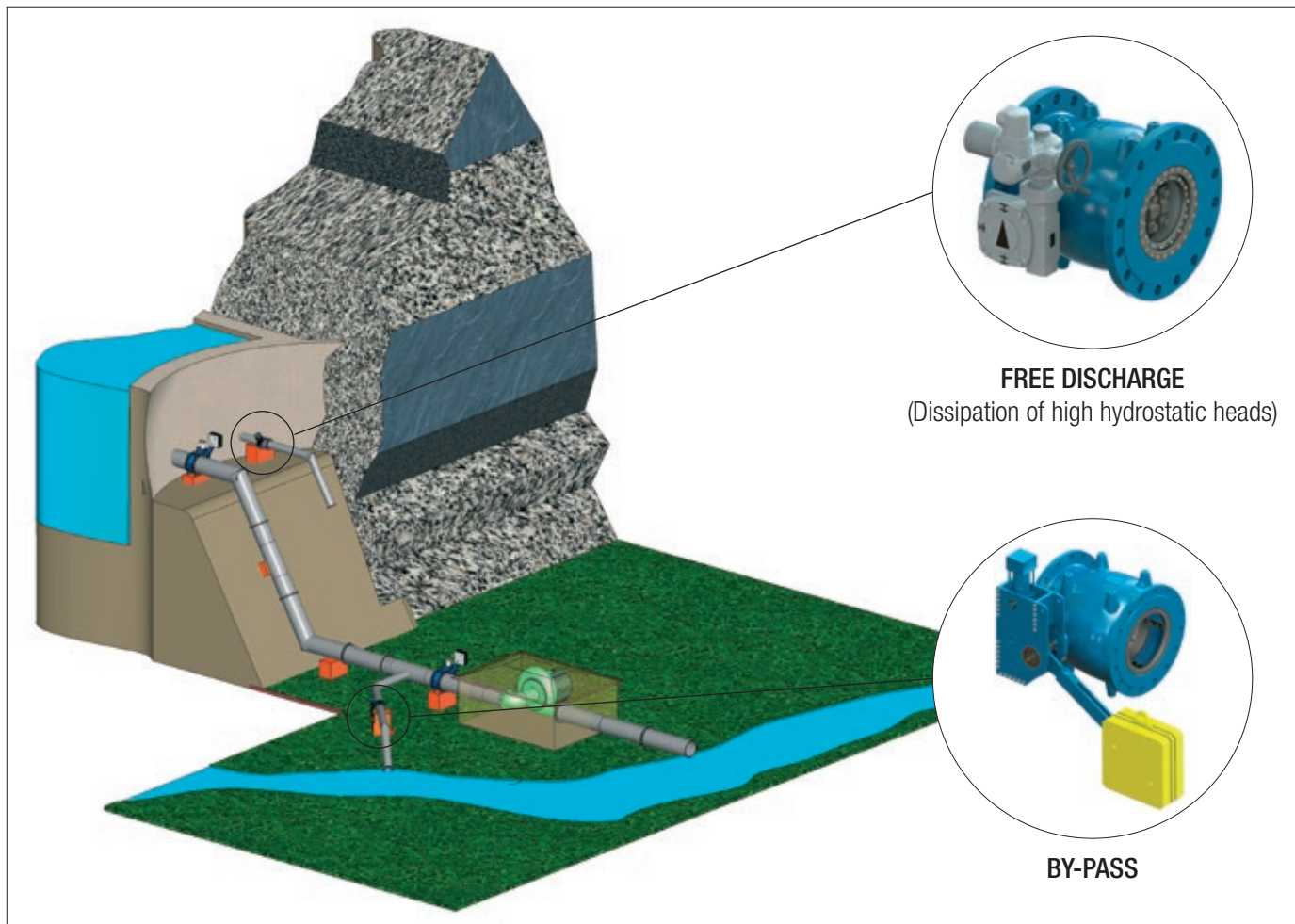




MAIN APPLICATIONS

MAIN APPLICATIONS

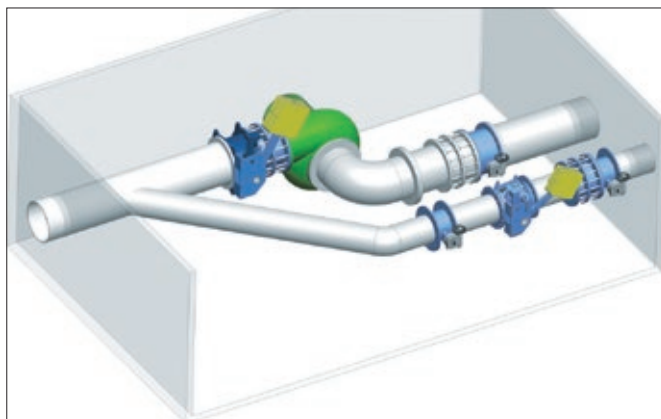
HYDRO POWER PLANTS APPLICATION



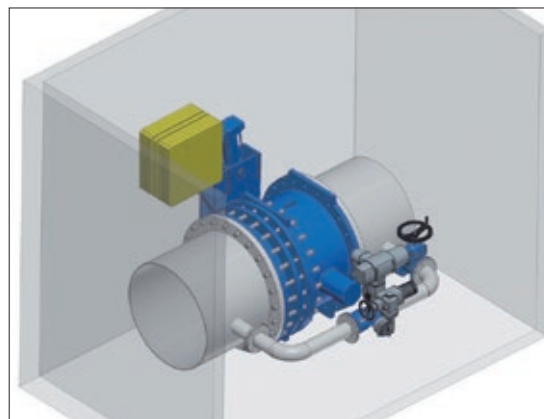
BY-PASS VALVE

Plunger valve could be used as:

- By-pass valve for hydroelectric installations such as protection of turbine-generator or in case of turbine service;
- By-pass valve for large pipelines filling.



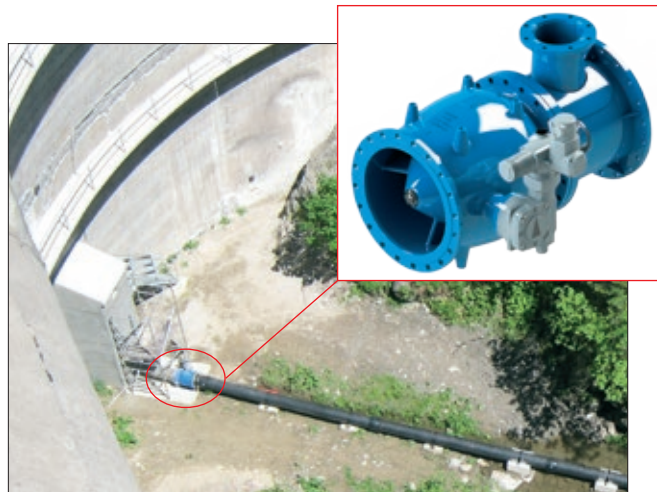
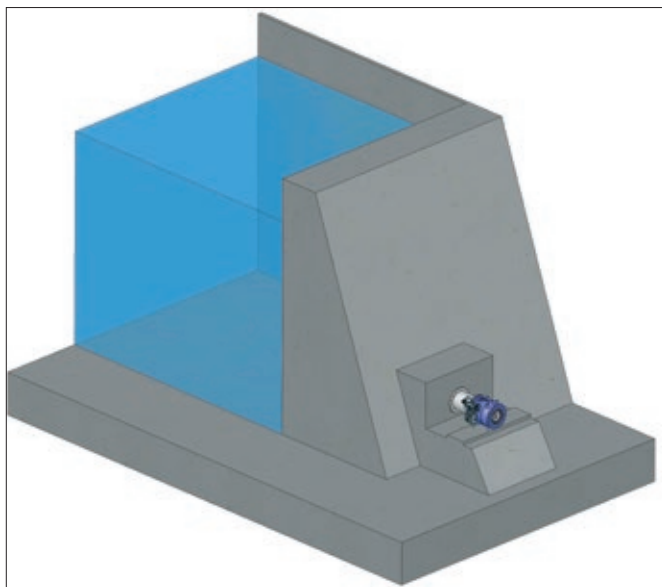
BY-PASS TURBINE-GENERATOR



BY-PASS FOR FILLING LARGE PIPELINES

DISSIPATION OF HIGH HYDROSTATIC HEADS

The plunger valve is used as a free discharge valve. A typical application is as discharge valve at dam base.



FLOW AND PRESSURE CONTROL

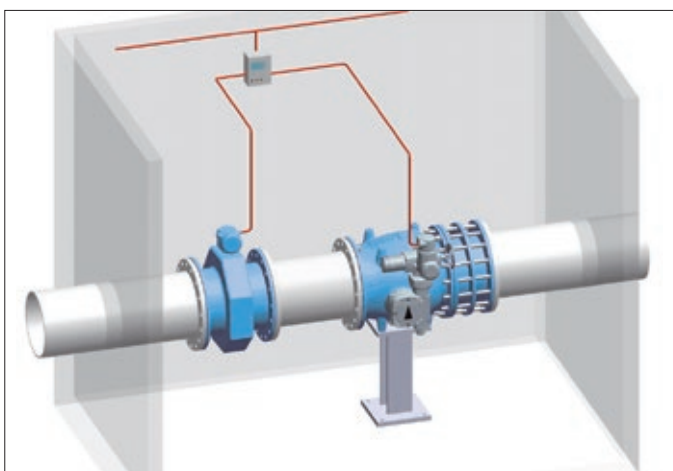
Most frequently used pressure reducer or flow control valves are the diaphragm types; however, these valves show limits as far as their hydraulic behavior and size.

Plunger valves are also perfectly suited for precise and reliable control of pressure and flow, and they have the advantages of the high range, from DN 80 to DN 1800.

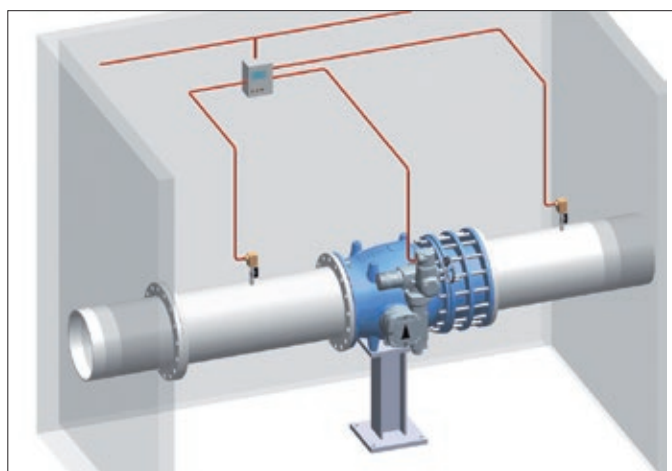
Unlike diaphragm valves (operated hydraulically only), plunger valves need an external actuator that could be manual operated,

electrical operated, pneumatic operated, operated by oil pressure, operated by float devices or by the gravity (cylinder with counterweight).

Pressure or flow could be controlled by reducing or increasing the inner crosssection of the valve by the external actuators driven by an external unit (PLC) connected to pressure gauges (mounted upstream and downstream of the plunger valve) or flow meter (mounted upstream of the plunger valve).



FLOW CONTROL CONFIGURATION



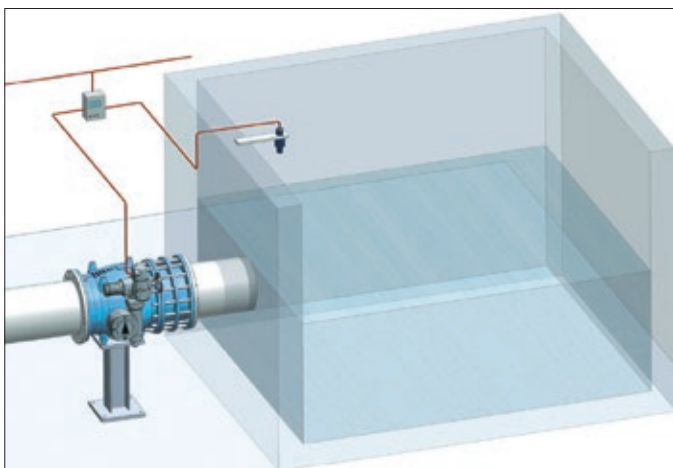
PRESSURE CONTROL CONFIGURATION

LEVEL CONTROL

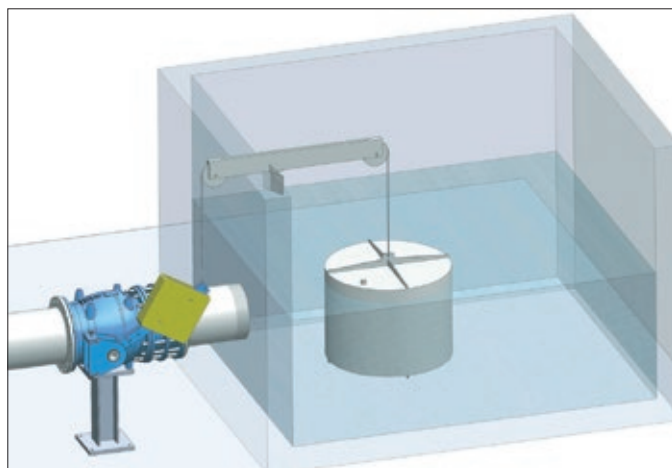
Plunger flow control valves can control reservoirs filling to maintain constant water level regardless water demand.

It is important to carefully select valve diameter according to system

hydraulic parameters: if the valve is properly sized, there should be fluctuations of tank level (if oversized) or the time needed to reach desired level may be too long (if undersized).



WITH ELECTRIC ACTUATOR AND LEVEL SENSOR



WITH COUNTERWEIGHT AND FLOAT

AIR APPLICATION

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



Plunger valve for regulating air flow inside a nitrification tank: the valve is equipped with an electrical actuator.

MAIN FEATURES

- **Precise adjustment** varying 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

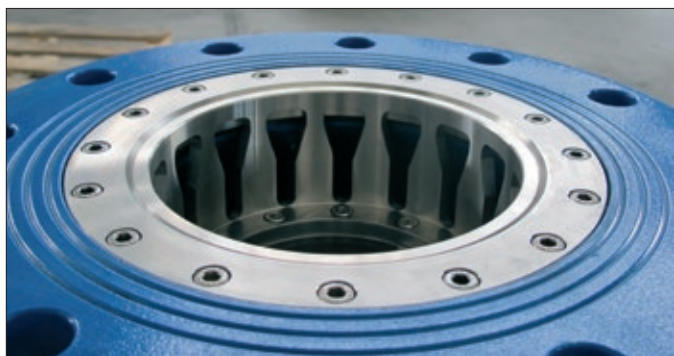
Operating temperature: +0°C to 100°C

Typical application: Use in water treatment plants, downstream of blowers for input of air into tanks (nitrification, **initial treatments**, etc.)

They can be used with various gasses including: air, nitrogen, carbon dioxide. They **cannot** be used with flammable and/or corrosive gasses.

In air applications, the use of a **slotted cylinder** ensure optimization of the 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 the flow variation.

Slotted cylinders are available for progressively greater pressure drops.



PLUNGER VALVE FOR AIR WITH SLOTTED CYLINDER

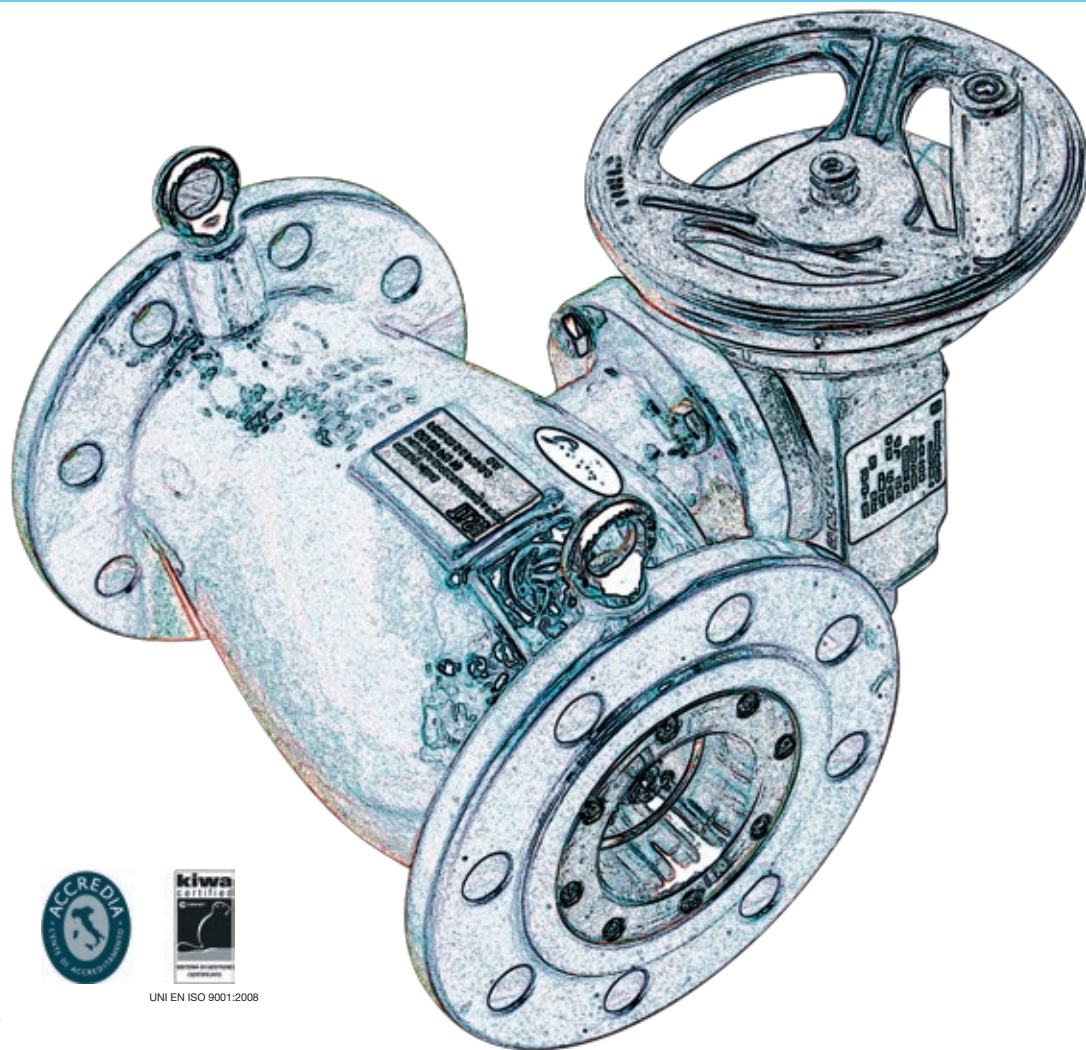
ASSOCIATED



Associazione italiana
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TEL. +39/035/83.54.811 - FAX +39/035/83.54.888
WWW.TISGROUP.IT - INFO@TISGROUP.IT

T.I.S. POLSKA SP. Z O.O.

UL. OŻAROWSKA 30D 05-850 OŻARÓW MAZOWIECKI - DUCHNICE - POLAND
TEL. +48/22/483.56.00 - FAX +48/22/483.56.03
WWW.TISPOLSKA.PL - INFO@TISPOLSKA.PL