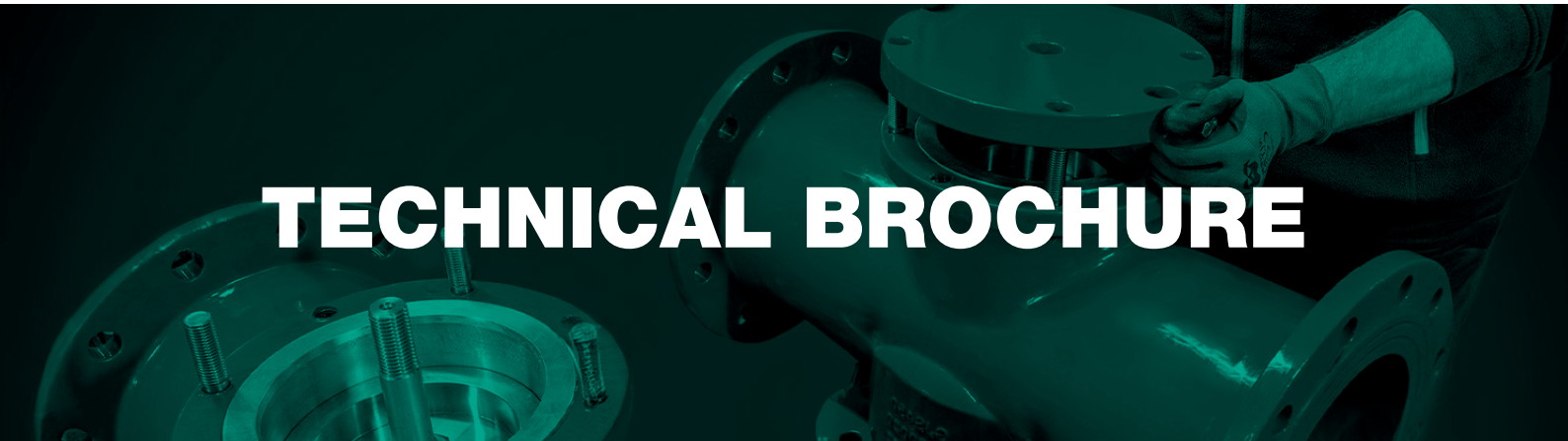
Pietro Fiorentini

W-VAL

Pressure reducing direct action valve



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W-VAL_technicalbrochure_ENG_revB

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Pressure reducing direct action valve

W-VAL HP

The **W-VAL** series valves reduce and stabilise the downstream pressure regardless of changes in flow rate and upstream pressure.

The W-VAL HP model can be used with water, and air. On request, it can be modified for industrial applications.

Constructive features and advantages

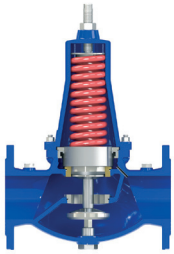
- Body and cap made of ductile cast iron class PN 40, internal components and bolts made of stainless steel.
- Self-cleaning piston, with innovative technology that improves running performance and reduces maintenance.
- Mobile block consisting of three stainless steel components obtained on a CNC lathe to avoid sliding friction and leakage due to accurate machining.
- Upstream and downstream pressure ports for the insertion of pressure gauges.
- Large expansion chamber reduces the risk of cavitation, even at high pressure differentials.
- Flanged version available from DN 50 to 150.

Main applications

- Water distribution networks
- Buildings and civil installations
- Irrigation
- Cooling systems
- Fire-fighting systems
- In general, where pressure reduction is required

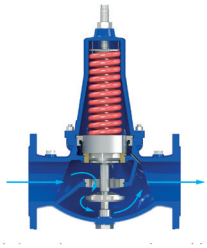
Operating principle

The W-VAL HP valve works thanks to the movement of a piston that slides inside two ring nuts of different diameters. These, firmly screwed to the body and fitted with special lip seals, create an upstream and downstream pressure compensation chamber, ensuring a perfect seal.



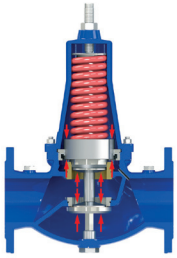
Normally open valve

In the absence of pressure or flow inside, the valve is normally open; the piston is pushed down by the force of the spring.



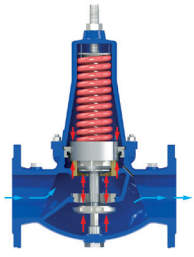
Fully open valve in operation

When the downstream pressure falls below the spring setting, the piston moves downwards and the valve moves to the fully open position.



Modulation valve

If the downstream pressure tends to rise above the set value, it pushes the plug upwards, reducing the passage. The result is the creation of a pressure drop such that the downstream pressure returns to the required value.



Closed valve (static conditions)

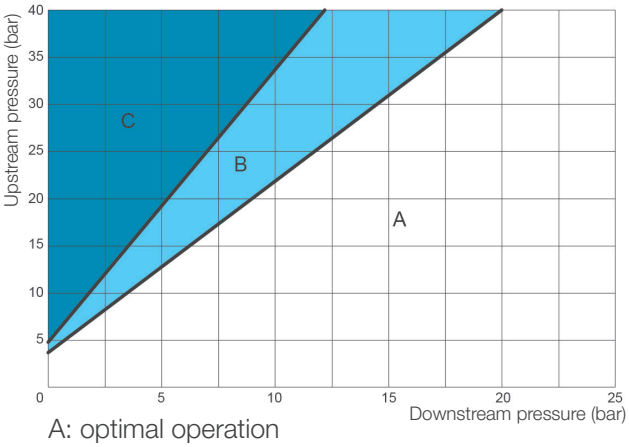
In the event that the downstream withdrawal is cancelled and the pressure rises above the spring setting, the valve moves to the fully closed position, maintaining the required downstream pressure. This also occurs under static conditions.

Technical data

Pressure drop coefficient

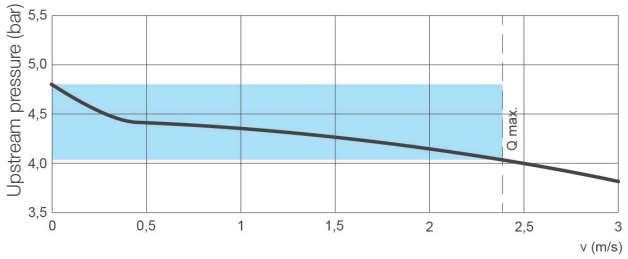
The Kv coefficient represents the flow rate that produces a pressure drop of 1 bar in the fully open valve.

DN (mm)	50	65	80	100	125	150
Kv (m^3/h)/bar	20	47	72	116	147	172



A: optimal operation
B: incipient cavitation
C: harmful cavitation

Pressure drops chart Ensure that the point corresponding to the operating condition of the valve appropriate to the required flow rate, identified by the values of the downstream pressure (in abscissa) and upstream pressure (in ordinate), falls in zone A in the graph.
The graph refers to valves modulating with an opening percentage of 35-40%, at standard temperature and altitude below 300 m. Under operating conditions, the pressure reduction differential must not exceed 24 bar.



Valve sensitivity

The curve shown in the figure shows the indicative change in actual downstream pressure from the set value as the flow rate increases. The maximum speed and recommended working conditions are indicated (blue area).

Recommended flow rates

DN (mm)	50	65	80	100	125	150
Min. flow rate (l/s)	0.3	0.5	0.8	1.2	1.8	2.6
Max. flow rate (l/s)	4,7	8.0	12	18	29	42
Emergency flow rate (l/s)	6,9	11	17	27	42	61

Operating conditions

Fluid	treated water
Maximum temperature	70°C
Maximum pressure	40 bar
Downstream pressure	calibration range 1.5 to 6 bar and 5 to 12 bar (higher values on request)

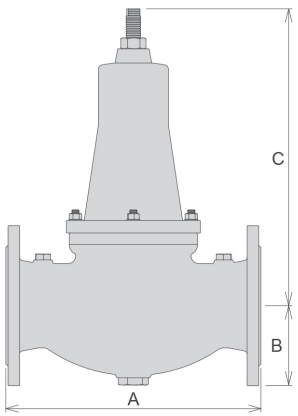
Standard

- Certification and testing according to EN 1074/5
- Flanges with drilling according to EN 1092-2
- RAL 5005 blue epoxy paint applied with fluid bed technique

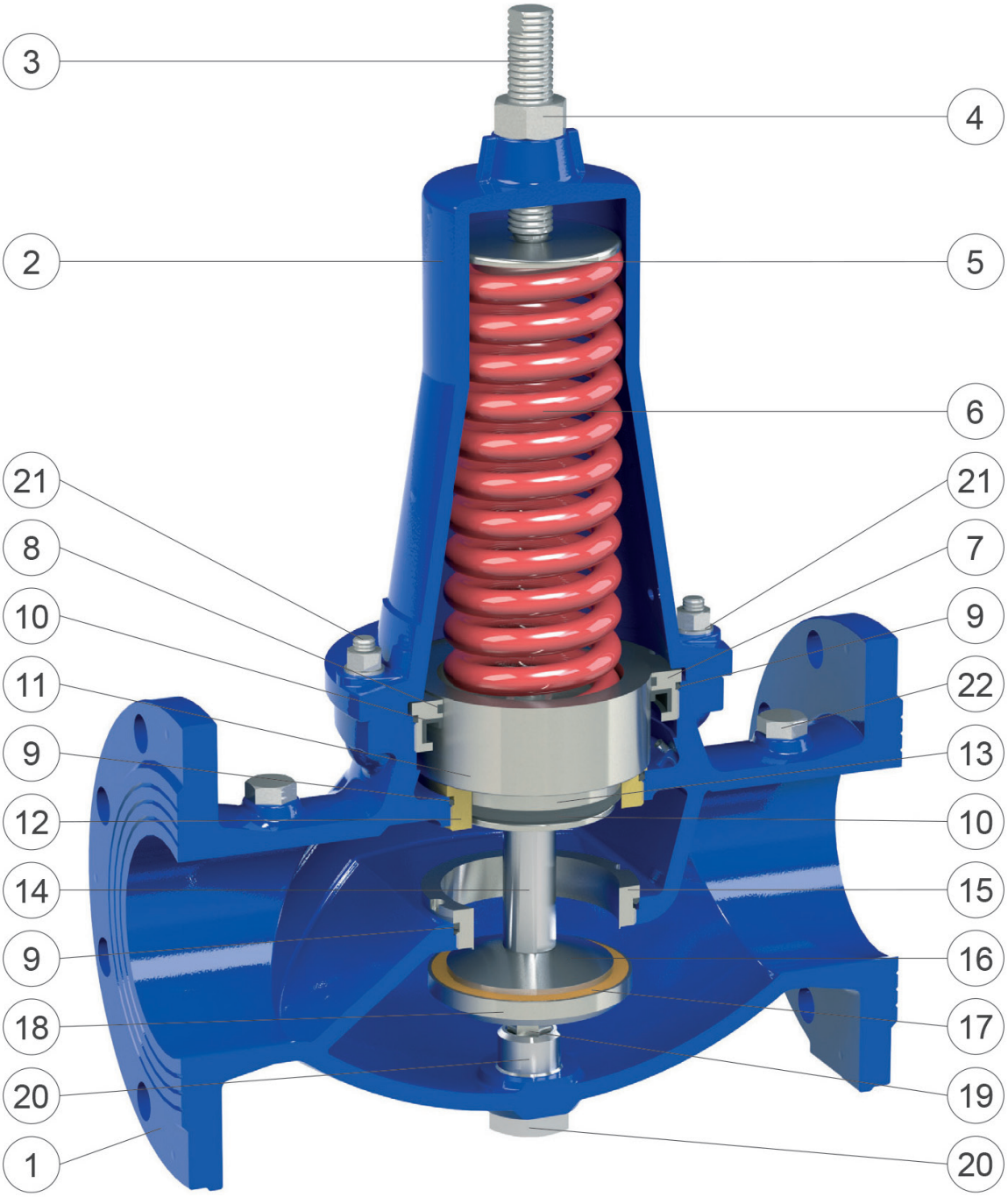
Modifications to flanges and painting on request.

Dimensions and weights

DN (mm)	50	65	80	100	125	150
A (mm)	230	290	310	350	400	480
B (mm)	83	93	100	110	135	150
C (mm)	280	320	350	420	590	690
Weight (Kg)	12	19	24	34	56	74



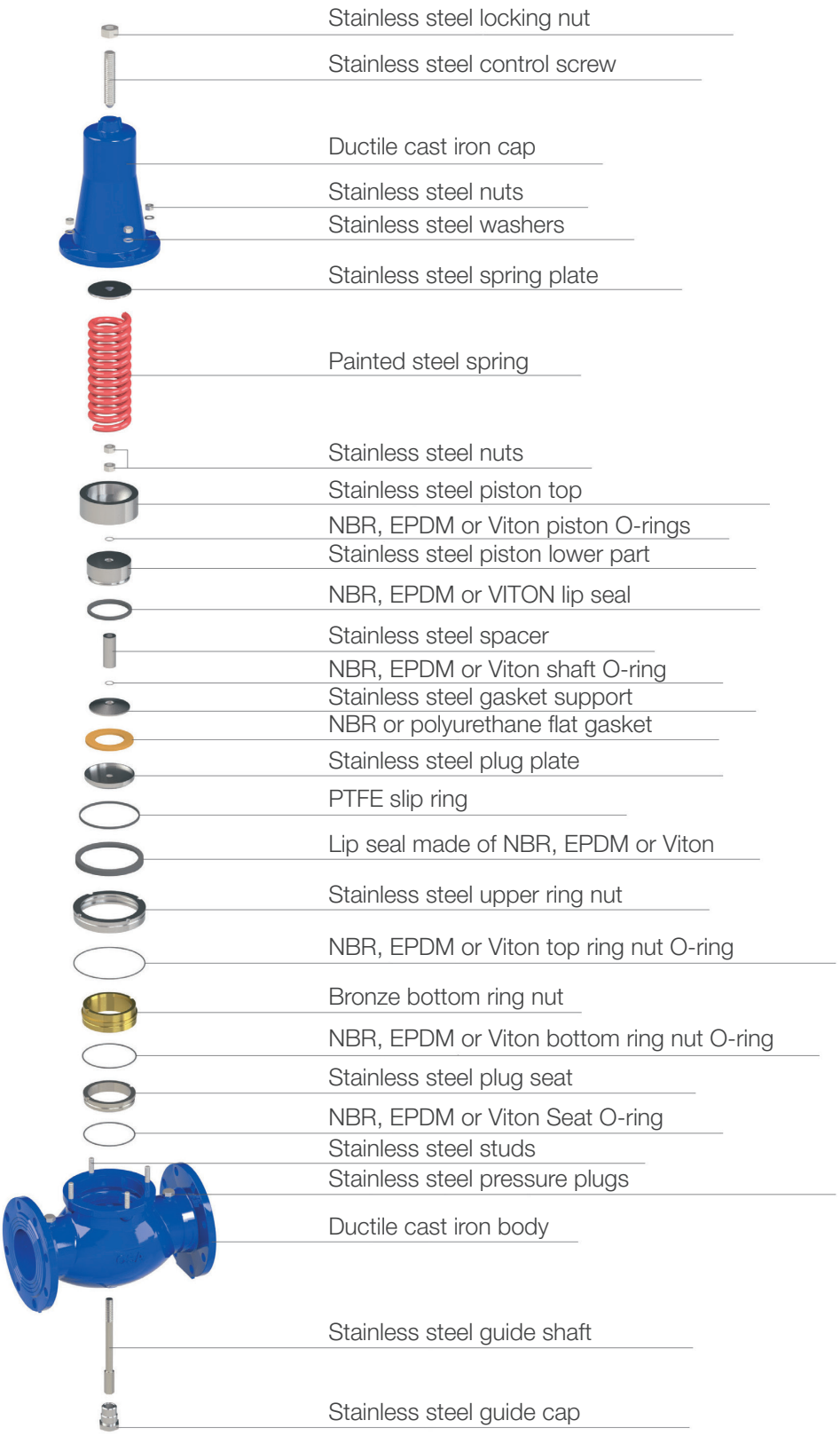
Construction details



No.	Component	Standard material	Optional
1	Body	ductile cast iron GJS 450-10	
2	Cap	ductile cast iron GJS 450-10	
3	Control screw	AISI 304 stainless steel	AISI 316 stainless steel
4	Locking nut	AISI 304 stainless steel	AISI 316 stainless steel
5	Spring plate	AISI 303 stainless steel	AISI 316 stainless steel
6	Spring	coated spring steel 52SiCrNi5	
7	Upper ring nut	AISI 304 stainless steel	AISI 316 stainless steel
8	Slip ring	PTFE	
9	O-ring	NBR	EPDM/Viton
10	Lip seals	NBR	EPDM/Viton
11	Upper piston part	ac. AISI 303 (bronze CuSn5Zn5Pb5 for DN 125-150)	AISI 303/316 stainless steel
12	Lower ring nut	bronze CuSn5Zn5Pb5	AISI 303/316 stainless steel
13	Lower piston part	AISI 303 stainless steel	AISI 316 stainless steel
14	Spacer	AISI 303 stainless steel	AISI 316 stainless steel
15	Plug seat	AISI 304 stainless steel	AISI 316 stainless steel
16	Gasket support	AISI 303 stainless steel	AISI 316 stainless steel
17	Flat gasket	NBR (polyurethane for PN 25-40)	
18	Plug plate	AISI 303 stainless steel	AISI 316 stainless steel
19	Guide shaft	AISI 303 stainless steel	AISI 316 stainless steel
20	Guide cap	AISI 303 stainless steel	AISI 316 stainless steel
21	Studs, nuts and washers	AISI 304 stainless steel	AISI 316 stainless steel
22	Pressure plugs	AISI 316 stainless steel	

The table of materials and components is subject to change without notice.

Spare parts

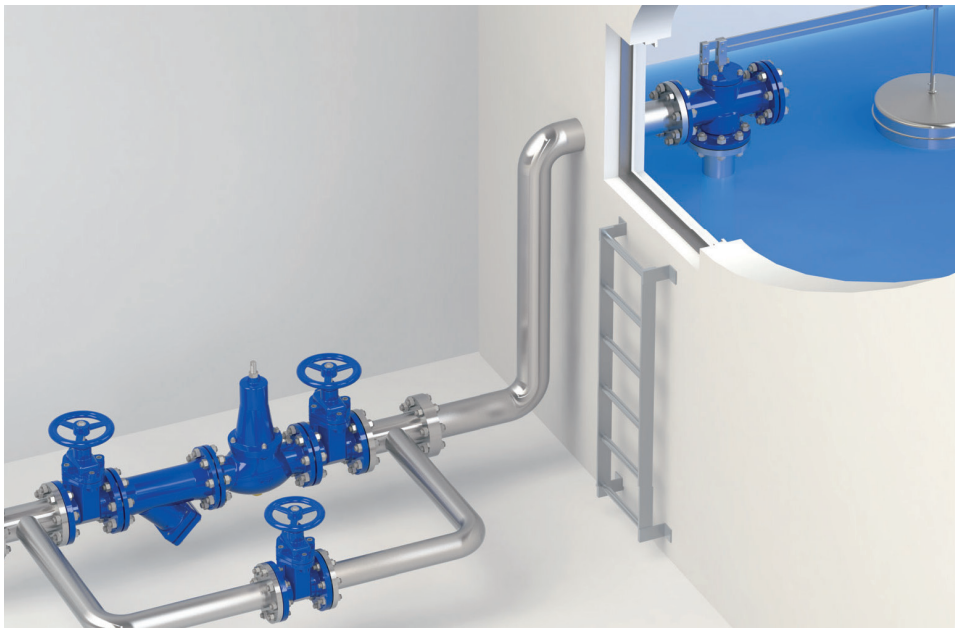

Stainless steel locking nut
Stainless steel control screw
Ductile cast iron cap
Stainless steel nuts
Stainless steel washers
Stainless steel spring plate
Painted steel spring
Stainless steel nuts
Stainless steel piston top
NBR, EPDM or Viton piston O-rings
Stainless steel piston lower part
NBR, EPDM or VITON lip seal
Stainless steel spacer
NBR, EPDM or Viton shaft O-ring
Stainless steel gasket support
NBR or polyurethane flat gasket
Stainless steel plug plate
PTFE slip ring
Lip seal made of NBR, EPDM or Viton
Stainless steel upper ring nut
NBR, EPDM or Viton top ring nut O-ring
Bronze bottom ring nut
NBR, EPDM or Viton bottom ring nut O-ring
Stainless steel plug seat
NBR, EPDM or Viton Seat O-ring
Stainless steel studs
Stainless steel pressure plugs
Ductile cast iron body
Stainless steel guide shaft
Stainless steel guide cap

Installation diagram

The installation layout of the W-VAL HP valves includes: an upstream filter to prevent the ingress of debris, stones and particles that can damage internal components and shut-off devices; WAVE 3S-AWH anti-water hammer vents upstream and downstream of the installation; and a WR/AM relief valve to relieve possible pressure surges. In addition, a bypass with another W-VAL HP is recommended to ensure flow during maintenance.

Installation diagram

The recommended scheme for level control of a tank sees the W-VAL HP pressure reducing direct action valve placed upstream of the H-FLOAT float valve. This is to prevent high pressure values from causing cavitation or other damage in the valve when the level has reached its maximum and it is fully closed.



Pressure reducing direct action valve

W-VAL LP

The W-VAL series valves reduce and stabilise the downstream pressure regardless of changes in flow rate and upstream pressure.

The W-VAL LP can be used with water and other liquids.

Constructive features and advantages

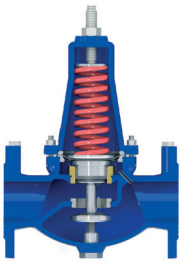
- Ductile cast iron body and cap, stainless steel internal components and bolts.
- Nylon-reinforced polyamide diaphragm.
- Self-cleaning piston, with innovative technology that improves running performance and reduces maintenance.
- Mobile block made of stainless steel components obtained on a CNC lathe to avoid sliding friction and losses due to accurate machining.
- Upstream and downstream pressure ports for the insertion of pressure gauges.
- Large expansion chamber reduces the risk of cavitation, even at high pressure differentials.
- Flanged version available from DN 50 to 150.

Main applications

- Water distribution networks
- Buildings and civil installations
- Irrigation
- Cooling systems
- Fire-fighting systems
- In general, where pressure reduction is required

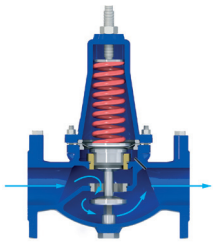
Operating principle

The W-VAL LP valve works by the movement of a piston that slides inside a ring nut firmly screwed to the body. This, together with the diaphragm above the piston, creates a perfectly sealed upstream and downstream pressure compensation chamber.



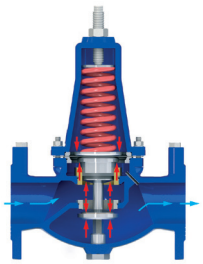
Normally open valve

In the absence of pressure or flow inside, the valve is normally open; the piston is pushed down by the force of the spring.



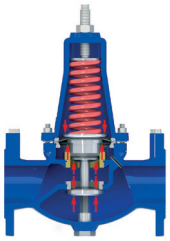
Fully open valve in operation

When the downstream pressure falls below the spring setting, the piston moves downwards and the valve moves to the fully open position.



Modulation valve

If the downstream pressure tends to rise above the set value, it pushes the plug upwards, reducing the passage. The result is the creation of a pressure drop such that the downstream pressure returns to the required value.



Closed valve (static conditions)

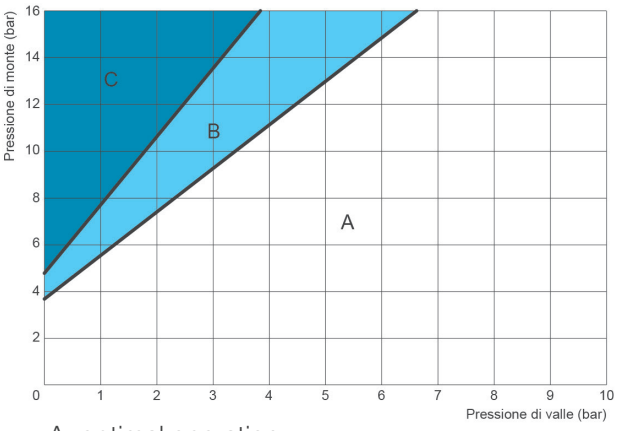
In the event that the downstream withdrawal is cancelled and the pressure rises above the spring setting, the valve moves to the fully closed position, maintaining the required downstream pressure. This also occurs under static conditions.

Technical data

Pressure drop coefficient

The Kv coefficient represents the flow rate that produces a pressure drop of 1 bar in the fully open valve.

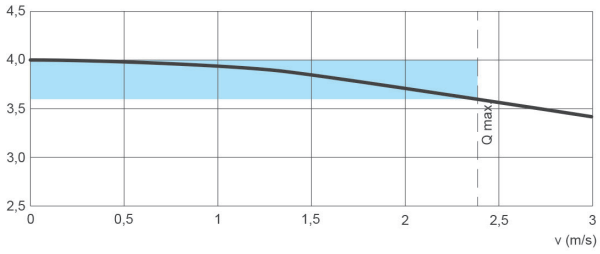
DN (mm)	50	65	80	100	125	150
Kv (m^3/h)/bar	20	47	72	116	147	172



A: optimal operation
B: incipient cavitation
C: harmful cavitation

Pressure drops chart

Ensure that the point corresponding to the operating condition of the valve, appropriate to the required flow rate, falls in zone A of the graph (abscissa: downstream pressure values; ordinate: upstream pressure values). The graph refers to valves modulating with an opening percentage of 35-40%, at standard temperature and altitude below 300 m. Under operating conditions, the pressure reduction differential must not exceed 24 bar.



Valve sensitivity

The curve shown in the figure shows the indicative change in actual downstream pressure from the set value as the flow rate increases. The maximum speed and recommended working conditions are indicated (blue area).

Recommended flow rates

DN (mm)	50	65	80	100	125	150
Min. flow rate (l/s)	0.3	0.5	0.8	1.2	1.8	2.6
Max. flow rate (l/s)	5.1	8,6	13	20	31	45
Emergency flow rate (l/s)	6,9	11	17	27	42	61

Operating conditions

Fluid	treated water
Maximum temperature	70°C
Maximum input pressure	16 bar
Downstream pressure	calibration range from 1.5 to 5 bar (different values on request)

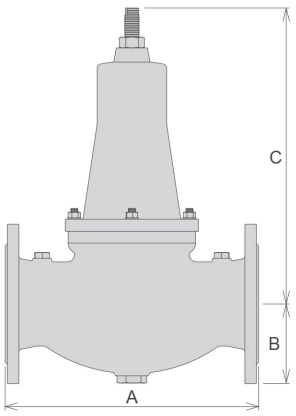
Standard

- Certification and testing according to EN 1074/5
- Flanges with drilling according to EN 1092-2
- RAL 5005 blue epoxy paint applied on fluid bed

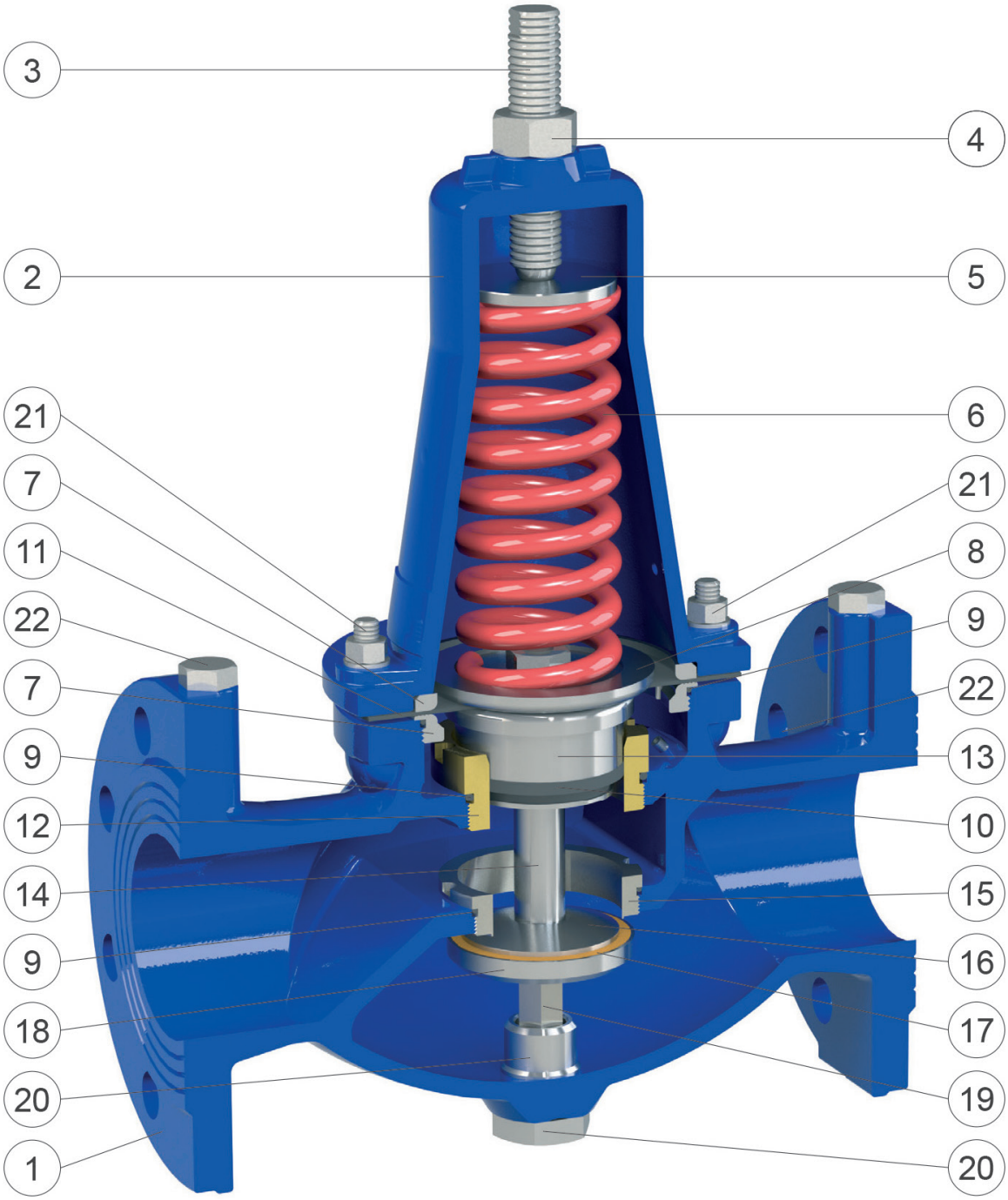
Flange modifications and painting on request

Dimensions and weights

DN (mm)	50	65	80	100	125	150
A (mm)	230	290	310	350	400	480
B (mm)	83	93	100	110	135	150
C (mm)	280	320	350	420	590	690
Weight (Kg)	12	19	24	34	56	74



Construction details



No.	Component	Standard material	Optional
1	Body	ductile cast iron GJS 450-10	
2	Cap	ductile cast iron GJS 450-10	
3	Control screw	AISI 304 stainless steel	AISI 316 stainless steel
4	Locking nut	AISI 304 stainless steel	AISI 316 stainless steel
5	Spring plate	AISI 303 stainless steel	
6	Spring	coated spring steel 52SiCrNi5	AISI 316 stainless steel
7	Upper and lower diaphragm rings	AISI 304 stainless steel	
8	Upper plate	NBR	AISI 304/316 stainless steel
9	O-ring	NBR	EPDM/Viton
10	Lip seals	Viton	EPDM/Viton
11	Diaphragm	EPDM- Nylon	neoprene
12	Lower ring nut	bronze CuSn5Zn5Pb5	AISI 304/316 stainless steel
13	Lower piston part	AISI 303 stainless steel	AISI 316 stainless steel
14	Spacer	AISI 303 stainless steel	AISI 316 stainless steel
15	Plug seat	AISI 304 stainless steel	AISI 316 stainless steel
16	Gasket support	AISI 303 stainless steel	AISI 316 stainless steel
17	Flat gasket	NBR	
18	Plug plate	AISI 303 stainless steel	AISI 316 stainless steel
19	Guide shaft	AISI 303 stainless steel	AISI 316 stainless steel
20	Guide cap	AISI 303 stainless steel	AISI 316 stainless steel
21	Studs, nuts and washers	AISI 304 stainless steel	AISI 316 stainless steel
22	Pressure plugs	AISI 316 stainless steel	

The table of materials and components is subject to change without notice.

Sustainability

Here at Pietro Fiorentini, we believe in a world capable of improvement through technologies and solutions that can shape a more sustainable future. That is why respect for people, society and the environment form the cornerstones of our strategy.

Our commitment to the world of tomorrow

While in the past we limited ourselves to providing products, systems and services for the oil & gas sector, today we want to broaden our horizons and create technologies and solutions for a digital and sustainable world, with a particular focus on renewable energy projects to help make the most of our planet's resources and create a future in which the younger generations can grow and prosper.

The time has come to put the why we operate before the what and how we do it.

Pietro Fiorentini

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