Controllable reduced pressure zone backflow preventer, BA type

5751 – 570 series

01421/25 EN

Function

The backflow preventer is a hydraulic protection device designed to prevent polluted water from flowing back into the potable water system. This type of backflow may occur when the pressure in the distribution system changes and causes a reversal of the flow. The backflow preventer is installed between the potable water system and the user circuit, and creates a separation zone that prevents the water in the two circuits from coming into contact.

Product range

5751 series Controllable reduced pressure zone backflow preventer, BA type. Flanged version	sizes DN 50–DN 100
570 series Pre-assembled group with BA type backflow preventer, shut-off valves, strainer. Flanged version	sizes DN 50–DN 100

Technical specifications

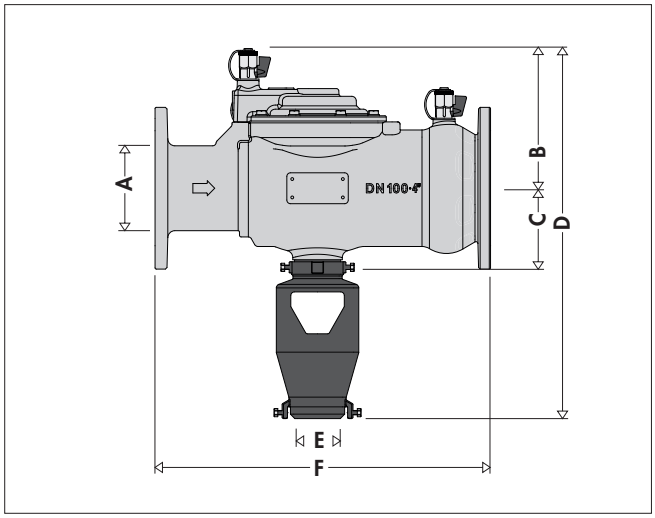
Backflow preventer 5751 – 570 series

Materials:	- body:	cast iron EN-GJS-400 with epoxy coating (DN 50-DN 100)
	- cover:	cast iron EN-GJS-400 with epoxy coating (DN 50-DN 100)
	- check valve stems:	stainless steel EN 10088-3 (AISI 303)
	- springs:	stainless steel ISO 6931-1 (4310-301-00)
	- diaphragm and seals:	EPDM
		Medium: potable water
Nominal pressure:		PN 10
Maximum working temperature		65 °C
Pressure test ports:		upstream, intermediate, downstream
Flanged connections:		DN 50, DN 65, DN 80 and DN 100
		can be coupled with counterflange EN 1092-1 PN 10
Conforms to standards:		NF, ACS, SVGW
Certification:		EN 12729

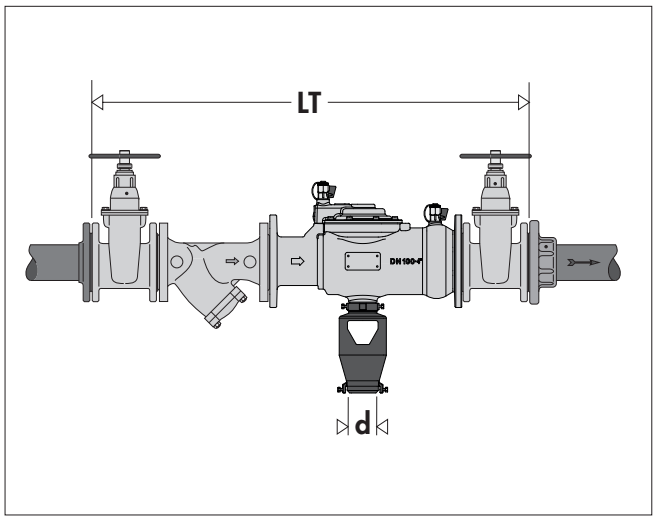
Shut-off valve and strainer, 570 series

Shut-off valve body:	cast iron EN 1563 EN GJS-400-15 epoxy resin coated
Strainer body:	cast iron EN 1561 EN GJL-250 epoxy resin coated
Strainer cartridge:	stainless steel EN 10088-2 (AISI 304)

Dimensions



Code	A	B	C	D	E	F	Mass (kg)
575105	DN 50	153	108	405	Ø 50	302	20
575106	DN 65	153	108	405	Ø 50	305	21
575108	DN 80	190	115	503	Ø 80	470	35
575110	DN 100	190	115	503	Ø 80	470	36



Code	DN	LT	d	Mass (kg)
570050	DN 50	838	Ø 50	55
570060	DN 65	941	Ø 50	79
570080	DN 80	1146	Ø 80	100
570100	DN 100	1206	Ø 80	118

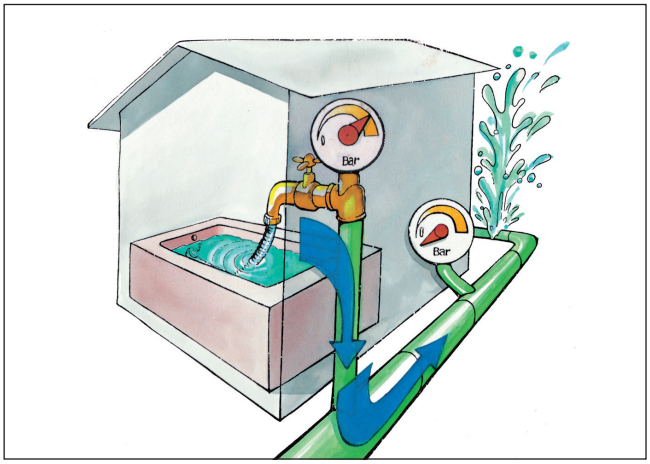
Backflow

Potable water from the mains system may suffer from hazardous pollution mainly caused by the return of contaminated medium from plumbing systems flowing back directly into the mains supply.
This phenomenon, termed “back flow”, occurs when:
a) the pressure in the main water system is less than that in the downstream circuit (back siphoning). This situation may occur when a pipe is broken in the mains system or when consumer demand on the mains supply is very heavy.
b) the pressure in the downstream circuit rises (counter pressure) due, for example, to water being pumped from a well.

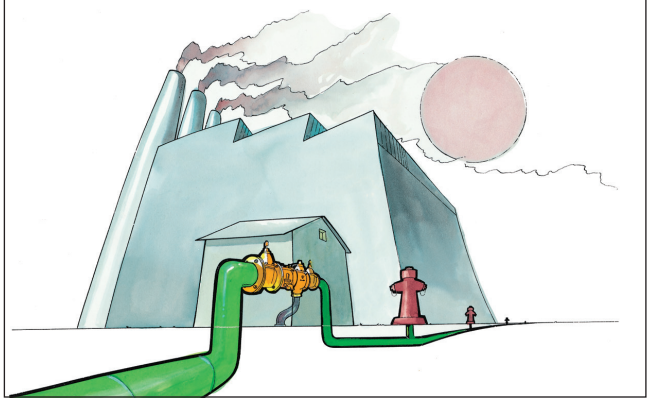
Risk assessment

Given the potential dangers of the phenomenon and the requirements of current legislation,a risk assessment of backflow pollution must be carried out based on the type of system and the characteristics of the medium that flows inside it. A suitable backflow prevention device must be selected on the basis of the assessment performed by the system designer and the mains supplier. The device must be located along the internal distribution system at the points at risk of backflow which would be hazardous to human health.

The protection can be provided by inserting a backflow preventer at critical points in the circuit at the inlet from the main supply or in the internal distribution system. This will prevent the backflow of polluted water in all systems for which direct connection to the mains or an internal supply is considered hazardous.



Installation in a fire fighting system



Use of BA type backflow preventers - reference to European standard EN 1717 and EN 12729

Proper use of the BA type backflow preventer is regulated by the European standards governing prevention of pollution caused by backflow.
The reference standard is *EN 1717: 2000 "Protection against pollution of potable water in hydraulic installations and general requirements of devices to prevent pollution by backflow"*.
In this standard, the water in the systems is classified according to the level of risk it represents for human health.

Category 1:
Water to be used for human consumption coming directly from a potable water distribution system.

Category 2:
Medium presenting no human health hazard, as per 1, the quality of which can have undergone a change in taste, odour, colour or temperature.

Category 3:
Medium representing some human health hazard due to the presence of one or more harmful substances.

Category 4:
Medium presenting a human health hazard due to the presence of one or more "toxic" or "very toxic" substances or one or more radioactive, mutagenic or carcinogenic substances.

Category 5:
Medium presenting a human health hazard due to the presence of microbiological or viral elements.

According to this classification, suitable backflow prevention devices must be fitted in water distribution system circuits.
BA type backflow preventers are used to protect against the risk of contamination by water up to category 4. For category 5 water, use a hydraulic separation tank.

The table opposite, titled "Protection matrix", associates the various types of system with the corresponding categories of medium, and has been drawn up based on the indications provided in the European standard. It is an extract and only lists the types of system which are compatible with the sizes of products in the 5751 series.

European standard EN 12729 -*"Devices to prevent pollution by backflow of potable water". Controllable reduced pressure zone backflow preventer. Family B - Type A"* defines the functional, dimensional and mechanical features required by BA type controllable reduced pressure zone backflow preventers.

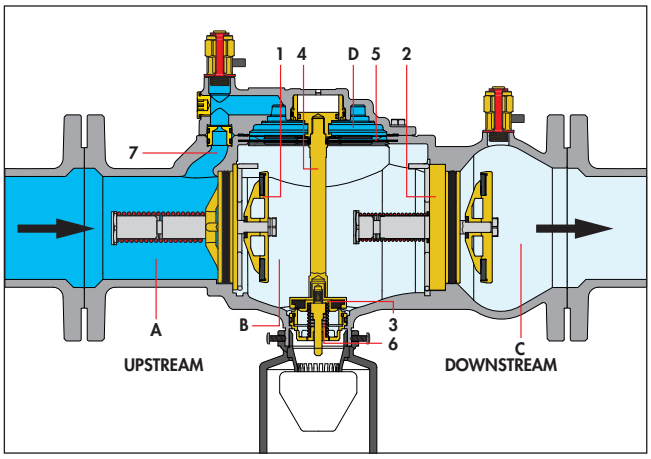
Protection matrix		
Type of installation	**Medium cat.**	
	4	5
General		
Sprinkler fire fighting systems that use antifreeze solutions	*	
Industrial tanks		*
Reclassified water systems		*
Industrial food processes		
Butchers and meat suppliers		*
Dairies	*	
Food preparation	*	
Abattoirs		*
Industrial and commercial applications		
Breweries and distillers	*	
Car washing and degreasing systems	*	
Commercial clothes washing systems	*	
Drain cleaning systems		*
Dry-cleaning appliances	*	
Industrial and chemical systems		*
Industrial disinfection equipment	*	
Laboratories		*
Water storage systems for agricultural applications		*
Water treatment or softening systems that use products other than salt	*	
Fire fighting systems using pressurised water	*	
Water collection systems for fire fighting applications		*
Agriculture		
Commercial irrigation with outlets underground or at ground level and/or permeable pipes, with or without chemical additives		*
Insecticide or fertiliser application systems		*

Operating principle

The controllable reduced pressure zone backflow preventer is composed of: a body with an inspection cover, an upstream check valve (1), a downstream check valve (2), a discharge device (3).
The two check valves mark off three different zones, each of which at a different pressure: an upstream or inlet zone (A); an intermediate zone, also known as the reduced pressure zone (B); a downstream or outlet zone (C). Each of these is equipped with a test port connection for pressure measurement. A discharge device (3) is located in the lower part of the intermediate zone.
The obturator of the discharge device is connected via the valve stem (4) to the diaphragm (5).
This mobile unit is pushed upwards by the counter-spring (6). The diaphragm (5) marks the limit of the operation chamber (D), which is connected to the upstream zone by the channel (7).

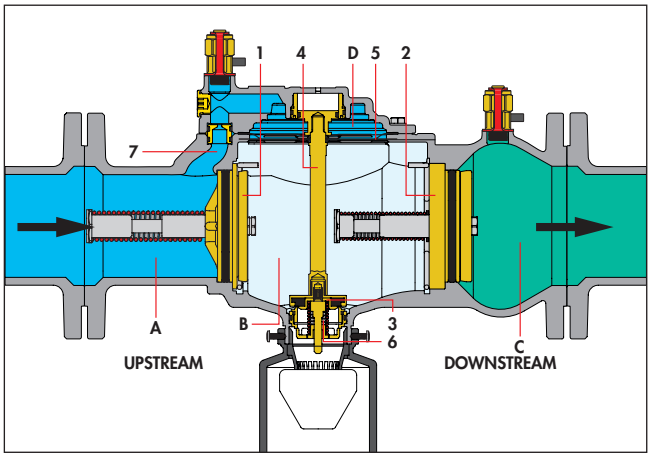
Correct flow conditions

Under normal flow conditions, both check valves are open, while the pressure in the intermediate chamber (B) is always lower than the inlet pressure by at least 140 mbar due to the pressure drop caused by the check valve (1).
In the operation chamber (D), however, the pressure is the same as in the inlet zone.
In this situation, the mobile unit consisting of the diaphragm (5), the valve stem (4) and the valve obturator (3) is pushed down by the thrust created by the difference in pressure acting on the diaphragm which is greater than that of the spring (6) acting in the opposite direction.
The drain valve is therefore held in the closed position.



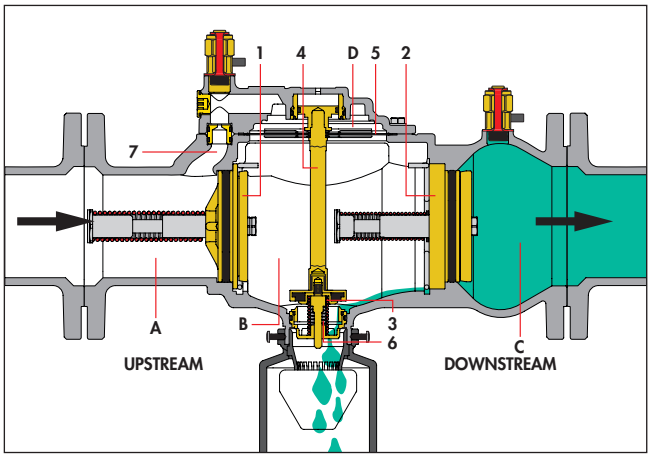
No flow conditions

The check valves (1) and (2) are now closed.
Since the pressure in the upstream zone, and therefore also in the operation chamber (D), is still at least 140 mbar higher than the pressure in the intermediate chamber (B), the drain valve remains closed.



Upstream pressure loss

Both check valves close as the pressure upstream drops.
The drain valve (3) opens at the moment in which the difference in pressureΔp, existing between the upstream and intermediate zones, decreases to reach a value just over 140 mbar.
Under these conditions the action exerted by the pressure difference Δp on the diaphragm (5) becomes weaker than that exerted by the counter-spring (6) and the drain valve (3) opens as a result. Discharge then occurs until the body of the backflow preventer is empty.
When the situation returns to normal (pressure upstream greater than pressure downstream), the drain valve closes and the backflow preventer is again ready to operate.



Downstream counter pressure

If the pressure in the downstream zone increases until it is greater than the upstream pressure, the check valve (2) closes and therefore prevents water already delivered to the user from returning back into the mains system.
If the seal of the check valve (2) is slightly defective or in general terms there is any other type of fault in the backflow preventer, the device always interrupts (disconnects) the connection between the mains system and the user system.
The backflow preventer has been designed with all construction details required for a properly functioning positive action device; the best possible safety conditions are therefore ensured under all conditions.

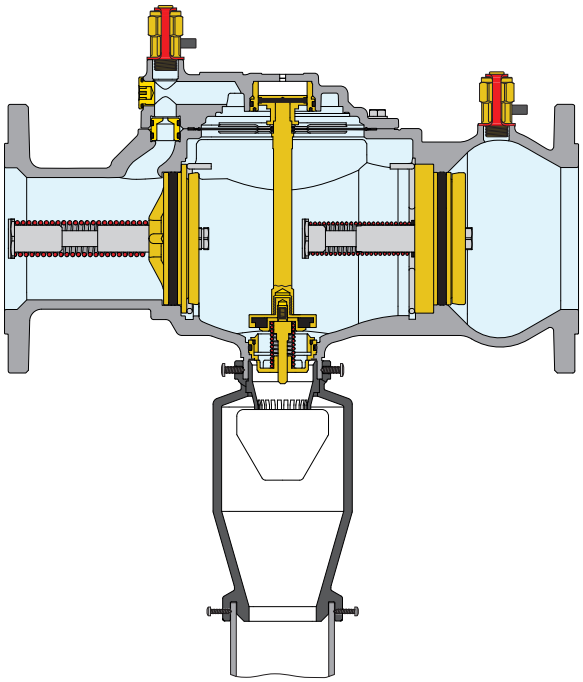
Construction details

Discharge tundish
In compliance with standard EN 1717, backflow from the connection pipe must be prevented during water discharge from the backflow preventer, and discharge must occur without any water spraying outside. Consequently the tundish connected to the drain pipe must be of an appropriate size with special slits to create the necessary air gap and it must be equipped with a suitable flow conveyor.

Elastomers complying with food regulations
The elastomers used for the hydraulic seals have been approved by the Certifying Bodies in accordance with the most recent provisions regarding compatibility for use with potable water.

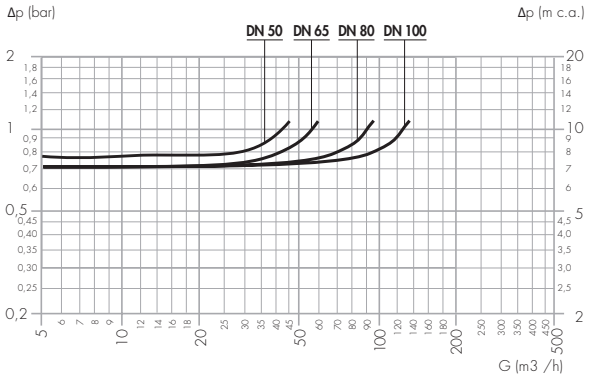
Easy maintenance
The backflow preventer is a device that must undergo periodic checking of its operating status during its normal working life. When needed any disassembly and maintenance work is easier to perform thanks to the use of components easy to verify and replace without having to disassemble the valve body from the pipe.

Certification
5751 series BA type controllable reduced pressure zone backflow preventers are certified as compliant with national and European product specifications by the following Bodies: NF - SVGW - ACS.



Hydraulic characteristics

5751 series



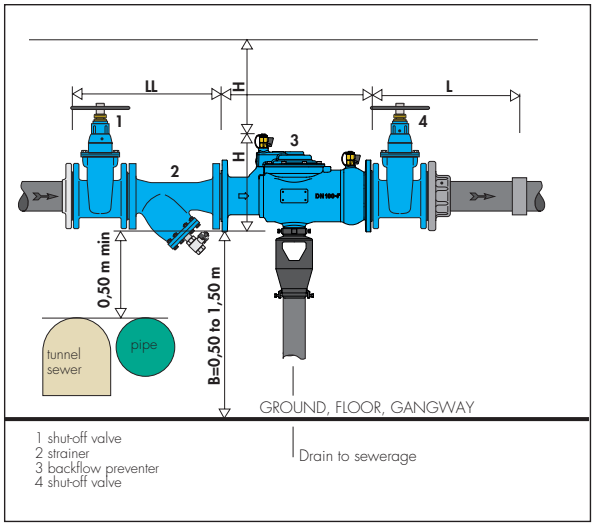
570 series

	Kv (m³/h)			
	DN 50	**DN 65**	**DN 80**	**DN 100**
Strainer	104	180	258	365
Shut-off valves	300	610	950	1,700

Installation

Backflow preventers must be installed by qualified personnel in accordance with current regulations.

The backflow preventer must be installed downstream from a shut-off valve and from an inspectable strainer with drain; another shut-off valve must be fitted downstream from it. The unit must be installed in an accessible position, appropriately sized to avoid possible immersion due to accidental flooding (see diagram).
The device must be installed horizontally. The discharge tundish must comply with standard EN 1717 and be connected to the sewage piping.
Before installing the backflow preventer and strainer, flush the pipe with a high flow rate.
For the protection of the main water system the backflow preventer must be installed after the water meter, whereas in order to protect the domestic use outlets of the internal network it should be installed at the limit of the areas where there may be contamination, for example: central heating, watering gardens, etc.



Inspection and maintenance

The backflow preventer unit is a health and safety device and therefore requires periodical inspection.
The first indication of poor operation, generally caused by foreign matter (sand or other debris) that is blocking the upstream check valve in an opened position, is revealed with a permanent leak from the drain. This leak is merely an early warning and definitely does not put the safety of the check valve at risk, but it requires removing and cleaning the unit and the strainer upstream. A quick method of inspection (taking less than 15 minutes) is described in the following table.
N.B. In the event of leakage from the drain, it is advisable to open one or more taps for a few minutes to create a strong circulation flow; this is often sufficient to expel any foreign matter and bring everything back to normal.

QUICK CHECKING METHOD

Check that the system is under pressure before each operation and watch the drain valve located on the lower part of the device (use a mirror if necessary).

OPERATION	DEFECT DETECTED	LIKELY CAUSE	ACTION TO BE TAKEN
1 Close the downstream shut-off valve	Permanent pressure drop	Upstream check valve or drain valve not sealed	Dismantle and check
	No permanent pressure drop		Proceed to operation 2
2 Close the upstream shut-off valve and open the upstream pressure control cock (on the front connection)	Drain does not open, or preferably pressure drop is minimal and lasts more than one minute	Drain blocked	Dismantle and check
	Drain opens abruptly and equipment is emptied in less than one minute		Proceed to operation 3
3 Open downstream shut-off valve	Continuous drainage	Downstream check valve not sealed	Dismantle and check
	No discharge		Put the equipment back into operation

N.B. : In normal operation the appliance must not present any permanent pressure drop. Otherwise dismantle and verify.

SPECIFICATION SUMMARY

570 series

Pre-assembled unit with backflow preventer. Flanged connections DN 50 (from DN 50 to DN 100) PN 16 can be coupled with counterflanges EN 1092- 1. Maximum working temperature 65 °C. Maximum working pressure 10 bar. Consisting of:
- Controllable reduced pressure zone backflow preventer. BA Type. Epoxy resin coated EN-GJS-400 cast iron body and cover. Check valve stems, relief seat and springs in stainless steel. EPDM seals. Positive action safety device compliant with standard EN 12729.
  Complete with upstream, intermediate and downstream pressure test ports and discharge tundish with pipe fixing collar.
- Y-strainer. Epoxy resin coated cast iron body. Stainless steel mesh, mesh size 0,7 mm (DN 50 and DN 65), 0,9 mm (DN 80 and DN 100). Complete with drain cock, connection 1/2" F.
- Upstream and downstream shut-off valves. Epoxy resin coated cast iron body. EPDM control stem seals.

5751 series

Controllable reduced pressure zone backflow preventer. BA Type. Flanged connections DN 50 (DN 50–DN 100) PN 16, can be coupled with counterflanges EN 1092-1. Epoxy resin coated EN-GJS-400 cast iron body and cover. Check valve stems, relief seat and springs in stainless steel. EPDM seals. Maximum working temperature 65 °C. Maximum working pressure 10 bar. Positive action safety device compliant with standard EN 12729. Complete with upstream, intermediate and downstream pressure test ports and discharge tundish with pipe fixing collar.

CALEFFI Hydronic Solutions

Caleffi S.p.A.
S.R. 229 n. 25 · 28010 Fontaneto d'Agogna (NO) · Italy
Tel. +39 0322 8491 · Fax +39 0322 863305
info@caleffi.com · www.caleffi.com