Comeval®

CSA

CSA

Control valves, Air valves and Protection devices

Flowing innovation
.... since 1974

Comeval®
A COMPANY OF THE ARI ARMATUREN GROUP

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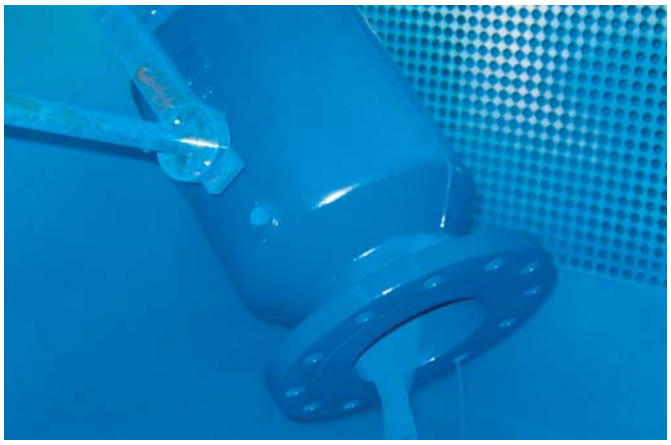
The company was founded in 1987 by transforming the former CSA, which was a trading company dealing with pipes and valves for water networks, into a manufacturing company, through the research and realization of pillar fire hydrants. Since then many other products have been added.
The history of our company is characterised by years of technical and commercial research, which have enabled us to offer a complete range of valves designed for controlling, regulating and protecting the pipelines under pressure in both waterworks and sewage lines as well as fire hydrants.
Our many industrial patents and innovative technical solutions, together with modern and attractive style of design, have made it possible to differentiate our products from those offered by competitors and have allowed us to become a point of reference in our sector.
Flexibility and reliability have been the key points of CSA's rapid growth over the last few years. We are perfectly aware that we are managing the world's most precious resource and, motivated by this responsibility and the commitment towards our customers, we have dedicated ourselves to constantly improving our products, placing them at the highest levels of quality.

Quality

In the manufacturing business today, quality is the fundamental requirement for achieving and maintaining a growing market share.
For this reason we have always aimed at developing a synergy between the various sectors of the company and thus ensuring:
-quick and precise answers;
-evaluation of data received and immediate response;
-rigorous control of incoming and outgoing products.
Since 1998 CSA is certified according to regulation ISO 9001 by Rina (Italian Naval Registry) recently converted into ISO 9001/2008.



During the research and realisation of new products, CSA has always focused his efforts on:
- listening to the customer's needs and finding the best solution both at the design and operational phases,
- guiding our R&D department to develop ranges of modern, reliable and complementary products,
- adopting production techniques that, even while complying with the severest quality standards, would allow us to reduce delivery times,
- guaranteeing complete technical support for our customers and prompt after-sales assistance.

This philosophy characterizes us not only as a valve manufacturer but also as a reliable partner whom you can always depend on for consulting and solutions.

The production cycle, aimed at the constant improvement of our products and complete customer satisfaction, ensures predetermined margins of tolerance by establishing production standards, which guarantee that the semi-finished products reach the next production stage with the required specifications.

All our valves are made of ductile cast iron GJS 450-10 or 500-7 in absolute compliance with European standards, and are suitable for PN 25-40 bar.

The manufacturing process is carried out exclusively by means of numerically controlled lathes, mills, and horizontal machining units. Subsequent step-by-step controls are based on strict quality procedures.

Painting, pretreated by sand blasting grade SA 2.5, is carried out inside a fluidized bed containing epoxy powder, which guarantees maximum surface protection. All our products are tested under water pressure and certified.

Downstream pressure reducer-stabilizer Mod. VRCD

The CSA direct acting pressure reducing valve Mod. VRCD reduces and stabilizes the downstream pressure to a constant value, regardless of flow rate and upstream pressure variations. It can be used for water, air and fluids in general with a maximum working pressure of 40 bar.

Technical features and benefits

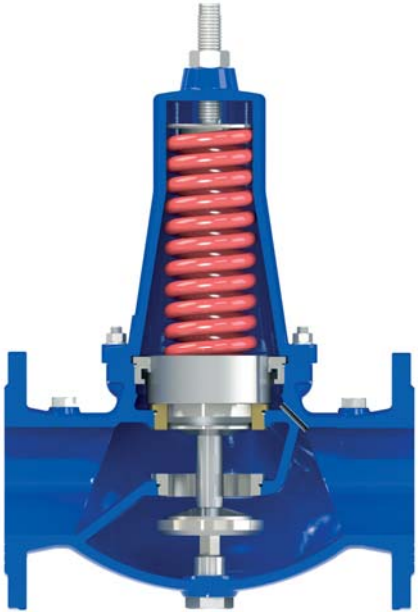
- Flanged version DN 50-150.
- Upstream and downstream pressure balanced, to stabilize the downstream pressure to a preset (and adjustable) value regardless of upstream pressure variations without creating unwanted upsurges.
- Ductile cast iron for body and cap, piston in stainless steel, seat in stainless steel, guiding bush in stainless steel as well as bolts and nuts.
- Innovative self cleaning piston technology, pat. pending, to improve performances reducing maintenance operations.
- Mobile block composed of three components in gun metal/stainless steel obtained by CNC to ensure the maximum accuracy and sliding precision, this is to avoid friction and unexpected leakage.
- Upstream/downstream pressure outlets for gauges.
- Large expansion chamber to reduce noise and to provide an excellent resistance to cavitation.
- Epoxy powder applied using FBT technology.

Applications

- Water distribution systems.
- Buildings and civil installations.
- Irrigations.
- Cooling systems.
- Fire protection systems and in general whenever the pressure reduction has to be ensured.

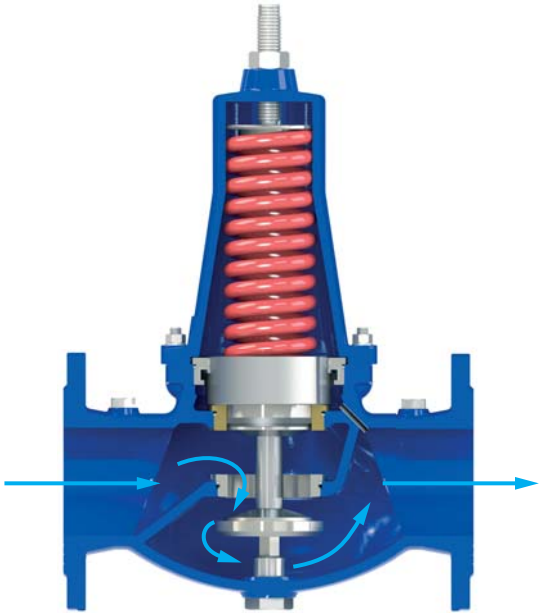
Operating principle

The operating principle of VRCD is based on a piston sliding into two rings in stainless steel/bronze of different diameters. These rings, tightly connected to the body, form a watertight chamber also known as the compensation chamber which is necessary for the accuracy and stability of the valve.



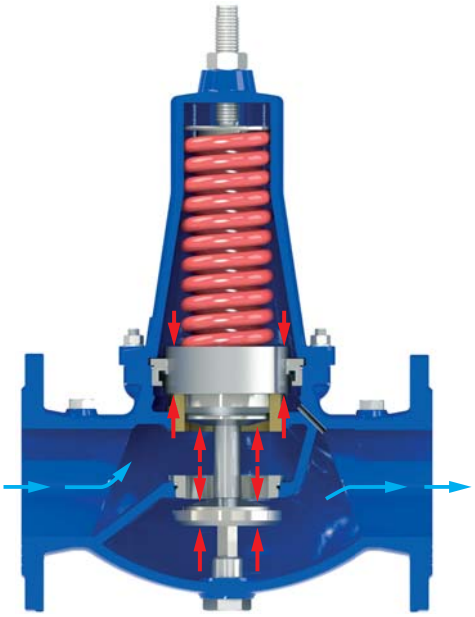
Valve normally open

Without any pressure the VRCD is a normally open valve, where the piston is kept pushed down by the force of the spring located in the cover.



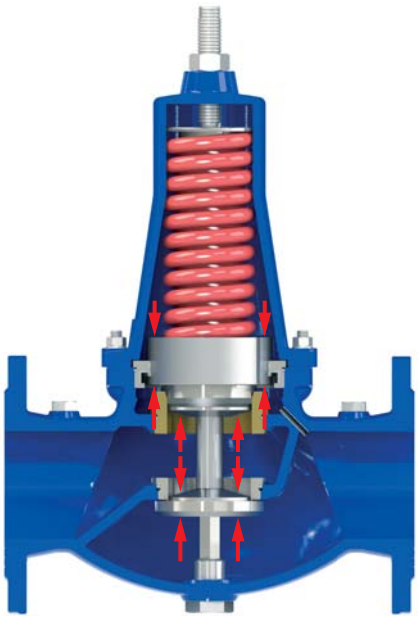
Valve fully open

During working conditions, should the downstream pressure drop below the valve's set point obtained by the compression of the spring, the VRCD will open completely allowing the full passage.



Valve modulating

Should the downstream pressure rise above the valve's set point the resultant of the force obtained by the downstream pressure, acting on the mobile block and the compensation chamber against the spring pushing downwards, will move the obturator producing the required head loss to modulate and stabilize the downstream pressure.



Valve fully closed (static conditions)

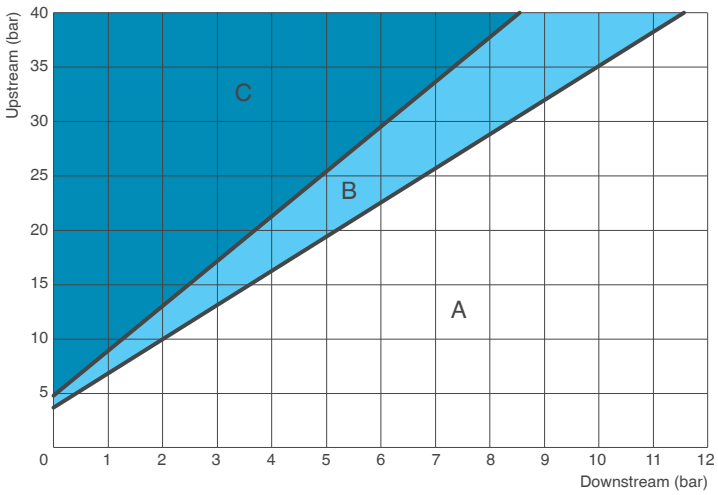
Should the water supply be interrupted from downstream the system will go in static conditions, the VRCD will maintain and stabilize the required pressure even with no flow thanks to the pressure balanced technology and compensation chamber.

Technical data

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

Head loss coefficient

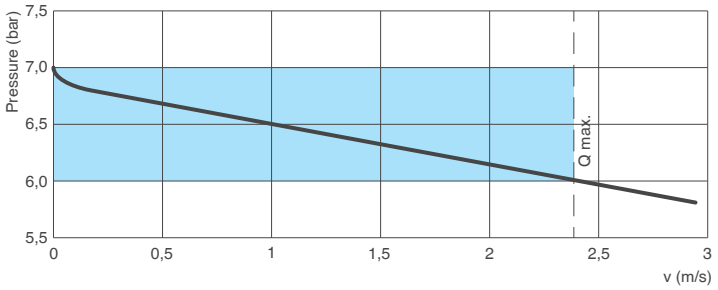
Kv coefficient representing the flow rate which is flowing through the valve fully open, and producing a head loss of 1 bar.



Cavitation chart

The cavitation phenomenon may lead to substantial damages, in addition to vibration and noise. The cavitation chart has to be used to determine whether the working point obtained by the intersection of the lines, connecting upstream (y axis) and downstream (x axis) pressure conditions, lies within one of the 3 zones to be identified as follows:
- A: Recommended working conditions;
- B: Incipient cavitation;
- C: Damage cavitation.

Ensure that the operating conditions fall on the A zone with the smallest valve to meet the required flow, contact CSA for further assistance.



Reduced pressure falloff

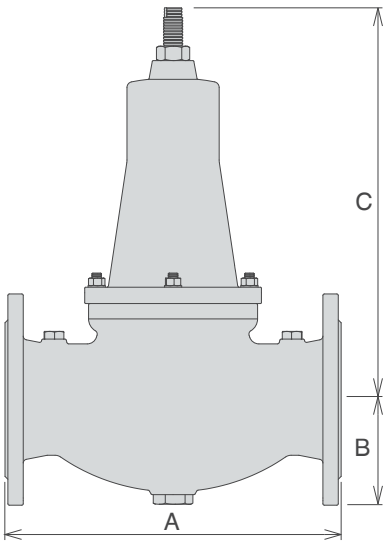
The plot is showing the reduced pressure falloff that occurs through the valve when the flow increases. Ensure that the operating conditions fall on the area depicted in blue for the recommended fluid flow velocity through the valve.

Working conditions

Treated water with a maximum temperature of 70°C.
Upstream pressure (inlet): maximum 40 bar.
Downstream pressure (outlet): adjustable from 1,5 to 6 bar or from 5 to 12 bar.
Higher downstream pressure values on request.

Standard

Designed in compliance with EN-1074/4.
Flanges according to EN 1092/2.
Epoxy painting applied through fluidized bed technology blue RAL 5005.
Changes and variations on the flanges and painting details available on request.

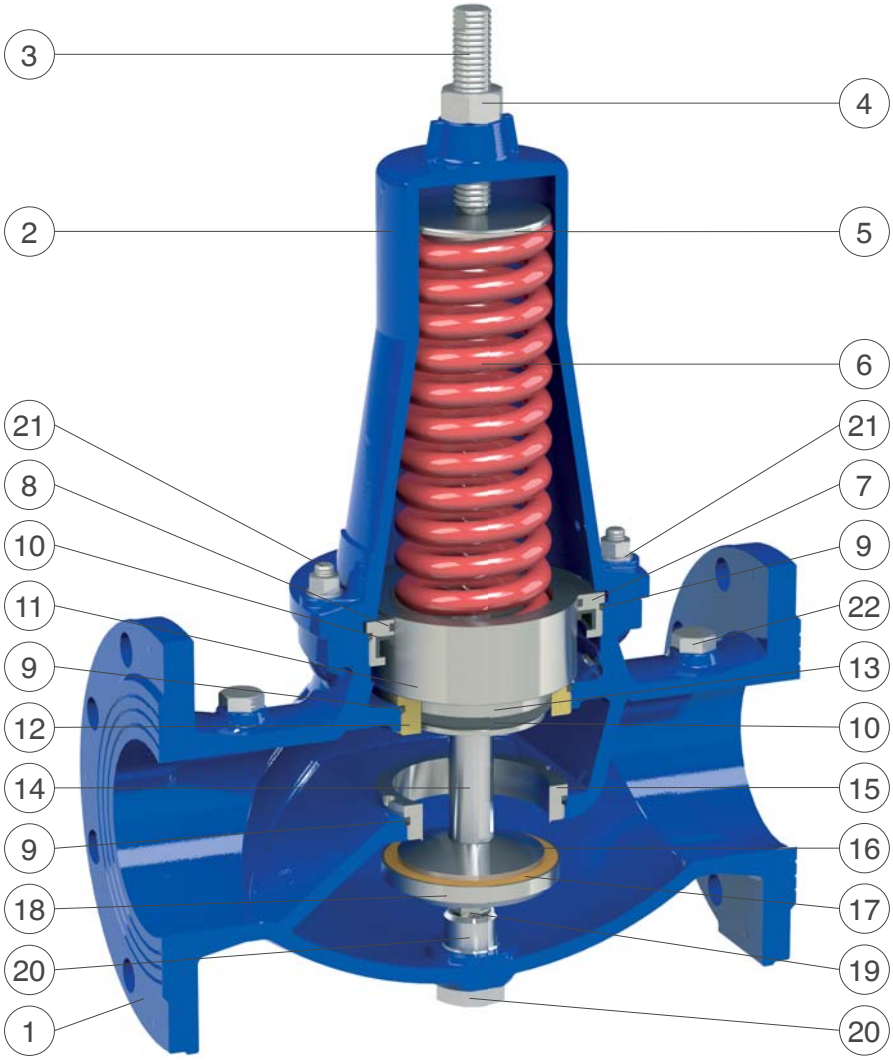


Weights and dimensions

DN (mm)	50	65	80	100	125	150
A (mm)	230	290	310	350	400	450
B (mm)	83	93	100	110	135	150
C (mm)	280	320	350	420	590	690
Weight (Kg)	12	19	24	34	56	74

Values are approximate, consult CSA service for more details.

Technical details



N.	Component	Standard material	Optional
1	Body	ductile cast iron GJS 500-7 or GJS 450-10	
2	Cap	ductile cast iron GJS 500-7 or GJS 450-10	
3	Driving screw	stainless steel AISI 304	stainless steel AISI 316
4	Nut	stainless steel AISI 304	stainless steel AISI 316
5	Spring guide	stainless steel AISI 303	stainless steel AISI 316
6	Spring	spring painted steel 52SiCrNi5	
7	Main bush	stainless steel AISI 304	stainless steel AISI 316
8	Sliding ring	PTFE	
9	O-ring	NBR	EPDM/Viton
10	Gasket	NBR	
11	Upper piston	s.s. AISI 303 (bronze CuSn5Zn5Pb5 for DN 125-150)	stainless s. AISI 303/316
12	Lower ring	bronze CuSn5Zn5Pb5	stainless s. AISI 304/316
13	Lower piston	stainless steel AISI 303	stainless steel AISI 316
14	Spacer	stainless steel AISI 303	stainless steel AISI 316
15	Obturator sealing seat	stainless steel AISI 304	stainless steel AISI 316
16	Gasket support	stainless steel AISI 303	stainless steel AISI 316
17	Plane gasket	NBR (polyurethane for PN 25-40)	
18	Gasket holder	stainless steel AISI 303	stainless steel AISI 316
19	Guiding shaft	stainless steel AISI 303	stainless steel AISI 316
20	Driving tap	stainless steel AISI 303	stainless steel AISI 316
21	Studs, nuts and washers	stainless steel AISI 304	stainless steel AISI 316
22	Taps for pressure gauges	stainless steel AISI 316	

The list of materials and components is subject to changes without notice.

Downstream pressure reducer-stabilizer in stainless steel - Mod. VRCD FF

The CSA direct acting pressure reducing valve Mod. VRCD FF reduces and stabilizes the downstream pressure to a constant value, regardless of flow rate and upstream pressure variations. It can be used for water, air and fluids in general with a maximum working pressure of 64 bar.

Technical features and benefits

- Entirely manufactured in stainless steel machined from a solid bar.
- Upstream and downstream pressure balanced, to stabilize the downstream pressure to a preset (and adjustable) value regardless of upstream pressure variations without creating unwanted upsurges.
- Innovative self cleaning piston technology, pat. pending, to improve performances reducing maintenance operations.
- Mobile block composed of stainless steel internals obtained by CNC to ensure the maximum accuracy and sliding precision, this is to avoid friction and unexpected leakage.
- Excellent resistance to cavitation and aggressive environments thanks to the design and the use of gaskets in special materials.
- Wide flow range and downstream pressure regulation values with long lasting performances compared to other solution in brass or different materials.

Applications

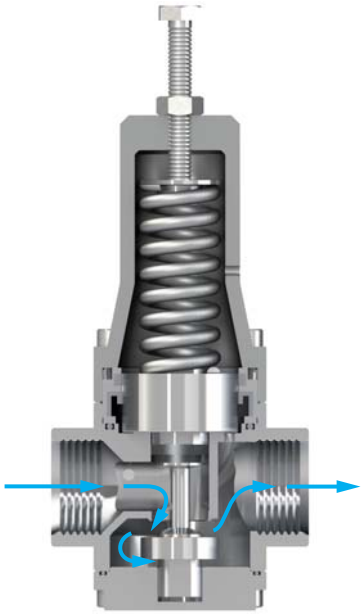
- Water distribution systems for high pressure ratio.
- Buildings and civil installations whenever stainless steel is required or advised for project aspects.
- Demineralized water and bottling plants.
- Industry and cooling systems.
- Mining and refineries.

Operating principle

The operating principle of VRCD FF, upstream pressure balanced, is based on a piston sliding into two rings of different diameters. These rings form a watertight chamber, also known as the compensation chamber, which is necessary for the accuracy and stability of the valve.

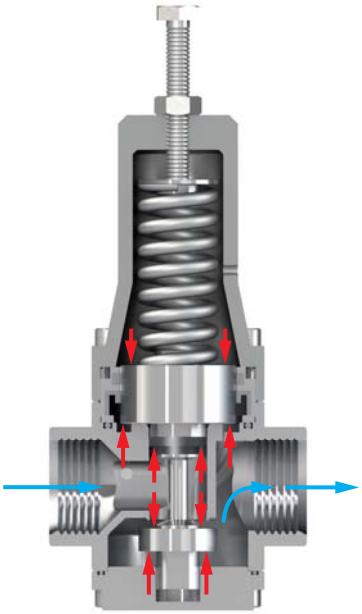
Valve normally open

Without any pressure the VRCD FF is a normally open valve, where the piston is kept pushed down by the force of the spring located in the cover.



Valve fully open

During working conditions, should the downstream pressure drop below the valve's set point obtained by the compression of the spring, the VRCD FF will open completely allowing the full passage.



Valve modulating

Should the downstream pressure rise above the valve's set point the resultant of the force obtained by the downstream pressure, acting on the mobile block and the compensation chamber against the spring pushing downwards, will move the obturator producing the required head loss to modulate and stabilize the downstream pressure.

Valve fully closed (static conditions)

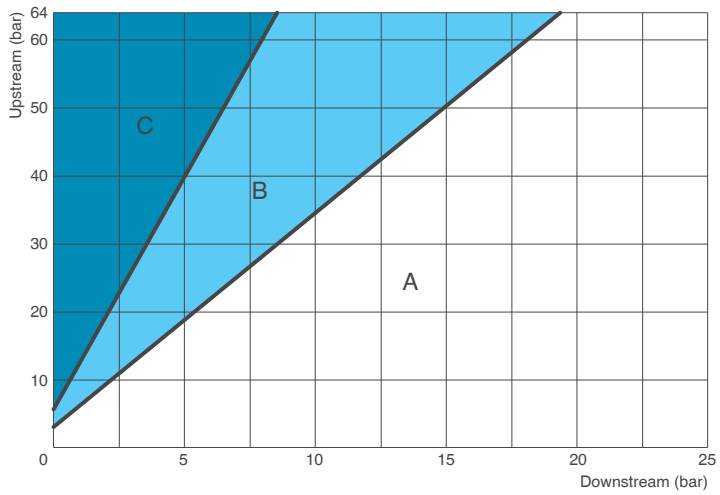
Should the water supply be interrupted from downstream the system will go in static conditions, the VRCD will maintain and stabilize the required pressure even with no flow thanks to the pressure balanced technology and compensation chamber.

Technical data

Thread inches	1/2"	1"	1" 1/2	2"
Kv (m^3/h)/bar	2,9	7,2	10,8	21

Head loss coefficient

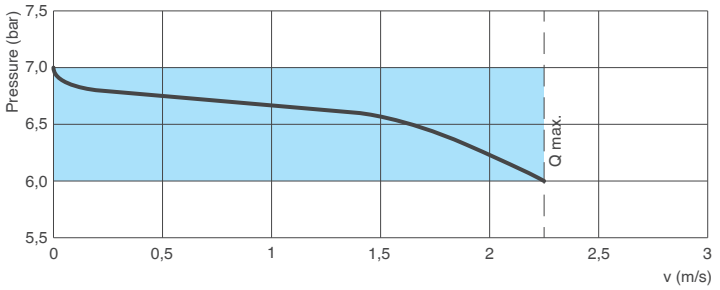
Kv coefficient representing the flow rate which is flowing through the valve fully open producing a head loss of 1 bar.



Cavitation chart

The cavitation phenomenon may lead to substantial damages, in addition to vibration and noise. The cavitation chart has to be used to determine whether the working point obtained by the intersection of the lines, connecting upstream (y axis) and downstream (x axis) pressure conditions, lies within one of the 3 zones to be identified as follows:
- A: Recommended working conditions;
- B: Incipient cavitation;
- C: Damage cavitation.

Ensure that the operating conditions fall on the A zone with the smallest valve to meet the required flow, contact CSA for further assistance.



Reduced pressure falloff

The plot is showing the reduced pressure falloff that occurs through the valve when the flow increases. Ensure that the operating conditions fall on the area depicted in blue for the recommended fluid flow velocity through the valve.

Working conditions

Treated water with a maximum temperature of 70°C (120°C on request).
Upstream pressure (inlet): maximum 40/64 bar.
Higher downstream pressure values on request.

Standard

Designed in compliance with EN-1074/4.
Threaded BSP connections.
Changes and variations on the thread available on request.

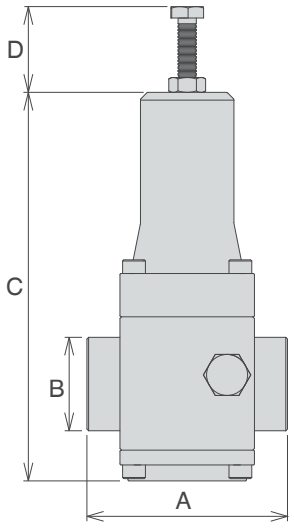
Springs pressure ranges

Thread (inches)	1/2"	1"	1" 1/2	2"
Spring pressure (bar)	1,5-10	1,5-10	1,5-7	1,5-6
	2-20	2-20	2-15	5-12

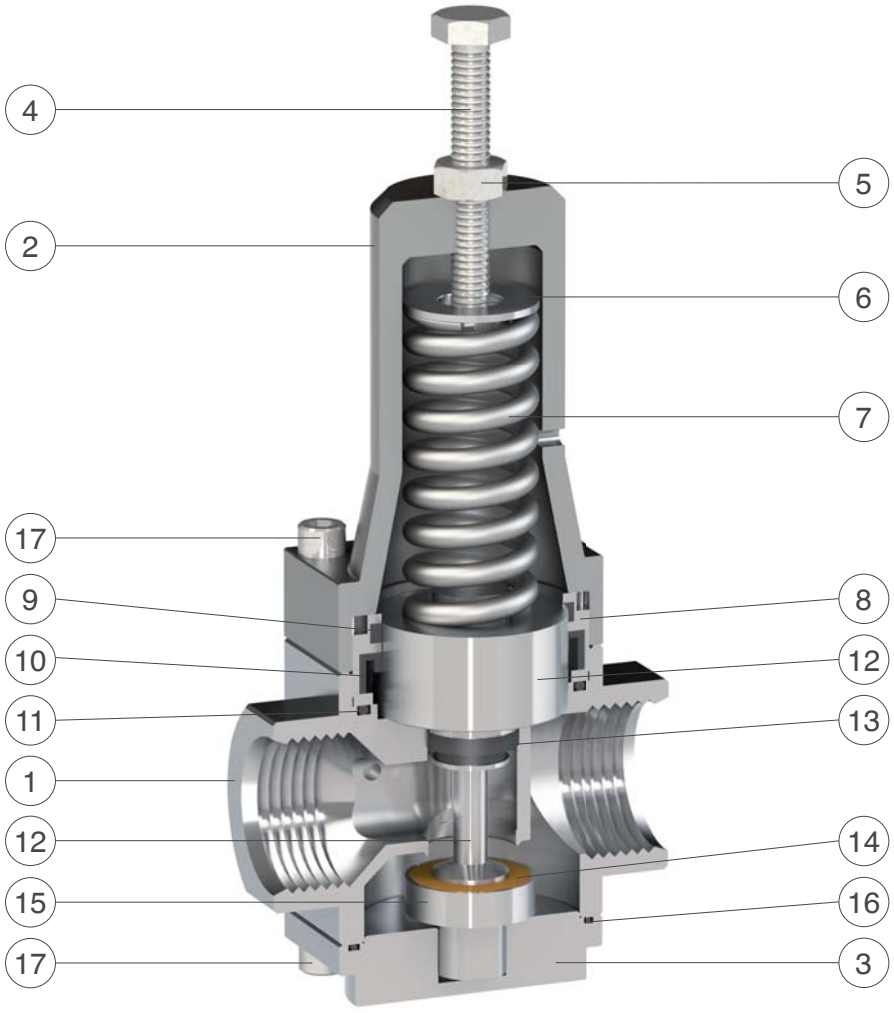
Weights and dimensions

Thread inches	A mm	B mm	C mm	D mm	Weight Kg
1/2"	53	- -	108	25	1,0
1"	90	CH 41	170	45	2,1
1" 1/2	110	CH 55	205	50	2,8
2"	152	CH 70	290	60	5,9

Values are approximate, consult CSA service for more details.



Technical details



N.	Component	Standard material	Optional
1	Body	s.s. AISI 303 (1"-1" 1/2), AISI 304 (1/2"-2")	
2	Cap	nickel-plated aluminium S11	
3	Driving tap	s.s. AISI 303 (1"-1" 1/2), AISI 304 (1/2"-2")	
4	Driving screw	stainless steel AISI 304	stainless steel AISI 316
5	Nut	stainless steel AISI 304	stainless steel AISI 316
6	Spring guide	stainless steel AISI 304	stainless steel AISI 316
7	Spring	s.s. AISI 302 (painted steel 52SiCrNi5 for 2")	
8	Main bush	stainless steel AISI 304	stainless steel AISI 316
9	Sliding ring	PTFE	
10	Upper gasket	NBR	EPDM/Viton
11	O-ring	NBR	EPDM/Viton
12	Piston	stainless steel AISI 303	stainless steel AISI 316
13	Lower gasket	NBR	EPDM/Viton
14	Plane gasket	polyurethane	
15	Obturator guide	stainless steel AISI 303	stainless steel AISI 316
16	Tap O-ring	NBR	EPDM/Viton
17	Screws	stainless steel AISI 304	stainless steel AISI 316

The list of materials and components is subject to changes without notice.

Downstream pressure reducer-stabilizer for high pressure - Mod. RDA

The CSA direct acting pressure reducing valve Mod. RDA reduces and stabilizes the downstream pressure to a constant value, regardless of flow rate variations. It can be used for water, air and fluids in general up to a temperature of 70° C and a max. pressure of 64 bar.

Technical features and benefits

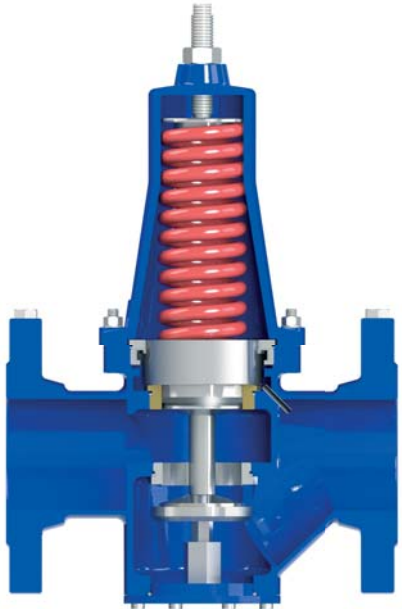
- Flanged version DN 50-150 PN 64 rated.
- Ductile cast iron cap and body in electro-welded steel, piston and mobile block in stainless steel.
- Upstream and downstream pressure balanced, to stabilize the downstream pressure to a preset (and adjustable) value regardless of upstream pressure variations without creating unwanted upsurges.
- Innovative self cleaning piston technology, pat. pending, to improve performances reducing maintenance operations.
- Mobile block composed of three components in gun metal/stainless steel obtained by CNC to ensure the maximum accuracy and sliding precision, this is to avoid friction and unexpected leakage.
- Upstream/downstream pressure outlets for gauges.
- Large expansion chamber and materials providing and excellent resistance to cavitation and long lasting performances.
- Epoxy powder applied using FBT technology.

Applications

- Water distribution systems for high pressure ratio.
- Mining.
- Industry and cooling systems.
- Dams and power plants.

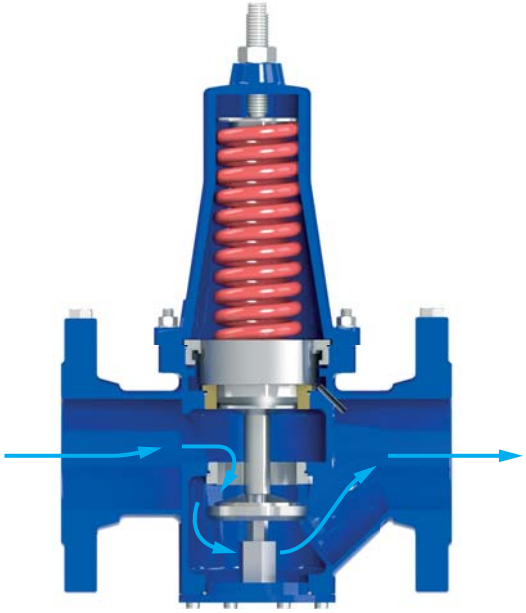
Operating principle

The operating principle of RDA is based on a piston sliding into two rings in stainless steel/bronze of different diameters. These rings, tightly connected to the body, form a watertight chamber also known as the compensation chamber which is necessary for the accuracy and stability of the valve.



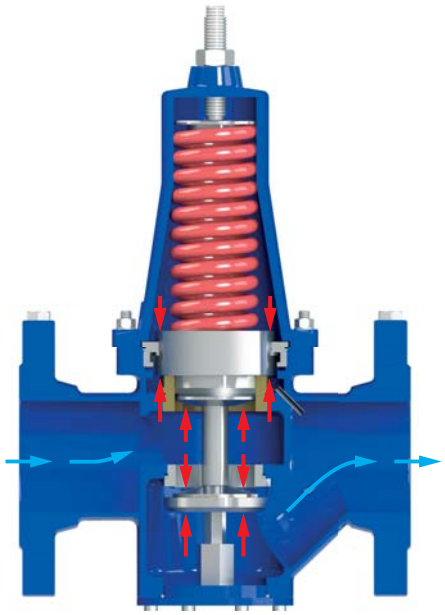
Valve normally open

Without any pressure the RDA is a normally open valve, where the piston is kept pushed down by the force of the spring located in the cover.



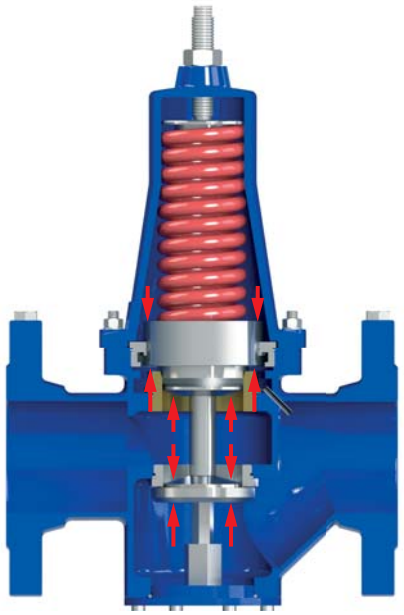
Valve fully open

During working conditions, should the downstream pressure drop below the valve's set point obtained by the compression of the spring, the RDA will open completely allowing the full passage.



Valve modulating

Should the downstream pressure rise above the valve's set point the resultant of the force obtained by the downstream pressure, acting on the mobile block and the compensation chamber against the spring pushing downwards, will move the obturator producing the required head loss to modulate and stabilize the downstream pressure.



Valve fully closed (static conditions)

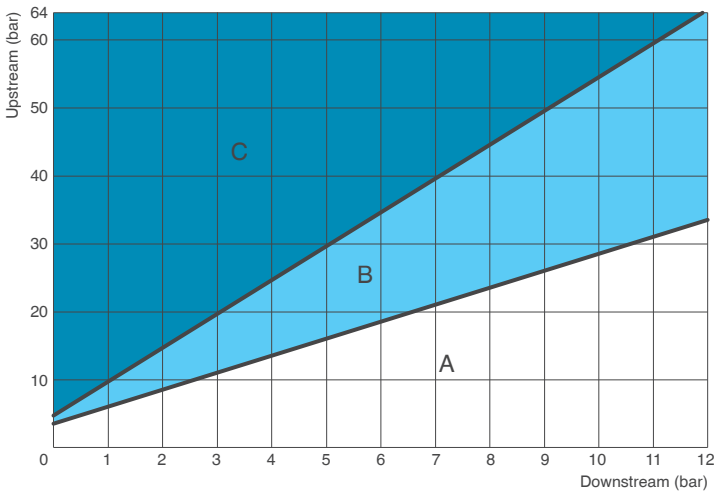
Should the water supply be interrupted from downstream the system will go in static conditions, the VRCD will maintain and stabilize the required pressure even with no flow thanks to the pressure balanced technology and compensation chamber.

Technical data

DN mm	50	80	100	150
Kv (m^3/h)/bar	18	63	98	147

Head loss coefficient

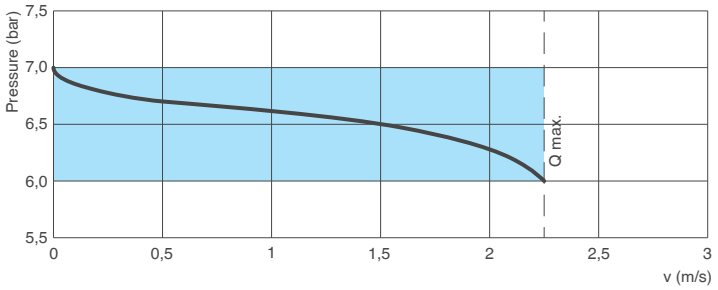
Kv coefficient representing the flow rate which is flowing through the valve fully open producing a head loss of 1 bar.



Cavitation chart

The cavitation phenomenon may lead to substantial damages, in addition to vibration and noise. The cavitation chart has to be used to determine whether the working point obtained by the intersection of the lines, connecting upstream (y axis) and downstream (x axis) pressure conditions, lies within one of the 3 zones to be identified as follows:
- A: Recommended working conditions;
- B: Incipient cavitation;
- C: Damage cavitation.

Ensure that the operating conditions fall on the A zone with the smallest valve to meet the required flow, contact CSA for further assistance.



Reduced pressure falloff

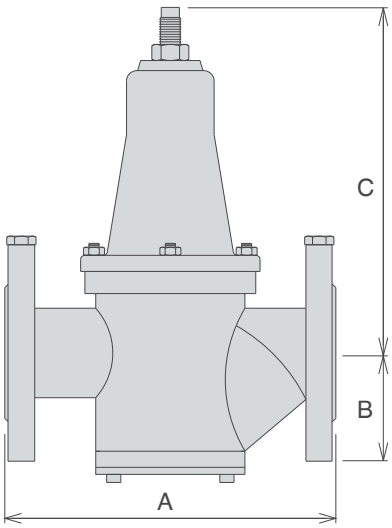
The plot is showing the reduced pressure falloff that occurs through the valve when the flow increases. Ensure that the operating conditions fall on the area depicted in blue for the recommended fluid flow velocity through the valve.

Working conditions

Treated water/air temperature: max. 70°C.
Upstream pressure (in): max. 64 bar.
Downstream pressure (out): standard from 1,5 to 6 bar or from 5 to 12 bar.
Higher values on request.

Standard

Designed in compliance with EN-1074/4.
Flanges according to EN 1092/2.
Epoxy painting applied through fluidized bed technology blue RAL 5005.
Changes and variations on the flanges and painting details available on request.

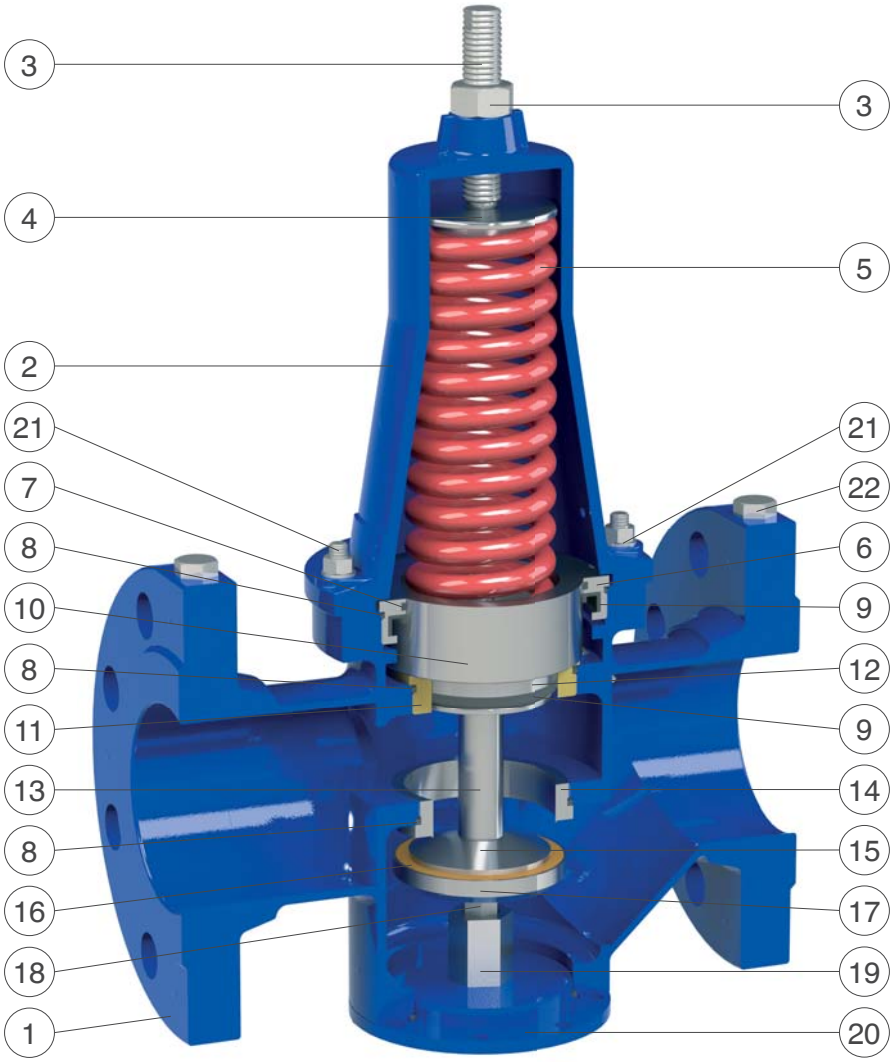


Weights and dimensions

DN (mm)	50	80	100	150
A (mm)	230	310	350	480
B (mm)	90	108	126	172
C (mm)	240	340	400	500
Weight (Kg)	15	29	40	90

Values are approximate, consult CSA service for more details.

Technical details



N.	Component	Standard material	Optional
1	Body	painted steel	
2	Cap	ductile cast iron GJS 500-7 or GJS 450-10	
3	Driving screw and nut	stainless steel AISI 304	stainless steel AISI 316
4	Spring guide	stainless steel AISI 303	stainless steel AISI 316
5	Spring	spring painted steel 52SiCrNi5	
6	Main bush	stainless steel AISI 304	stainless steel AISI 316
7	Sliding ring	PTFE	
8	O-ring	NBR	EPDM/Viton
9	Gasket	NBR	EPDM/Viton
10	Upper piston	s.s. AISI 303 (bronze CuSn5Zn5Pb5 for DN 150)	stainless s. AISI 303/316
11	Lower reinforcements	bronze CuSn5Zn5Pb5	stainless s. AISI 304/316
12	Lower piston	stainless steel AISI 303	stainless steel AISI 316
13	Spacer	stainless steel AISI 303	stainless steel AISI 316
14	Obturator sealing seat	stainless steel AISI 304	stainless steel AISI 316
15	Gasket support	stainless steel AISI 303	stainless steel AISI 316
16	Plane gasket	polyurethane	
17	Obturator guide	stainless steel AISI 303	stainless steel AISI 316
18	Guiding shaft	stainless steel AISI 303	stainless steel AISI 316
19	Driving tap	stainless steel AISI 303	stainless steel AISI 316
20	Lower tap	painted steel	
21	Studs, nuts and washers	stainless steel AISI 304	stainless steel AISI 316
22	Taps for pressure gauges	stainless steel AISI 316	

The list of materials and components is subject to changes without notice.

Pressure relief/sustaining valve
Mod. VSM

The CSA direct acting upstream pressure relief/sustaining valve Mod. VSM automatically maintains and sustains a preset upstream pressure, discharging any excess downstream, regardless of variations in demand and downstream pressure fluctuations.

Technical features and benefits

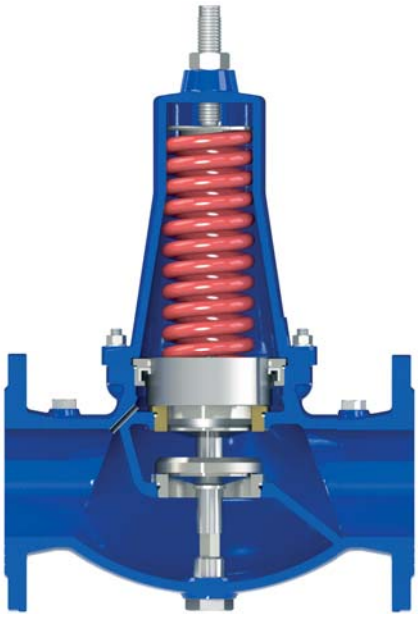
- Flanged version DN 50-150.
- Upstream pressure balanced, to stabilize and maintain the upstream pressure to a minimum preset (and adjustable) value regardless of demand and downstream pressure variations.
- Ductile cast iron for body and cap, piston in stainless steel, seat in stainless steel, guiding bush in stainless steel as well as bolts and nuts.
- Innovative self cleaning piston technology, pat. pending, to improve performances reducing maintenance operations.
- Mobile block composed of three components in gun metal/stainless steel obtained by CNC to ensure the maximum accuracy and sliding precision, this is to avoid friction and unexpected leakage.
- Upstream/downstream pressure outlets for gauges.
- Large expansion chamber to reduce noise and to provide an excellent resistance to cavitation.
- Epoxy powder applied using FBT technology.

Applications

- Water distribution systems as a pressure relief/discharge valve.
- Fire fighting systems to discharge overpressure caused by pumps.
- Irrigation systems as an effective protection against water hammer and to prevent pumps from overload.
- Industrial plants, civil buildings and more.

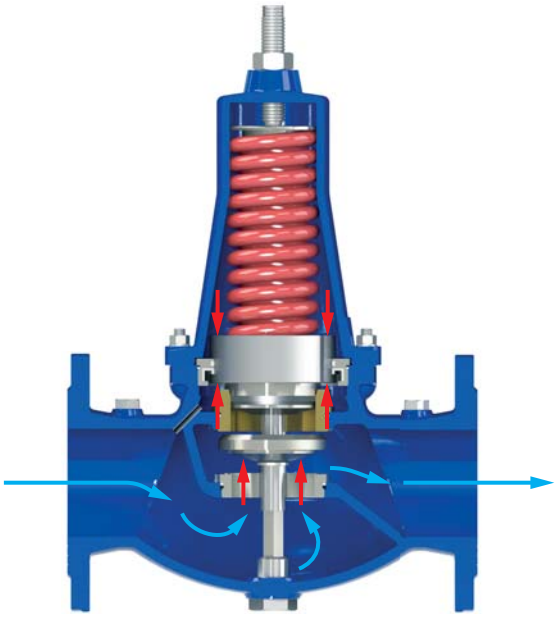
Operating principle

The operating principle of VSM is based on a piston sliding into two rings in stainless steel/bronze of different diameters. These rings, tightly connected to the body, form a watertight chamber also known as the compensation chamber.



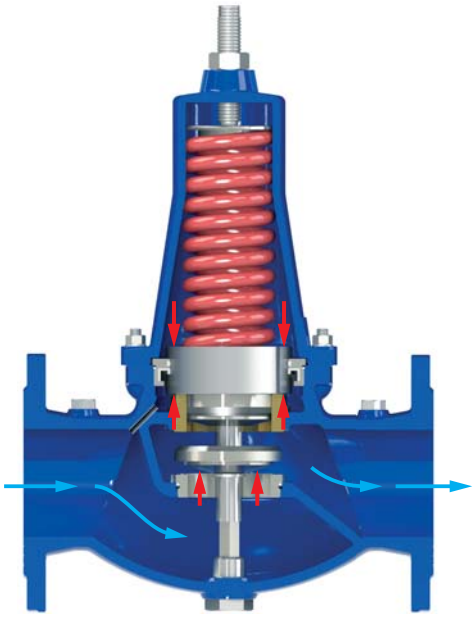
Valve normally closed

Without any incoming pressure the VSM is a normally closed valve, as shown in the picture, where the obturator is kept pushed down to the seat by the force of the spring.



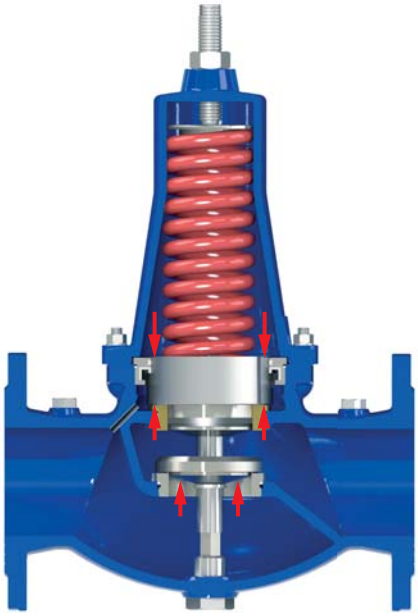
Valve fully open

Should the upstream pressure rise above the valve's set point, obtained by the compression of the spring, the VSM will open completely allowing the full passage through the seat.



Valve modulating

Should the upstream pressure fluctuate around the valve's set point the obturator, thanks to the difference in force between the spring pushing downwards and incoming pressure underneath and through the compensation chamber pushing upwards, will move throttling the flow through the seat in order to maintain the minimum required value.



Valve fully closed (static conditions)

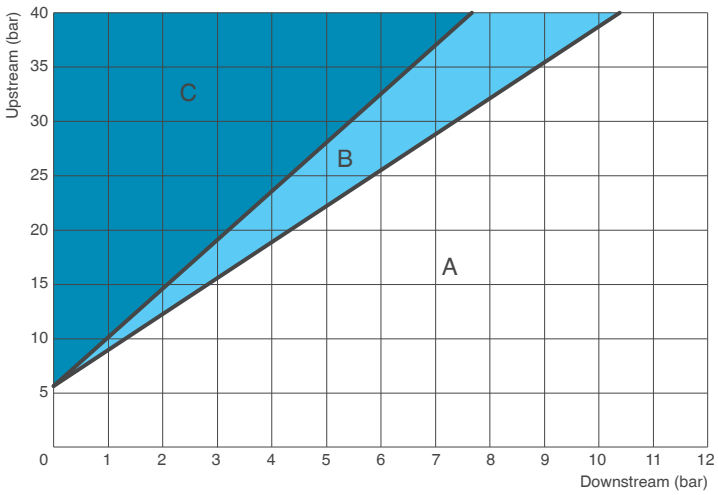
Should the water supply be interrupted from upstream pressure will begin to drop , in this case the VSM will react immediately to maintain and stabilize the required upstream pressure even with no flow thanks to the pressure balanced technology and compensation chamber.

Technical data

DN mm	50	65	80	100	125	150
Kv (m^3/h)/bar	22	51	83	122	166	194

Head loss coefficient

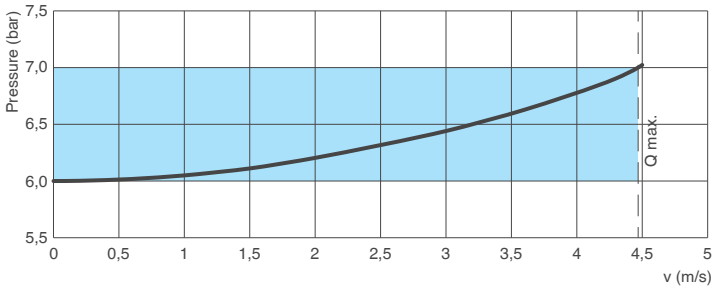
Kv coefficient representing the flow rate which is flowing through the valve fully open producing a head loss of 1 bar.



Cavitation chart

The cavitation phenomenon may lead to substantial damages, in addition to vibration and noise. The cavitation chart has to be used to determine whether the working point obtained by the intersection of the lines, connecting upstream (y axis) and downstream (x axis) pressure conditions, lies within one of the 3 zones to be identified as follows:
- A: Recommended working conditions;
- B: Incipient cavitation;
- C: Damage cavitation.

Ensure that the operating conditions fall on the A zone with the smallest valve to meet the required flow, contact CSA for further assistance.



Upstream pressure buildup

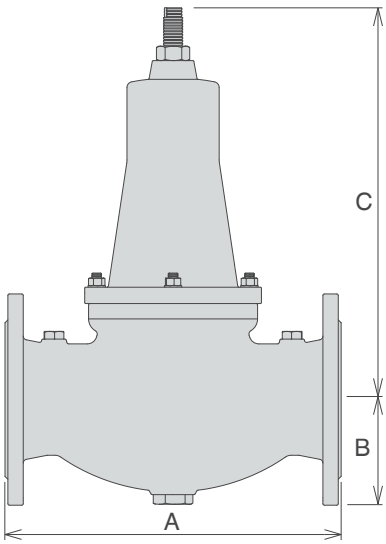
The plot is showing the increase in the upstream pressure that occurs through the valve, when the flow increases. Ensure that the operating conditions fall on the area depicted in blue for the recommended fluid flow velocity through the valve.

Working conditions

Treated water/air temperature: max. 70°C.
Maximum working pressure 40 bar.
Upstream pressure values: from 1,5 to 6 bar or from 5 to 12 bar.
Higher values on request.

Standard

Designed in compliance with EN-1074/4.
Flanges according to EN 1092/2.
Epoxy painting applied through fluidized bed technology blue RAL 5005.
Changes and variations on the flanges and painting details available on request.

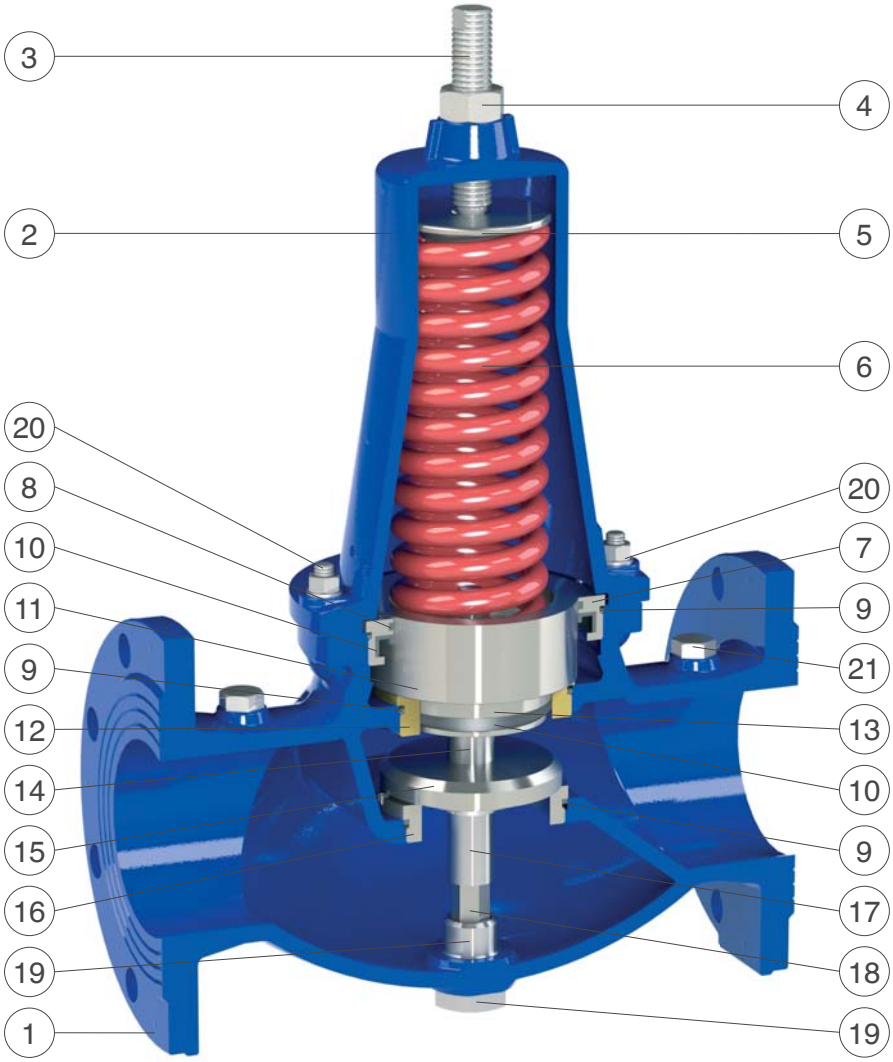


Weights and dimensions

DN (mm)	50	65	80	100	125	150
A (mm)	230	290	310	350	400	450
B (mm)	83	93	100	110	135	150
C (mm)	280	320	350	420	590	690
Weight (Kg)	12	19	24	34	56	74

Values are approximate, consult CSA service for more details.

Technical details



N.	Component	Standard material	Optional
1	Body	ductile cast iron GJS 500-7 or GJS 450-10	
2	Cap	ductile cast iron GJS 500-7 or GJS 450-10	
3	Driving screw	stainless steel AISI 304	stainless steel AISI 316
4	Nut	stainless steel AISI 304	stainless steel AISI 316
5	Spring guide	stainless steel AISI 303	stainless steel AISI 316
6	Spring	spring painted steel 52SiCrNi5	
7	Main bush	stainless steel AISI 304	stainless steel AISI 316
8	Sliding ring	PTFE	
9	O-ring	NBR	EPDM/Viton
10	Gasket	NBR	EPDM/Viton
11	Upper piston	s.s. AISI 303 (bronze CuSn5Zn5Pb5 for DN 125-150)	stainless s. AISI 303/316
12	Lower reinforcements	bronze CuSn5Zn5Pb5	stainless s. AISI 304/316
13	Lower piston	stainless steel AISI 303	stainless steel AISI 316
14	Central spacer	stainless steel AISI 303	stainless steel AISI 316
15	Obturator guide	stainless steel AISI 303	stainless steel AISI 316
16	Obturator sealing seat	stainless steel AISI 304	stainless steel AISI 316
17	Lower spacer	stainless steel AISI 303	stainless steel AISI 316
18	Guiding shaft	stainless steel AISI 303	stainless steel AISI 316
19	Driving tap	stainless steel AISI 303	stainless steel AISI 316
20	Studs, nuts and washers	stainless steel AISI 304	stainless steel AISI 316
21	Taps for pressure gauges	stainless steel AISI 316	

The list of materials and components is subject to changes without notice.

Fast acting anti-water hammer valve Mod. VRCA

The CSA fast acting, surge prevention, pressure relief valve Mod. VRCA has been designed to avoid the devastating effects of water hammers in pipeline networks. The purpose is actually to prevent pressure from rising above a preset value, thanks to its capability of discharging the excessive volume of water directly into the atmosphere.

Technical features and benefits

- Solid and compact design suitable for treated and raw water and to reduce blowback.
- Negligible inertia of the internal mobile parts ensuring the absence of friction and long lasting performances.
- Perfect water tightness and excellent resistance to cavitation and wearing working conditions due to the floating obturator technology and to the use of special gaskets and high resistant stainless steel grades.
- Fast and accurate response without any hysteresis effect thanks to high frequency annealed springs.
- Reduced overpressure thanks to a wide selection of spring and ranges in pressure.
- Water vertical discharge deflector.

Applications

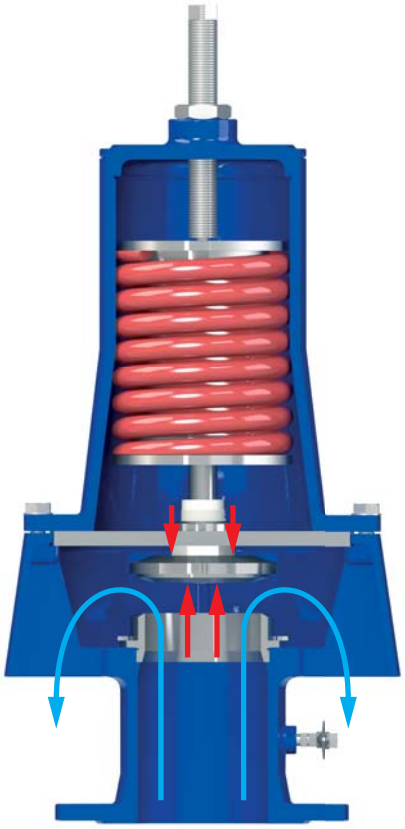
- Downstream of pumping stations to cushion sudden overpressure as a result of pump start up and power failure (in case of one of more pumps in parallel).
- Downstream and upstream of main transmission lines, or pipe segments, not able to endure critical conditions such as sudden and unexpected rise in pressure, and to guarantee reliable system protection.
- Downstream of a pressure reducing valve as a safety device.
- Upstream of modulating and sectioning devices with rapid response time, likely to generate unwanted surges.
- In general, whenever and wherever pipe bursts are expected.

Operating principle

The valve must be preset at first, simply acting on the spring, to open whenever the pressure rises above a certain value considered critical for the system.
The particular shape and construction, along with the perfect centering of the mobile block, will protect the upper part against water spurts coming from VRCA operation cycles. The valve is supplied with a pressure gauge and drainage ball valve, in order to facilitate the pressure measurement and setting procedure directly on the field.

Valve closed

Should the pressure remain below the valve's set point the VRCA will be perfectly closed, thanks to the compression of the spring pushing the obturator down to the seat.



Valve open

Should the pressure rise above the valve's set point the obturator will lifted, discharging to the atmosphere the excessive fluid volume necessary to avoid the upsurge.

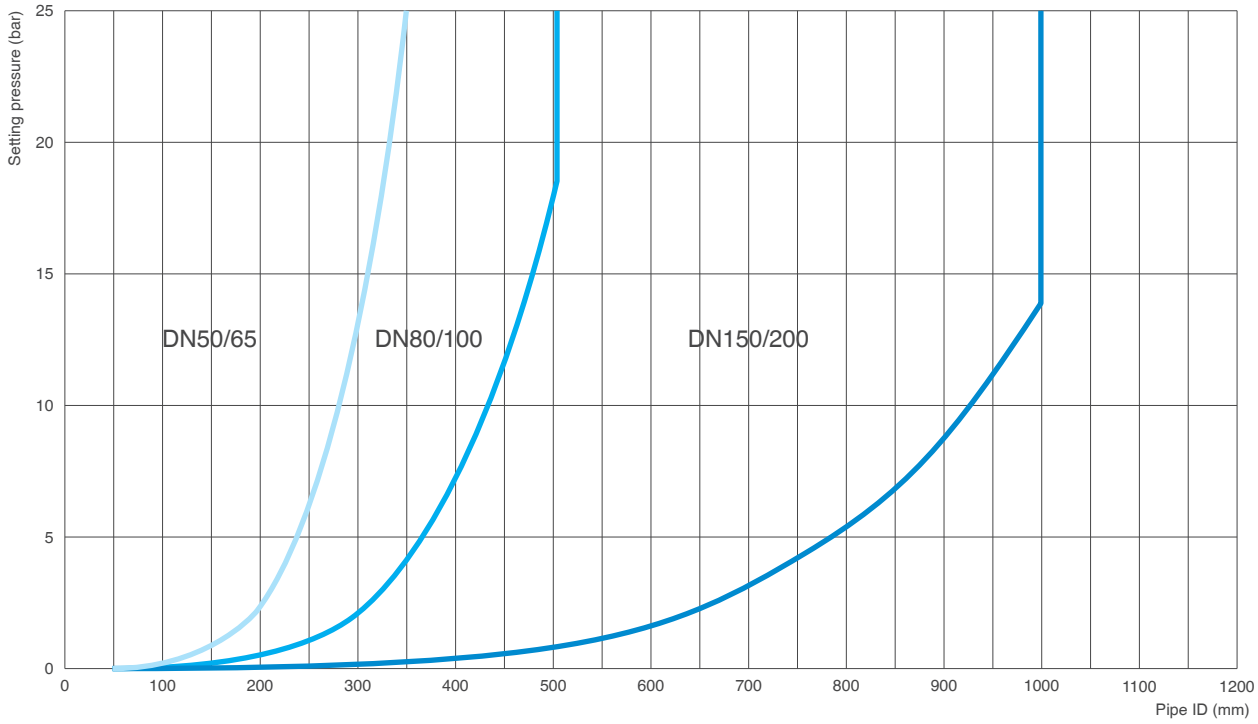
Optional

■ The spring setting, gasket materials and other technical features related to the valve response time and performances, can be modified on request according to the project requirements.

Technical data

Preliminary sizing chart

The function of the fast acting relief valve CSA Mod. VRCA is to protect piping systems, pumps, vessels and other equipment from excess in pressure and potential damages.
For the sizing overpressure values, blowdown effects and installation criteria must be taken into account, purely as an indication and for a preliminary assessment use the following chart showing the recommended valve's DN versus pressure setting and pipe ID. Ensure that the operating conditions fall on the left of the curve of the chosen valve.

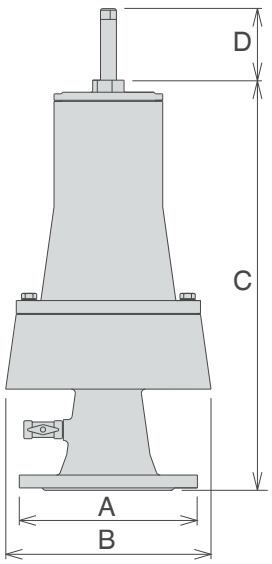


Working conditions

Treated and row water with a maximum temperature of 70°C.
Maximum pressure 25 bar.
Setting ranges: 0-8 bar, 8-16 bar, 16-25 bar.
Higher pressure values on request.

Standard

Designed in compliance with EN-1074/4.
Flanges according to EN 1092/2.
Epoxy painting applied through fluidized bed technology blue RAL 5005.
Changes and variations on the flanges and painting details available on request.

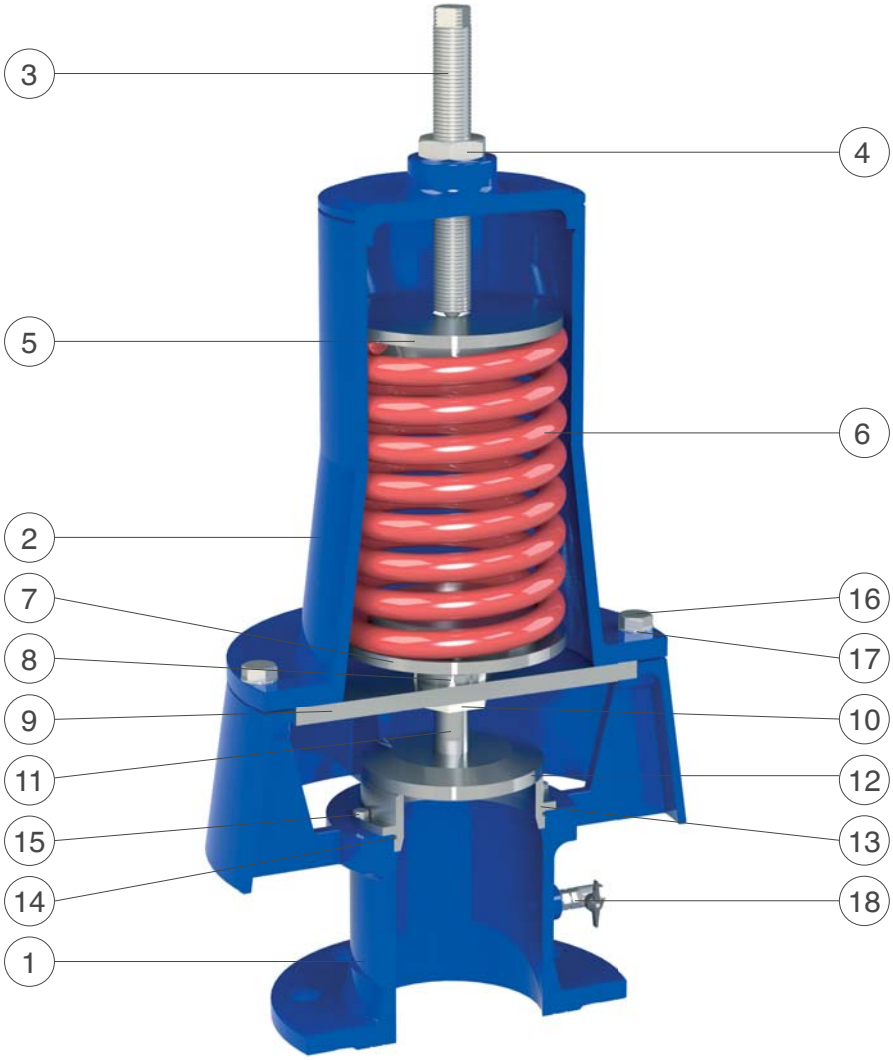


Weights and dimensions

DN mm	A mm	B mm	C mm	D mm	Seat DN mm	Weight Kg
50/65	185	185	417	40	40	14
80/100	235	242	540	50	62	28
150	300	404	720	220	137	75
200	360	404	720	220	137	79

Values are approximate, consult CSA service for more details.

Technical details

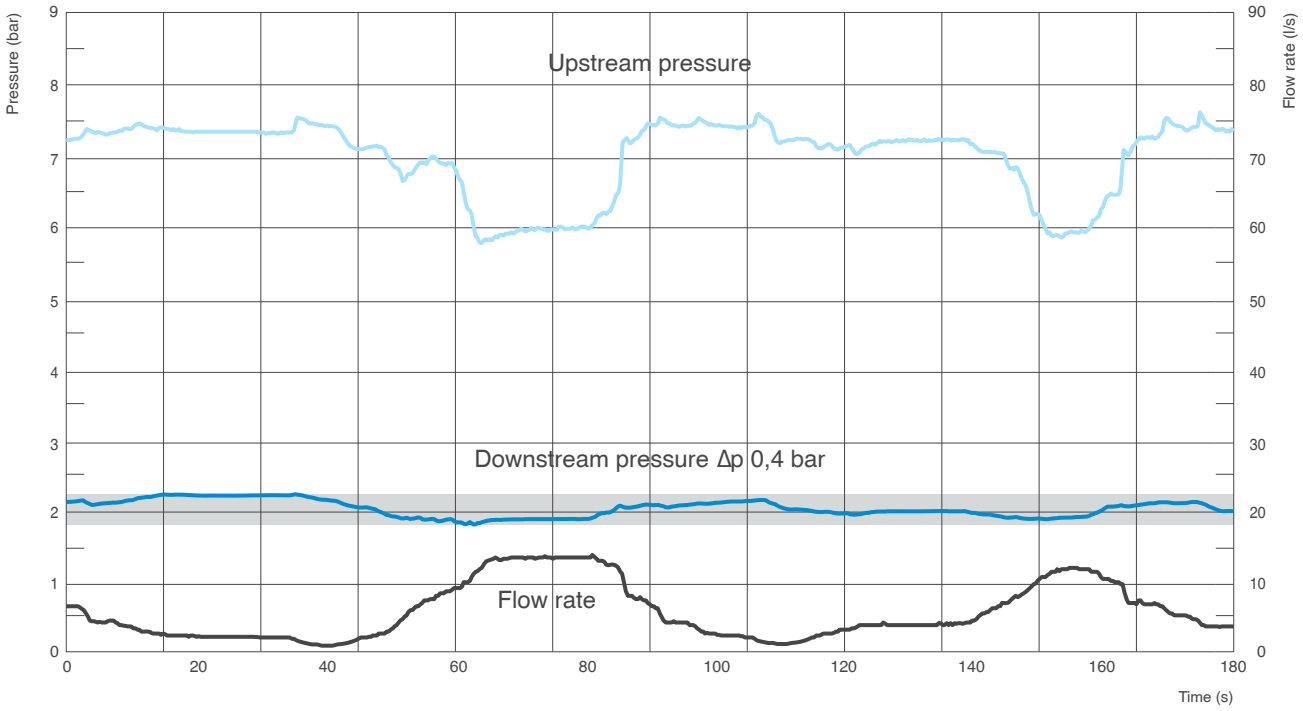


N.	Component	Standard material	Optional
1	Body	ductile cast iron GJS 500-7 or GJS 450-10	
2	Cap	duct. cast iron GJS 500-7 or 450-10 and painted steel	
3	Driving screw	stainless steel AISI 304	stainless steel AISI 316
4	Nut	stainless steel AISI 304	stainless steel AISI 316
5	Spring support	stainless steel AISI 303 (304 for DN 150-200)	stainless steel AISI 316
6	Spring	spring painted steel 52SiCrNi5	
7	Spring housing	stainless steel AISI 303 (304 for DN 150-200)	stainless steel AISI 316
8	Ring	stainless steel AISI 304	stainless steel AISI 316
9	Separation plate	s.s. AISI 304 (painted steel for DN 150-200)	stainless steel AISI 316
10	Driving sleeve	Delrin (s. s. AISI 304 for DN 150-200)	
11	Shaft	stainless steel AISI 304	stainless steel AISI 316
12	Obturator	stainless steel AISI 303 (304 for DN 150-200)	stainless steel AISI 316
13	Sealing seat	stainless steel AISI 304 (303 for DN 50/65)	stainless steel AISI 316
14	O-ring	NBR	EPDM/Viton
15	Screws	stainless steel AISI 304	stainless steel AISI 316
16	Screws	stainless steel AISI 304	stainless steel AISI 316
17	Washers	stainless steel AISI 304	stainless steel AISI 316
18	Ball valve 1/4”	nickel-plated brass	stainless steel AISI 316

The list of materials and components is subject to changes without notice.

Pressure reducing performance chart

Actual hydraulic laboratory results.



Installation layout

The picture below shows the recommended installation layout of a pressure reducing station, using CSA direct acting pressure control valves. On the main line it is clearly visible the CSA pressure reducer VRCD, with a strainer upstream to prevent the entrance of debris, stones and particles likely to damage the internal components, and isolated by means of sectioning devices needed for inspection and maintenance. A by-pass line, with one more VRCD of the same size or smaller, is highly recommended to ensure water supply during maintenance. CSA anti-slam combination air valves FOX AS series are needed before and after the installation as well as CSA direct acting pressure relief valve VSM downstream, to discharge possible increase in pressure.

Technical data - Recommended flow rate

The following chart shows the recommended flow rate for the proper sizing of the CSA pressure control valves.

VRCD

DN (mm)	50	65	80	100	125	150
Flow rate min. (l/s)	0,3	0,5	0,8	1,2	1,8	2,6
Flow rate max. (l/s)	3,9	6,6	10	15	24	35

RDA

DN (mm)	50	65	80	100	125	150
Flow rate min. (l/s)	0,3	0,4	0,6	1,0	1,5	2,1
Flow rate max. (l/s)	3,5	5,9	9,0	14	22	31

VRCD FF

Thread (inches)	1/2"	1"	1" 1/2	2"
Flow rate min. (l/s)	0,02	0,05	0,11	0,30
Flow rate max. (l/s)	0,35	0,98	2,20	4,45

VSM used as pressure sustaining

DN (mm)	50	65	80	100	125	150
Flow rate min. (l/s)	0,4	0,6	0,9	1,4	2,2	3,2
Flow rate max. (l/s)	4,5	7,6	11	18	28	40

VSM used as pressure relief

DN (mm)	50	65	80	100	125	150
Flow rate max. (l/s)	8,8	14	22	35	55	79

Advanced testing facilities

Designed to reproduce real conditions of modern water distribution systems the CSA testing facility is able to assess the dynamic performances of automatic control valves, direct acting pressure control valves, air valves and anti water hammer valves.
Provided with a high capacity booster pumps station, and linked to an advanced high frequency pressure transducers and flow meters, the testing rig allows for a real time visualization of pressure and flow evolutions. Water hammer events can also be simulated and recorded to prove the efficacy of CSA fast acting relief valve, in addition to level control for which, using an auxiliary stilling tank, a part of the pipeline system is entirely dedicated.
The PLC and control station allows for the operation of step by step and solenoid operated valves to determine the sensitivity of such kind of application and pressure management solutions. Thanks to this important and powerful tool valves can be customized, simulated and set according to the project requirements assuring the perfect performance and accuracy.

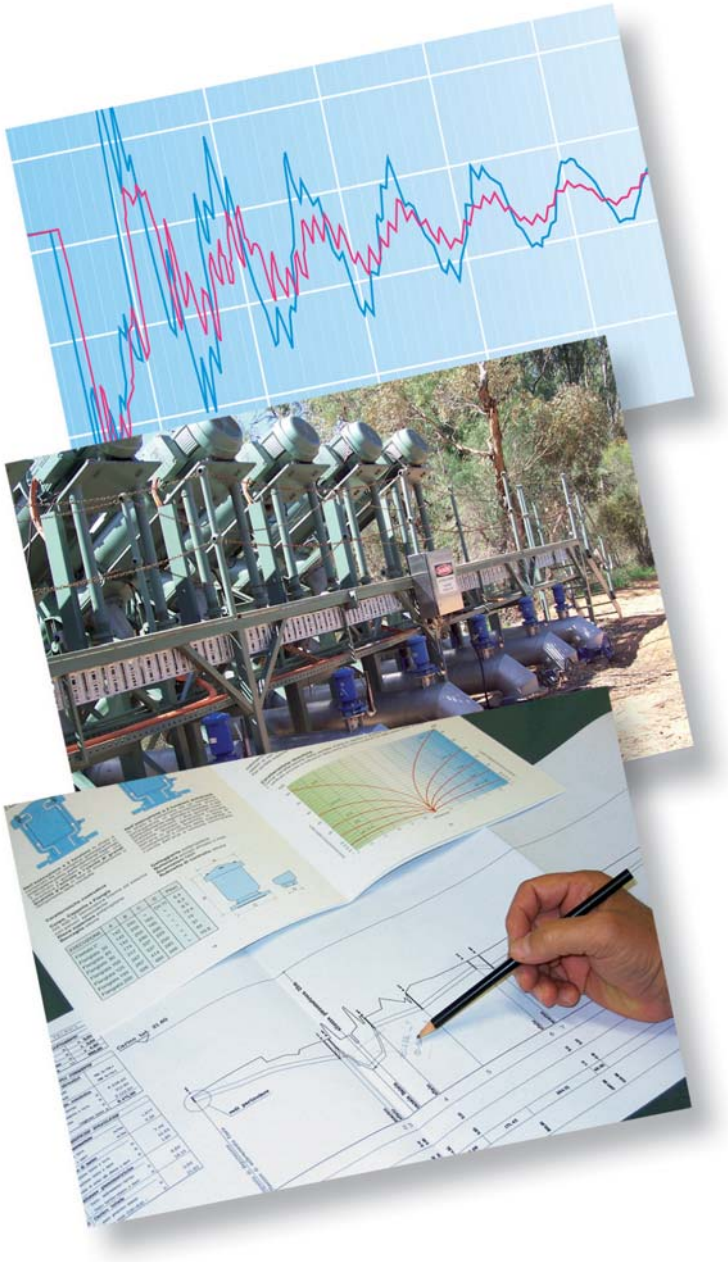
The testing process

All our valves undergo severe tests according to EN standards to ensure they are mechanically resistent, watertight, and high performing. After testing every valve is identified by means of a metallic tag or sticker, and duly registered and certified.

CSA HYCONSULT

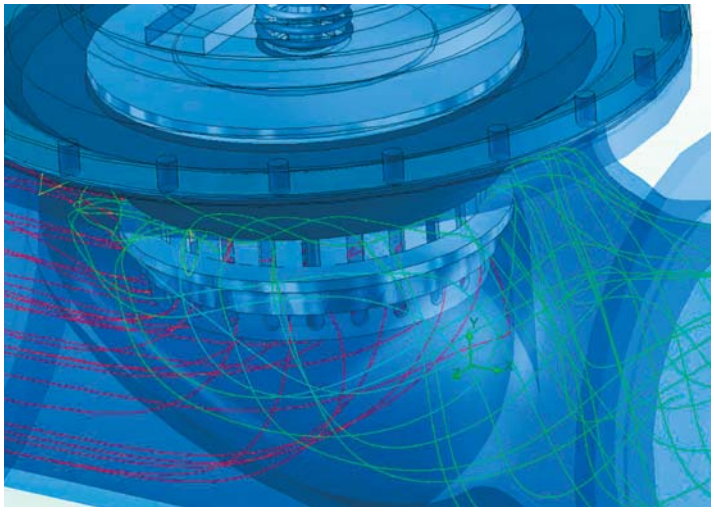
Water hammer analysis
CSA Hyconsult

CSA Hyconsult was founded to provide designers and consultants, involved in the design of water distribution and sewage systems, with accurate and unique technical support.
CSA Hyconsult has specialized in hydraulic modelling and transients analysis, entirely through the use of modern computational tools and advanced algorithms. Simulations are essential to predict system responses to events under a wide range of conditions without disrupting the actual system.
Using simulations, problems can be anticipated in possible or existing situations, and solutions can be evaluated in order to invest time, money and material in the most productive manner.



Research and innovation

CSA has always regarded knowledge as being indispensable for the kind of research that consistently feeds innovation at all levels. The R&D department at CSA constantly strives to improve product performance and continually searches for new solutions to meet our customer's needs. Twenty years of experience in valve design and sizing, supported by advanced computational tools, cooperation with external entities at the highest level, and test facilities for the verification of theoretical results which are available for our customers, guarantee our professionalism and reliability.



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