

**Operation and maintenance**  
**manual for**

**FLANGED**  
**CONTROL VALVES**

**P/N**  
**6800**

Approved for use by

President of Factory, JAFAR S.A.

Failure to comply with the guidelines and instructions in this Operation and Maintenance Manual releases the manufacturer from all obligations, liability and guarantee.

Due to continuous business development, we reserve the right to introduce modifications and design changes to the presented product.

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## 1 TECHNICAL DESCRIPTION

### 1.1 1.1 PRODUCT DESIGNATION AND IDENTIFICATION

The subject of this Operation and Maintenance Manual is:  
Type 106 PR / 206 PR flanged cast-iron reducing valves, in straight-line and pilot-operated angular versions, hydraulically controlled by the medium.

### 1.2 USE

The Type 6800 reducing valve is designed to automatically reduce and stabilise the downstream pressure at a preset value, and irrespective of the inlet pressure or water distribution in the system. The valve reduces varying inlet pressure to a constant and lower outlet pressure, independent from the flow rate.

If the flow is not collected downstream, the valve outlet will remain closed.

### 1.3 TECHNICAL SPECIFICATION

The reducing valve is primarily suited for:

- Interfaces between high and low pressure zones in gravity feed system;
- System pressure control in areas of varying elevation (e.g. mountain regions or multi-storey production halls, etc.);
- Pressure reduction to the required level of the distribution system.

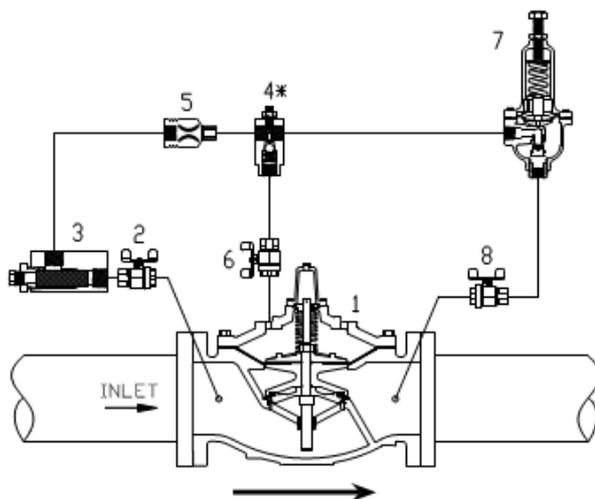
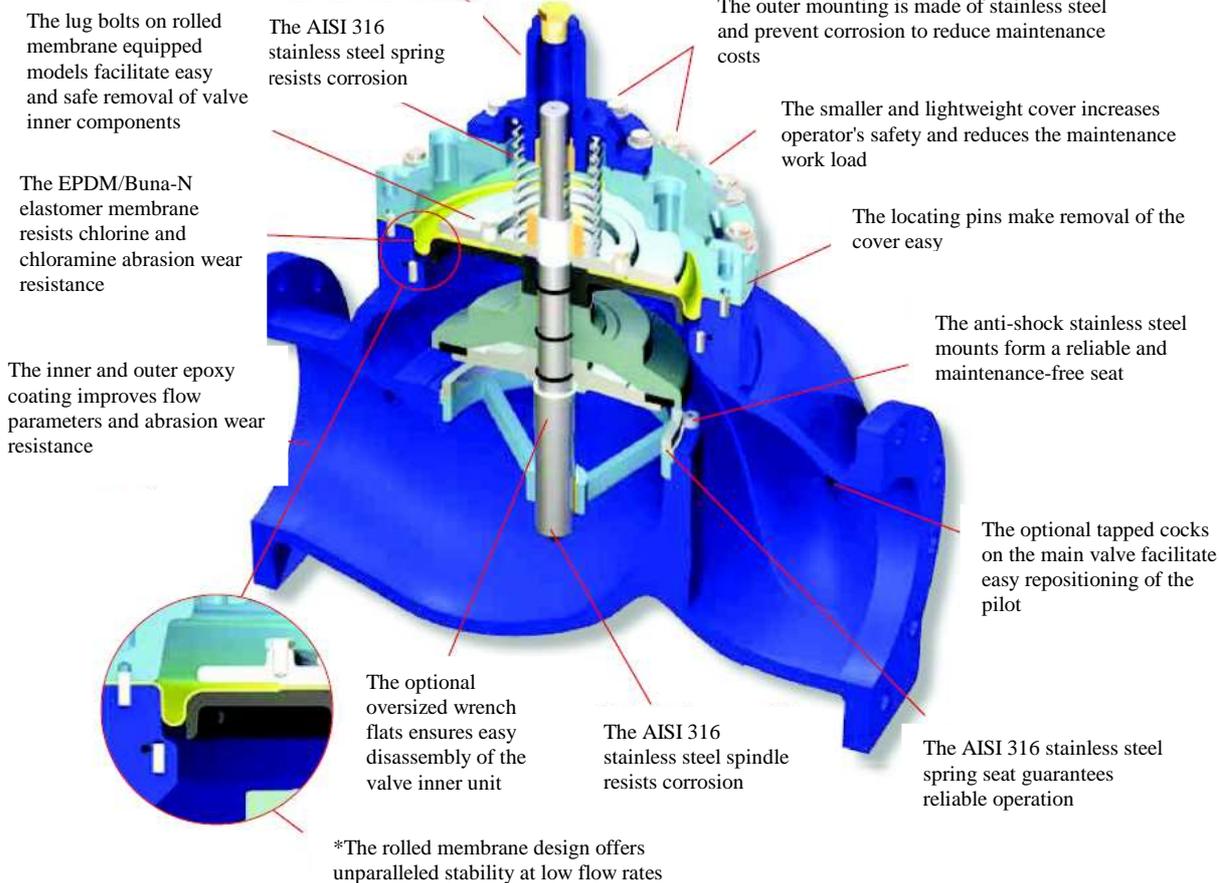


Diagram A-0306C

1. Main valve, 106-PG or 206-PG
2. Cut-off valve, standard for 100 mm and larger
3. Strainer, standard for 100 mm and larger
- 4\*. Flow stabilizer assembly, model 26 w/opening rate control
  - Standard (106 or 206): flat membrane
  - Optional (S106 or S206): rolled membrane
5. Turn limiter
6. Cut-off valve, standard for 100 mm and larger
7. Pilot, model 160
  - 5-50 psi / 0.35 - 3.5 bar
  - 10 -80 psi / 0.70 - 5.5 bar
  - 20 -200 psi / 1.3 - 13.8 bar
  - 100-300 psi / 6.9 - 20.7 bar
8. Cut-off valve, standard for all sizes

Removable separate spindle cap which reduces the spindle bending hazard for faster assembly and inspection



- Available diameters: DN50 – DN900;
- max medium flow rate: 4 m/s;
- max operating pressure (PS): 2.4 MPa;
- max operating temperature (TS): 70°C.

The valve body features a flow direction arrow.  
 The Type 6800 reducing valve connection flanges design is acc. to PN-EN 1092-2: 1999, with appropriate dimensions for the assumed nominal pressures.

## 2 DESIGN

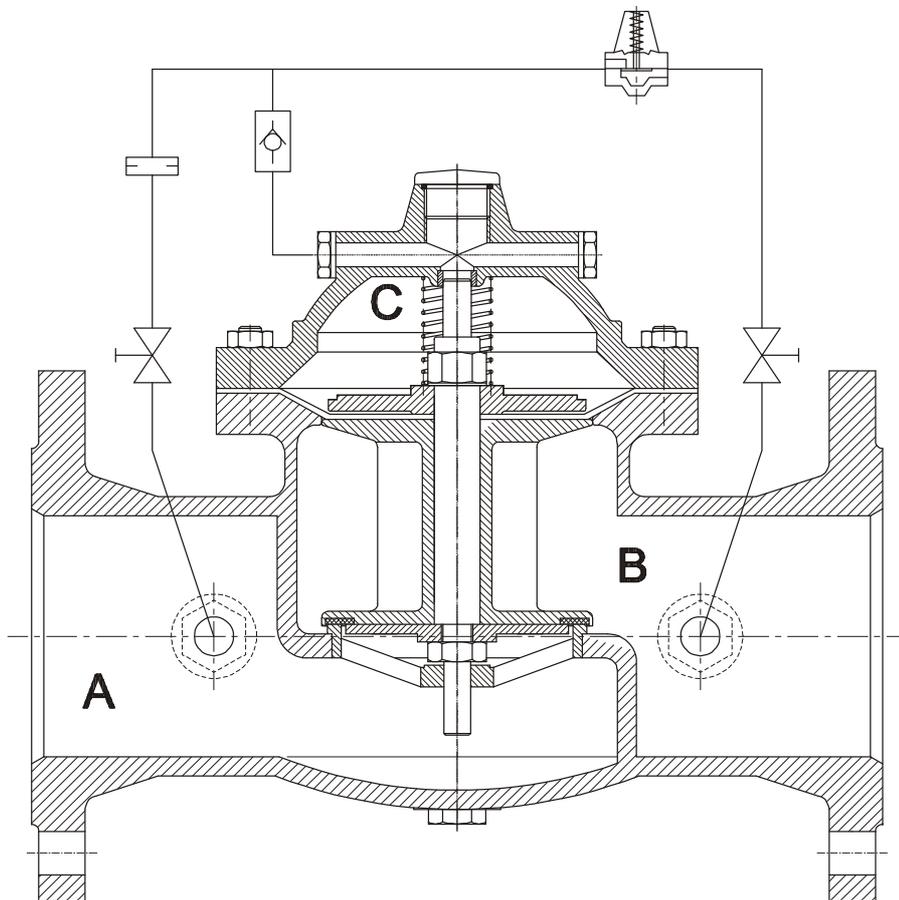
### 2.1 DESCRIPTION OF THE VALVE DESIGN

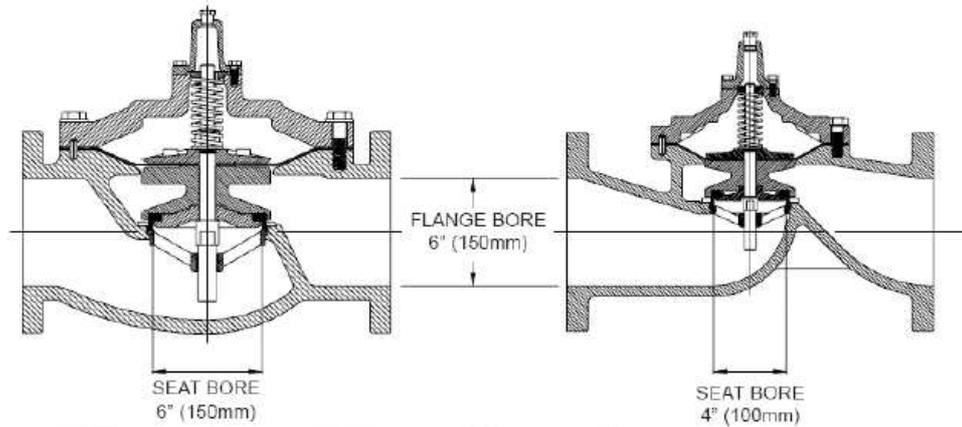
The reducing valve comprises two main components:

- the main valve;
- the control system.

The reducing valve has three different pressure zones:

- Zone A, operating under the inlet (high) pressure;
- Zone B, operating under the outlet (low) pressure;
- Zone C, the pressure control zone.





TYPE 206



TYPE 106

Whenever the flow (outlet) pressure is below the operating pressure preset with the pilot knob, the main valve spring reduces the flow by moving the poppet towards the seat.

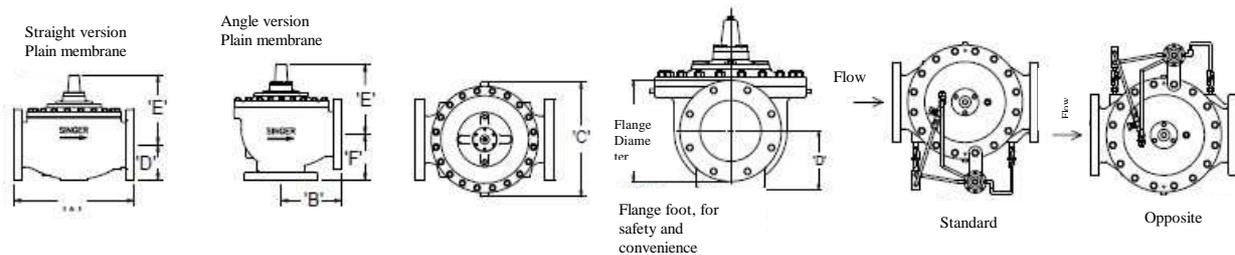
The pilot works according to the inlet (high) pressure and opens when the outlet (low) pressure is below the preset operating pressure. When the pilot opens, the pressure underneath the valve cover (in Zone C) drops, which moves the main valve poppet in the direction of higher flow rate. When the pressure rises in Zone B above the pilot preset operating pressure, the pilot closes, which increases the pressure in Zone C and closes the main valve.

Given the potential risk of cavitation, the reducing valve sizing shall depend on the foreseen flow rate, and not the pipeline diameter.

## Valve specifications (metric) - 106 PR

Size mm	Fig. No.	Std ISO	Plain membrane										
			15 mm	20 mm	25 mm	32 mm	40 mm	50 mm	65 mm	80 mm	100 mm	150 mm	200 mm
<b>Straight-line valve dimensions</b>			All values in millimetres, unless otherwise specified										
Lay length	A	BSPT	89	89	171	171	171	238	279	343	-	-	-
Centreline to bottom	D	BSPT	31	31	64	64	64	70	86	93	-	-	-
Lay length	A	PN10/PN16	-	-	-	-	229	238	279	318	381	508	645
Centreline to bottom	D	PN10/PN16	-	-	-	-	83	76	89	100	117	142	200
Lay length	A	PN25 / PN40	-	-	-	-	229	238	279	318	397	533	670
Centreline to bottom	D	PN25 / PN40	-	-	-	-	83	76	89	100	129	161	200
<b>Angle valve dimensions</b>													
Inlet centre to outlet	B	BSPT	-	-	86	86	36	119	140	168	-	-	-
Outlet centre to inlet	F	BSPT	-	-	76	76	76	83	102	118	-	-	-
Inlet centre to outlet	B	PN10 / PN16	-	-	-	-	-	121	140	163	191	254	324
Outlet centre to inlet	F	PN10 / PN16	-	-	-	-	-	83	102	113	127	152	203
Inlet centre to outlet	B	PN25 / PN40	-	-	-	-	-	121	140	163	200	267	337
Outlet centre to inlet	F	PN25 / PN40	-	-	-	-	-	83	102	113	135	165	216
<b>Common dimensions (angle &amp; straight-line valve)</b>													
Width	C		76	76	124	124	156	152	208	235	276	425	549
Height (to spindle guard, straight v.)	E		78	78	111	111	111	121	191	203	232	298	379
Height (to spindle guard, angle v.)	E		-	-	111	111	111	121	191	203	232	298	379
Body port thread	FNPT	inch	1M	1M	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	1/2
Spindle plug	MNPT	inch	1/4	1/4	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
Cover port thread	FNPT	inch	-	-	3/8	3/8	3/8	3/8	3/8	3/8	3/8	1/2	1/2
Valve stroke		mm	6.4	6.4	13	13	13	14	25	29	37	43	73
Removed cover capacity (L)			0.01	0.01	0.03	0.03	0.03	0.1	0.3	0.3	0.8	2.1	6.3
Approx. transport weight (kg)			5	5	9	9	9	18	29	45	79	181	295
<b>Straight-line/angle valve throughput (L/s)</b>													
K <sub>v</sub> - straight-line valve			1.5	1.5	6.6	7.1	7.6	13	19	26	47	110	190
K <sub>v</sub> - angle valve			-	-	5.7	5.7	6.2	15	21	32	55	123	225
Continuous (straight-line valve)			0.8	1.2	3	6	8	13	19	29	50	114	196
Intermittent (straight-line valve)			1.0	1.3	4	8	10	16	24	36	63	142	244
Instantaneous (straight-line valve)			2	3	7	11	16	30	42	65	114	252	442
<b>Maximum pressure ratings</b>													
Bar <sup>1</sup>		BSPT	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6	-	-	-
Bar		PN16	-	-	-	-	16	16	16	16	16	16	16
Bar <sup>1</sup>		PN25	-	-	-	-	25	25	25	25	25	25	25
<b>Maximum temperature</b>													
°C			82°	82°	82°	82°	82°	82°	82°	82°	82°	82°	82°

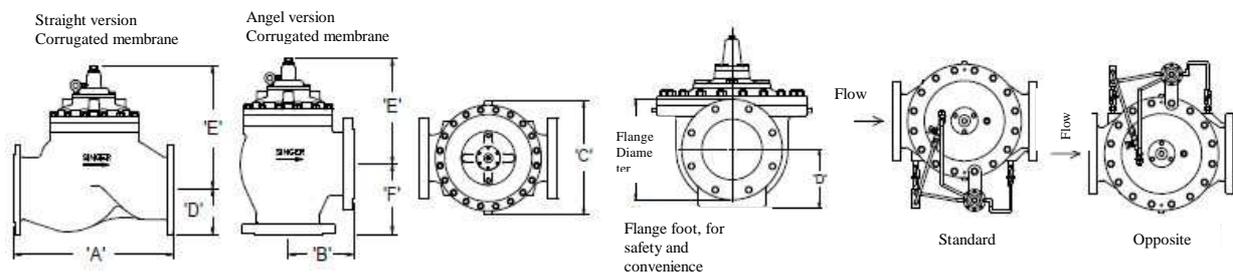
Ratings given for the standard 27.6 bars; 41 bar version available on request.



## Valve specifications (metric) - 106 PR

Size mm	Fig. No.	Standard ISO	Corrugated membrane								
			150 mm	200 mm	250 mm	300 mm	350 mm	400 mm	500 mm	600 mm	900 mm
<b>Straight-line valve dimensions</b>			<b>All values in millimetres, unless otherwise specified</b>								
Lay length	A	BSPT	-	-	-	-	-	-	-	-	-
Centreline to bottom	D	BSPT	-	-	-	-	-	-	-	-	-
Lay length	A	PN10/PN16	508	645	756	864	787	1051	1321	1562	1930
Centreline to bottom	D	PN10/PN16	142	200	217	241	267	298	367	435	597
Lay length	A	PN25 / PN40	533	670	790	864	826	1105	1362	1607	1981
Centreline to bottom	D	PN25 / PN40	161	200	243	241	292	324	400	499	648
<b>Angle valve dimensions</b>											
Inlet centre to outlet	B	BSPT	-	-	-	-	-	-	-	-	-
Outlet centre to inlet	F	BSPT	-	-	-	-	-	-	-	-	-
Inlet centre to outlet	B	PN10/PN16	-	-	292	349	-	457	-	-	-
Outlet centre to inlet	F	PN10/PN16	-	-	318	318	-	399	-	-	-
Inlet centre to outlet	B	PN25 / PN40	•	-	310	349	-	478	-	-	-
Outlet centre to inlet	F	PN25 / PN40	-	-	335	318	-	419	-	-	-
<b>Common dimensions (angle &amp; straight-line valve)</b>											
Width	C		324	409	562	660	660	813	889	1262	1422
Height (to spindle guard, straight v.)	E		346	455	592	679	681	798	902	1162	1550
Height (to spindle guard, angle v.)	E		-	-	508	603	-	724	-	-	-
Body port thread	FNPT	inch	3/8	1/2	3/4	3/4	3/4	3/4	3/4	3/4	1
Spindle guard plug	MNPT	inch	3/8	3/8	3/4	3/4	3/4	3/4	3/4	3/4	1
Cover port thread	FNPT	inch	1/2	1/2	3/4	3/4	3/4	3/4	3/4	3/4	1
Valve stroke		mm	43	73	83	95	95	120	141	150	229
Removed cover capacity (L)			2	4	6	9	9	26	34	56	163
Approx. transport weight (kg)			160	250	480	590	635	1043	1565	2268	6124
<b>Straight-line/angle valve throughput (L/s)</b>											
$K_v$ - straight-line valve			110	190	310	500	610	780	1210	1800	3875
$K_v$ - angle valve			-	-	332	581	-	948	-	-	-
Continuous (straight-line valve)			114	196	309	442	536	694	1104	1577	3500
Intermittent (straight-line valve)			142	244	385	555	726	899	1370	1968	4375
Instantaneous (straight-line valve)			252	442	694	1009	1199	1577	2460	3546	7867
<b>Maximum pressure ratings</b>											
Bar		BSPT	-	-	-	-	-	-	-	-	-
Bar		PN16	16	16	16	16	16	16	16	16	16
Bar		PN25	25	25	25	25	25	25	25	25	25
<b>Maximum temperature</b>											
°C			82°	82°	82°	82°	82°	82°	82°	82°	82°

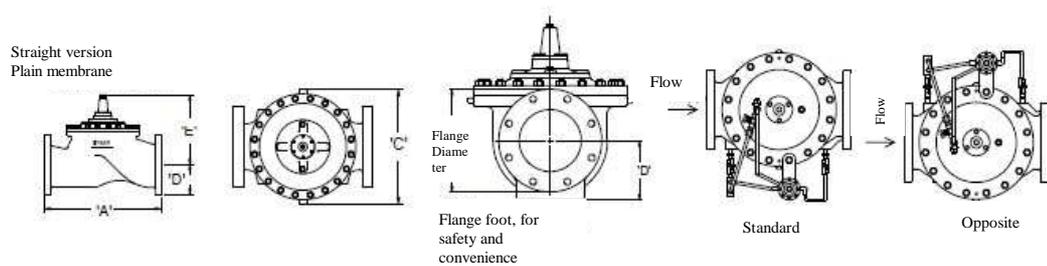
Ratings given for the standard 27.6 bars; 41 bar version available on request.



## Valve specifications (metric) - 206 PR

Size	Fig.	Standard	Plain membrane				
mm	No.	ISO	80 mm	100 mm	150 mm	200 mm	250 mm
<b>Straight-line valve dimensions</b>		<b>BS4504</b>	<b>All values in mm</b>				
Lay length	A	BSPT	-	-	-	-	-
Centreline to bottom	D	BSPT	-	-	-	-	-
Lay length	A	PN10/PN16	305	381	511	635	622
Centreline to bottom	D	PN10/PN16	102	117	142	171	217
Lay length	A	PN25/PN40	-	397	533	660	657
Centreline to bottom	0	PN25/PN40	-	127	161	191	236
<b>Angle valve dimensions</b>							
Inlet centre to outlet	B	BSPT	-	-	-	-	-
Outlet centre to inlet	F	BSPT	-	-	-	-	-
Inlet centre to outlet	B	PN10/PN16	-	192	259	318	-
Outlet centre to inlet	F	PN10/PN16	-	151	157	229	-
Inlet centre to outlet	B	PN25 / PN40	-	200	270	330	-
Outlet centre to inlet	F	PN25 / PN40	-	159	173	241	-
<b>Common dimensions (angle &amp; straight-line valve)</b>							
Width	C		208	238	318	406	508
Height (to spindle guard, angle v.)	E		191	244	267	359	473
Height (to spindle guard, angle v.)	E		-	197	224	287	-
Body port thread	FNPT	inch	3/8	3/8	3/8	3/8	1/2
Spindle guard plug	MNPT	inch	3/8	3/8	3/8	3/8	3/8
Cover port thread	FNPT	inch	3/8	3/8	3/8	1/2	1/2
Valve stroke		mm	14	29	37	43	73
Removed cover capacity (L)			0.08	0.3	0.8	2.1	6.3
Approx. transport weight (kg)			34	45	113	227	295
<b>Straight-line/angle valve throughput (L/s)</b>							
K <sub>v</sub> - straight-line valve			14	36	60	120	230
K <sub>v</sub> - angle valve			-	36	60	133	-
Continuous (straight-line valve)			19	37	65	145	259
Intermittent (straight-line valve)			24	44	75	170	295
Instantaneous (straight-line valve)			36	78	136	303	530
<b>Maximum pressure ratings</b>							
Bar		BSPT	-	-	-	-	-
Bar		PN16	16	16	16	16	16
Bar		PN25	25	25	25	25	25
<b>Maximum temperature</b>							
°C			82°	82°	82°	82°	82°

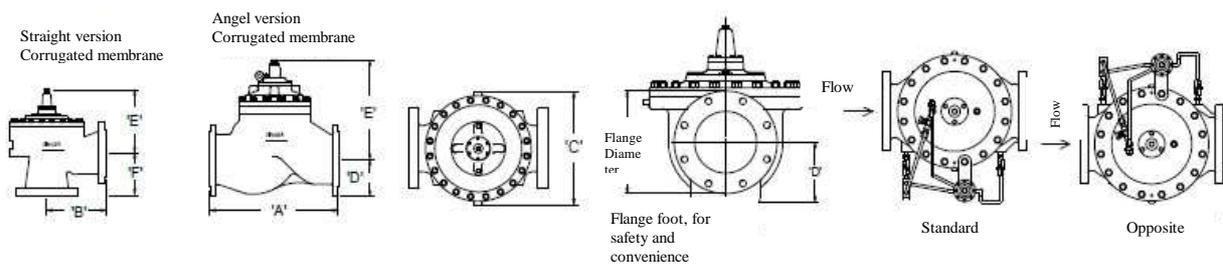
Ratings given for the standard 27.6 bars; 41 bar version available on request.



## Valve specifications (metric) - 206 PR

Size	Fig.	Standard	Corrugated membrane							
			300 mm	400 mm	450 mm	500 mm	600 x 400	600 x 500	750 mm	900 mm
<b>Straight-line valve dimensions</b>			<b>All values in millimetres, unless otherwise specified</b>							
Lay length	A	FNPT	-	-	-	-	-	-	-	-
Centreline to bottom	D	FNPT	-	-	-	-	-	-	-	-
Lay length	A	150F	699	914	1067	1143	1283	1562	1776	1776
Centreline to bottom	D	150F	241	298	318	354	419	435	525	603
Lay length	A	300F	737	956	1108	1184	1327	1607	-	-
Centreline to bottom	D	300F	260	324	356	387	457	499	-	-
<b>Angle valve dimensions</b>										
Inlet centre to outlet	B	FNPT	-	-	-	-	-	-	-	-
Outlet centre to inlet	F	FNPT	-	-	-	-	-	-	-	-
Inlet centre to outlet	B	150F	-	-	-	-	-	-	-	-
Outlet centre to inlet	F	150F	-	-	-	-	-	-	-	-
Inlet centre to outlet	B	300F	-	-	-	-	-	-	-	-
Outlet centre to inlet	F	300F	-	-	-	-	-	-	-	-
<b>Common dimensions (angle &amp; straight-line valve)</b>										
Width	C		562	660	795	800	914	914	1264	1264
Height (to spindle guard, straight v.)	E		592	679	797	797	797	875	1162	1162
Height (to spindle guard, angle v.)	E		-	-	-	-	-	-	-	-
Cover port thread	FNPT	inch	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
Spindle guard plug	MNPT	inch	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
Cover port plug	FNPT	inch	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
Valve stroke		mm	83	95	120	120	120	141	150	150
Removed cover capacity (L)			6	9	26	26	26	34	56	56
Approx. transport weight (kg)			408	635	1089	1179	1270	2155	2812	3175
<b>Straight-line/angle valve throughput (L/s)</b>										
$K_v$ - straight-line valve			370	520	780	810	830	1210	1850	1870
$K_v$ - angle valve			-	-	-	-	-	-	-	-
Continuous (straight-line valve)			404	582	1041	1041	1041	1370	2120	2132
Intermittent (straight-line valve)			465	661	1320	1320	1320	1640	2362	2375
Instantaneous (straight-line valve)			833	1211	1893	1896	1899	2460	4255	4267
<b>Maximum pressure ratings</b>										
Bar		FNPT	-	-	-	-	-	-	-	-
Bar		150F	17	17	17	17	17	17	17	17
Bar <sup>1</sup>		300F	27.6	27.6	27.6	27.6	27.6	27.6	27.5	27.5
<b>Maximum temperature</b>										
°C			82°	82	82	82	82	82	82	82

Ratings given for the standard 27.6 bars; 41 bar version available on request.

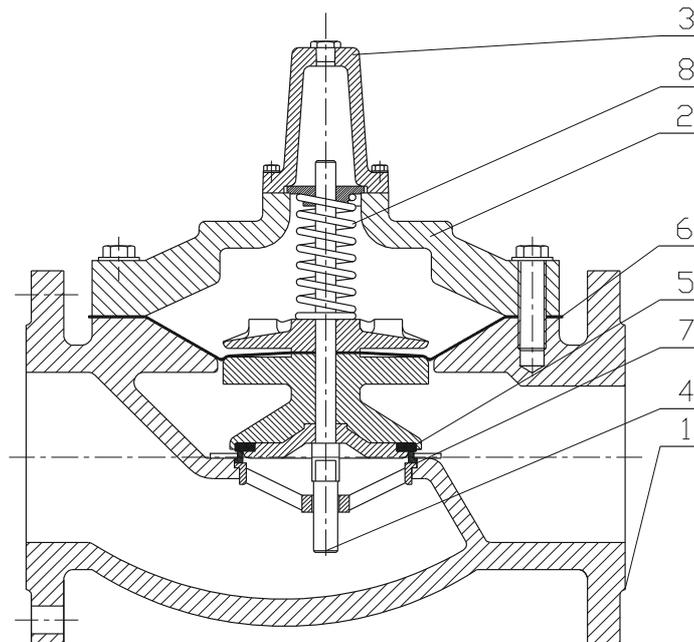


## 2.2 MATERIALS

The table below lists the structural materials of the reducing valves.

Item	Part designation	Material	Reference standard
1	Body	Spheroidal cast iron, EN-GJS 450-15	PN-EN 1563: 2012
2	Cover	Spheroidal cast-iron, EN-GJS-450-15	PN-EN-1563: 2012
3	Spindle guard	Spheroidal cast-iron, EN-GJS-450-15	PN-EN-1563: 2012
4	Spindle	Stainless steel, 1.4401	PN-EN 10088-1:2014
5	Wafer	Stainless steel, 1.4401	PN-EN 10088-1:2014
6	Membrane	EPDM/Buna-N	PN-ISO 1629: 2005
7	Seat ring	Stainless steel, 1.4401	PN-EN 10088-1:2014
8	Spring	Stainless steel, 1.4401	PN-EN 10088-1:2014

## 2.3 DIMENSIONS



## 2.4 REFERENCE STANDARDS

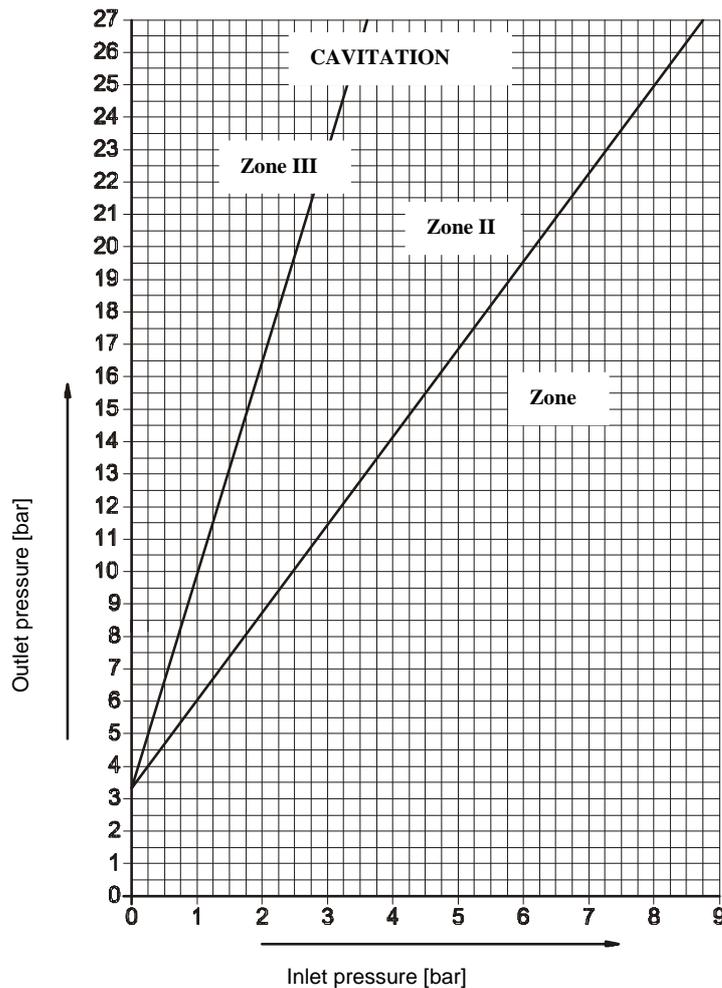
PN-EN 1074-1: 2002	Valves for water supply. Fitness for purpose requirements and appropriate verification tests. General requirements
PN-EN 1074-5: 2002	Valves for water supply. Fitness for purpose requirements and appropriate verification tests. Control valves.
PN-89/H-02650	Valves and pipelines. Pressure and temperature ratings.
PN-EN 1092-2: 1999	Flanges and their joints. Circular flanges for pipes,

PN-EN 19: 2005	valves, fittings and accessories, PN designated. Cast iron flanges.
PN-EN 12266-1: 2012	Industrial valves. Marking of metallic valves
PN-EN 558: 2012	Industrial valves. Testing of metallic valves. Pressure tests, test procedures and acceptance criteria. Mandatory requirements.
PN-EN ISO 6708: 1998	Industrial valves. Face-to-face and centre-to-face dimensions of metal valves for use in flanged pipe systems. PN-designated valves.
PN-EN 1559-1: 2011	Pipework components. Definition and selection of DN (nominal size).
PN-EN 1563: 2012	Founding. Technical conditions of delivery. General.
PN-EN 1370: 2012	Founding. Spheroidal graphite cast irons.
PN-EN 1717: 2003	Founding. Surface roughness inspection by visual tactile comparators.
PN-ISO 965-1: 2001	Protection against pollution of potable water in water installations and general requirements of devices to prevent pollution by backflow.
PN-EN ISO 4762: 2006	General purpose ISO metric threads. Tolerances. Principles and basic data.
DIN 6912: 2006	Hexagon socket head cap screws.
PN-EN 10204: 2006	Hexagon socket low head cap screws.
PN-ISO 1629: 2005	Metallic products. Types of inspection documents.
PN-EN ISO 1872-1: 2000	Rubbers and latices. Nomenclature.
PN-EN ISO 1873-1: 2000	Plastics. Polyethylene (PE) moulding and extrusion materials. Designation system and basis for specifications.
PN-EN ISO 1874-1: 2010	Plastics. Polypropylene (PP) moulding and extrusion materials. Designation system and basis for specifications.
PN-EN ISO 12944-5: 2009	Plastics. Polyamide (PA) moulding and extrusion materials. Designation system and basis for specification.
	Paints and varnishes. Corrosion protection of steel structures by protective paint systems. Protective paint systems.

## 2.5 ORDERING INFORMATION

Water supply system valves are specific purpose industrial valves, therefore orders must include:

- Part Number (P/N)
  - intended use, e.g. for water supply systems
- and:
- flow rate
  - nominal diameter, acc. to PN-EN ISO 6708: 1998;
  - nominal pressure, acc. to PN-89/H-02650;
  - maximum operating temperature, acc. to PN-89/H-02650.



**CAVITATION:** this effect occurs when the liquid particles turn into a gaseous state when the liquid is accelerated across the throttle orifice and when static pressure is below the saturated steam at control valves, and hammering of steam bubbles downstream of the valve seat. Cavitation produces noise, vibration and head from the shock waves, which disturbs flow and may cause damage to valves.

**Prevention of cavitation damage:** select the valves for operation in Zone II, and the inlet to outlet pressure ratio shall not exceed 1:3; if the inlet pressure is higher, install several valves in succession. Select a higher DN valve to reduce the flow rate.

## 2.6 PRODUCTION AND ACCEPTANCE

The Type 6800 reducing valves are manufactured and accepted in accordance with: PN-EN 1074-5:2002 (Valves for water supply. Fitness for purpose requirements and appropriate verification tests), and PN-EN 12266-1: 2007 (Industrial valves. Testing of valves). All valves are leak tested (100%). The tests include external body tightness and closing tightness at high and low pressure values.

## 2.7 MARKINGS

The valve marking is regulated by the following standards: PN-EN 19: 2005; PN-EN-1074-1: 2002. The anticontamination valve bodies feature markings on the front and back walls of the body. The marking contains the following data:

- nominal diameter;
- nominal pressure;
- body material type;
- manufacturer's trade mark;
- flow direction arrow

and a boss with the identification marking (e.g. lot number).

### 3 PROTECTION, STORAGE & TRANSPORT

#### 3.1 PROTECTIVE COATINGS

All inner and outer cast-iron surfaces are protected with electro-deposited epoxy coat. The coat has been approved for contact with foodstuffs.

The anti-corrosion coating layer minimum thickness is 250µm.

The casting surface is pre-treated for epoxy coating in accordance with the relevant technical documentation and PN-EN ISO 12944-5: 2009.

#### 3.2 PACKAGING

The valves are packed in special crates.

#### 3.3 STORAGE

Store the gate valves in sheltered rooms.

#### 3.4 TRANSPORT

Transport the valves on sheltered vehicles.

### 4. ASSEMBLY AND INSTALLATION

#### 4.1. ASSEMBLY GUIDELINES

The Type 6800 flanged cast-iron reducing valves can be installed in overground pipelines in horizontal orientation as shown in the following figure. The flanged valves are suitable for joining with the flanged ends of pipelines with the size equal to that of the valve flanges. Note that the system must not expose the valve to bending or tensile stress from loading with the unsupported pipeline sections. It is recommended to perform installation works considering pipeline compensation due to temperature and pressure. The valve adjusted and delivered by the manufacturer is ready for installation. Disassembly of the valve components without proper care may result in loss of integrity.

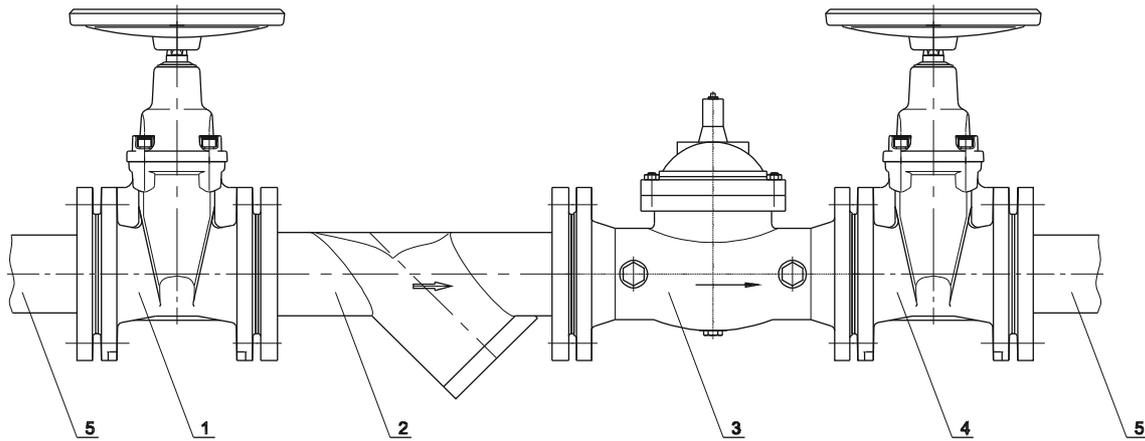
#### 4.2 ASSEMBLY INSTRUCTIONS

Before attempting to install the valve, check the technical and commercial documents delivered with the product to verify that the media, and especially pipeline operating parameters (flow rate range) comply with the manufacturer's declaration. Any change in the operating conditions must be consulted with the valve manufacturer beforehand.

Before attempting to assemble the valve, remove the main bore plugs, check the inner surfaces of the valve and thoroughly flush with water, if necessary.

**CAUTION! If the product has mechanical damage, do not install it in the pipeline.**

The assembly method for the anticontamination valve is shown in the following figure:



1. Gate valve; 2. Filter; 3. Valve; 4. Gate valve; 5. Pipeline.

#### 4.3 OPERATION

The flanged reducing valves shall be operated according to the requirements for reducing valves, i.e. in the orientation shown in the recommended assembly orientation diagram. It is recommended to periodically purge the valve with fresh water (once a year) to assure full performance. Hard solids with the size above 1mm should be filtered out of the transmitted medium by an upstream filter to prevent seizure of the poppet gear and damage to the seals.

Install cut-off valves upstream and downstream of the valve to allow maintenance.

A filter should be installed directly upstream of the valve.

The installation site and method shall assure free access for maintenance and servicing.

Do not install the valve in a location exposed to flooding.

The product shall not be exposed to temperatures outside of the permissible operating range.

**Exceeding the operating limits of the valve may result in damage that will not covered by the suretyship granted by the manufacturer.**

#### 4.4 OCCUPATIONAL HEALTH AND SAFETY

The reducing valves are eligible for the OHS guidelines and recommendation concerning installation of pipelines and devices for water supply stations, water treatment stations, sewage treatment plants, pumping stations and other facilities.

**Misuse of this product is prohibited.**

#### 5 WARRANTY TERMS AND CONDITIONS

The product assembled, installed and operated in compliance with this Manual is covered by a commercial warranty from the manufacturer. The warranty terms, conditions and period are specified in the relevant Warranty Sheet.