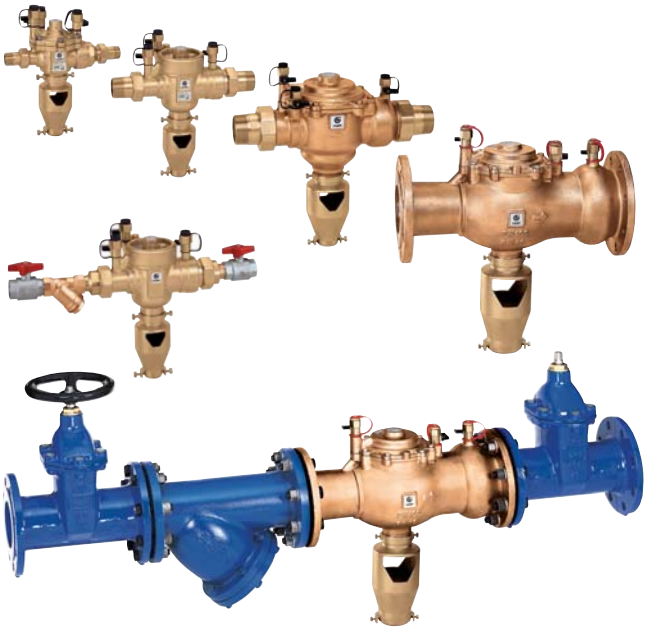
Controllable reduced pressure zone backflow preventer (BA type)

series 574 - 575 - 570

cert. n° 0003 ISO 9001

01022/03 GB

Replaces 01022/99 GB



Function

The backflow preventer is a plumbing protection device designed to prevent polluted water from flowing back into the mains supply. This type of backflow may occur when the pressure in the mains supply changes and causes a reversal of the flow. The backflow preventer is installed between the mains supply and the internal consumer circuit in water supply systems and creates a safety zone which prevents the water in the two circuits from coming into contact.

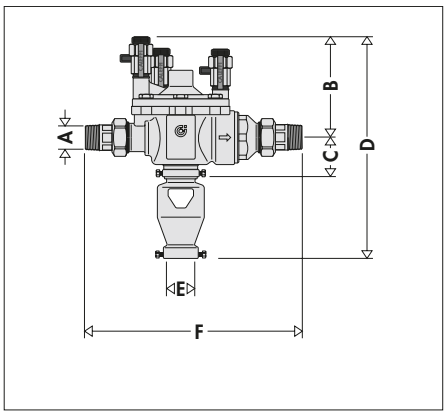
Product range

Series 574 Controllable reduced pressure zone backflow preventer (BA type). Threaded connections ..... Sizes 1/2"÷2"
Series 575 Controllable reduced pressure zone backflow preventer (BA type). Flanged connections ..... Sizes DN 50÷DN 100
Series 570 Assembly fitted with backflow preventer (BA type), shut-off valves, strainer. Threaded connections ..... Sizes 1/2"÷2"
Series 570 Assembly fitted with backflow preventer (BA type), shut-off valves, strainer. Flanged connections ..... Sizes DN 50÷DN 100

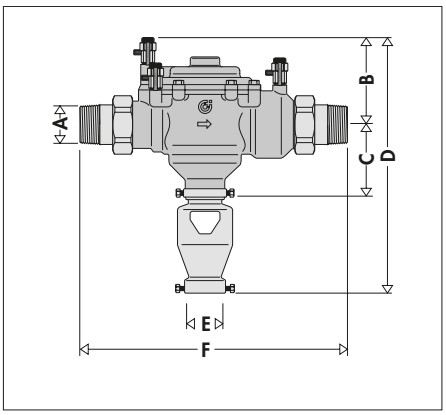
Technical specification

series ⇨	574-570 threaded	575-570 flanged
Materials		
Body and cover:	dezincification resistant alloy CR EN 12165 CW602N (1/2"÷1 1/4") bronze RG5 Pb3 DIN 50930-6 (1 1/2"-2")	bronze RG5 Pb3 DIN 50930-6
Check valve spindle:	stainless steel	stainless steel
Discharge seat:	dezincification resistant alloy CR EN 12164 CW602N (1/2"-3/4") stainless steel (1"÷2")	stainless steel
Springs:	stainless steel	stainless steel
Diaphragm:	EPDM	EPDM
Seals:	NBR	NBR
Shut-off valve body:	brass EN 12165 CW617N, chrome plated	Ductile iron GGG 40 coated with epoxy resin
Strainer body:	bronze EN1982 CB491K	Cast iron GG 25 coated with epoxy resin
Strainer cartridge:	stainless steel	stainless steel
Performance		
Medium:	water	water
Max. working pressure:	10 bar	10 bar
Max. working temperature:	65°C	65°C
Filter mesh:	0,8 mm	0,7 mm (DN 50-DN 65) 0,9 mm (DN 80-DN 100)
Connections	1/2"÷2" M with union	DN 50÷DN 100 flanged PN 16
Pressure test port connections	1/4" F	DN 50: 1/4" F DN 65÷DN 100: 1/2" F

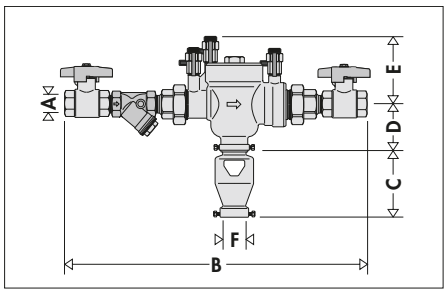
Dimensions



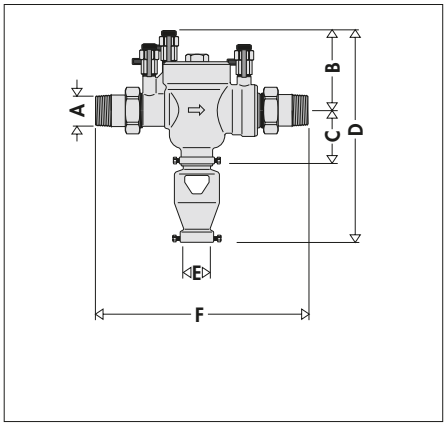
Code	A	B	C	D	E	F	Weight (kg)
574040	1/2"	103	30	263	Ø 40	227	2,9
574050	3/4"	103	30	263	Ø 40	227	2,9



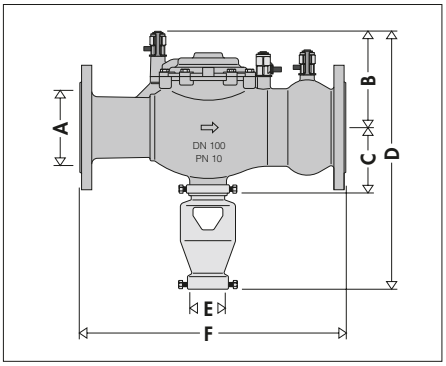
Code	A	B	C	D	E	F	Weight (kg)
574800	1 1/2"	130	31	382	Ø 50	387	11,3
574900	2"	130	31	382	Ø 50	395	11,4



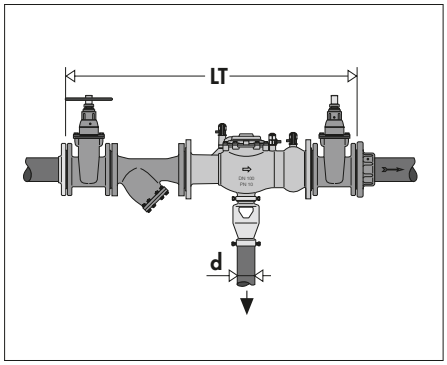
Code	A	B	C	D	E	F	Weight (kg)
570004	1/2"	365	130	44,5	103	Ø 40	3,0
570005	3/4"	390	130	44,5	103	Ø 40	3,6
570006	1"	430	162	72,5	99,5	Ø 40	5,4
570007	1 1/4"	540	162	72,5	99,5	Ø 40	6,2
570008	1 1/2"	670	221	103,4	129,6	Ø 50	14,4
570009	2"	735	221	103,4	129,6	Ø 50	16,5



Code	A	B	C	D	E	F	Weight (kg)
574600	1"	100	30	292	Ø 40	280	3,6
574700	1 1/4"	100	30	292	Ø 40	280	3,8



Code	A	B	C	D	E	F	Weight (kg)
575005	DN 50	129	27	382	Ø 50	302	13,2
575006	DN 65	132,5	27	385	Ø 50	305	17,0
575008	DN 80	170	26	484	Ø 80	470	26,5
575010	DN 100	170	26	484	Ø 80	470	28,0



Code	DN	Lt	d	Weight (kg)
570050	50	1050	Ø 50	70
570060	65	1150	Ø 50	80
570080	80	1350	Ø 80	104
570100	100	1430	Ø 80	135

Backflow

Potable water fed from the mains supply may suffer from hazardous pollution caused mainly by contaminated fluids from plumbing systems flowing back directly into the mains supply.
This phenomenon, termed “backflow” occurs when:

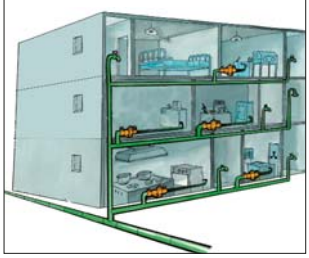
a) the pressure in the mains system is less that in the plumbing circuit receiving the supply (back syphonage). This situation may occur when there is a pipe breaking in the mains system or when demand on the mains supply from consumers is very heavy.
b) the pressure in the plumbing circuit receiving the supply rises (back pressure) due, for example, to water being pumped from a well.

Risk assessment

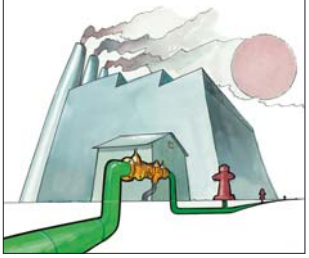
Given the potential dangers of the phenomenon and the requirements of current regulations, the risk of pollution from backflow must be assessed on the basis of the type of system and the characteristic of the fluid that flows in it. An appropriate backflow prevention device must be selected on the basis of that assessment performed by the system designer and the mains supplier. The device must be located along the supply line at those 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 mains supply or in the internal plumbing system. This will prevent polluted water from flowing back in all systems for which direct connection to the mains or an internal supply is considered hazardous.

Installation in a building with multiple outlets



Installation in a fire fighting system



Use of backflow preventers (BA type) according to European standards EN 1717 and EN 12729

Proper use of the BA type backflow preventer is regulated by the new European standards on the prevention of pollution from backflow.
The relevant standard is *EN 1717: 2000 "Protection against pollution of potable water in water installations and general requirements of devices to prevent pollution by backflow".*
The types of water contained in water systems are classified in this standard according to the degree of risk to health.

Category 1:
Water used for human consumption provided by a water company.

Category 2:
Fluid which does not present health hazard, as in category 1, whose quality has been compromised as a result in changes to its temperature, taste, odour or appearance.

Category 3:
Fluid which presents a slight health hazard due to concentrations of "low toxic" substances.

Category 4:
Fluid that presents a significant health hazard due to concentrations of "toxic substances".

Category 5:
Fluid that presents a serious health hazard due to concentrations of "pathogenic organisms, radioactive or very toxic substances".

Appropriate backflow prevention devices must be fitted in water supply systems on the basis of this classification.

Backflow preventers (BA type) can be used to protect against the risk of pollution from backflow for types of water up to category 4.
For category 5 types of water an air gap separation must be used.

The table on the right, entitled "Protection matrix", relates the categories of water to different types of system. It has been compiled on the basis of indications given by the European regulations.

The new European standard EN 12729 - *"Devices to prevent pollution by backflow of potable water. Controllable backflow preventer with reduced pressure zone. Family B - Type A"* - stipulate the functional, dimensional and mechanical requirements that must be met for controllable reduced pressure zone backflow preventers (BA type).

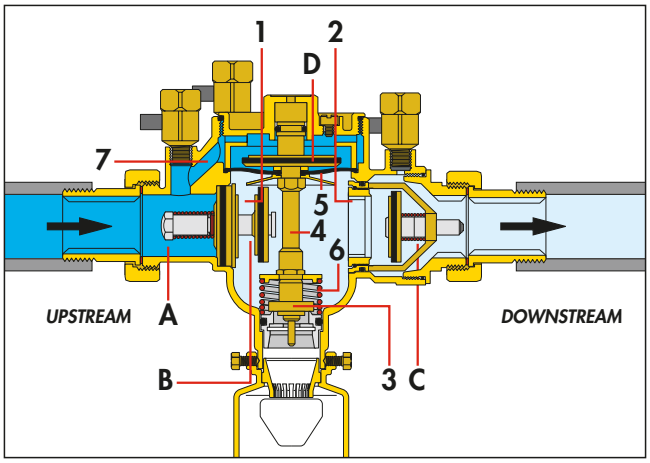
Protection matrix		
Type of system	**Fluid cat.**	
	5	4
General		
Sprinkler fire fighting systems using anti freeze solutions		*
Industrial cisterns	*	
Non-domestic hose union taps	*	
Permeable hoses in others than domestic gardens, laid below or at ground level, with or without chemical additives	*	
Primary circuits and central heating circuits in other than a house		*
Reclaimed water systems	*	
Urinals, WC's and bidets	*	
Domestic or residential gardens		
Mini-irrigation systems without fertilisers or insecticides applications, such as pop-up sprinklers or porous hoses		*
Food processing		
Bottle washing apparatus		*
Butchery and meat trade	*	
Dairies		*
Food preparation		*
Slaughterhouse equipment	*	
Vegetable washing	*	
Medical		
Medical or dental equipment with submerged inlets	*	
Bed-pans washers	*	
Commercial clothes washing in health care premises	*	
Domestic appliances such as sinks, baths and wash basins	*	
Dialysing machines	*	
Laboratories	*	
Mortuary equipment	*	
Catering		
Bottle washing apparatus		*
Dish washing machines in commercial buildings		*
Dish washing machines in health care premises	*	
Drink vending machines in which ingredients or CO_2 are injected into the supply or distribution pipe		*
Refrigerating equipment		*
Vegetable washing	*	
Industrial and commercial applications		
Brewery and distillation		*
Car washing and degreasing plants		*
Commercial clothes washing plants		*
Drain cleaning plant	*	
Dyeing equipment		*
Industrial and chemical plants	*	
Industrial disinfection equipment		*
Laboratories	*	
Mobile plant, tankers and gully emptiers	*	
Printing and photographic equipment		*
Water storage for agricultural purposes	*	
Animals drinking systems	*	
Water treatment plant or water softeners using products other than salt		*
Pressurised water fire fighting systems		*
Water storage for fire fighting purposes	*	
Agricultural		
Commercial irrigation with outlets below or at ground level and/or permeable pipes, with or without chemical additives	*	
Commercial hydroponic systems	*	
Insecticide of fertiliser applications	*	

Operating principle

The controllable reduced pressure zone backflow preventer is comprised 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 divide 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 has a test port for measuring pressure.
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 spring (6). The diaphragm (5) marks the limit of the top chamber (D), which is connected to the upstream zone by the channel (7).

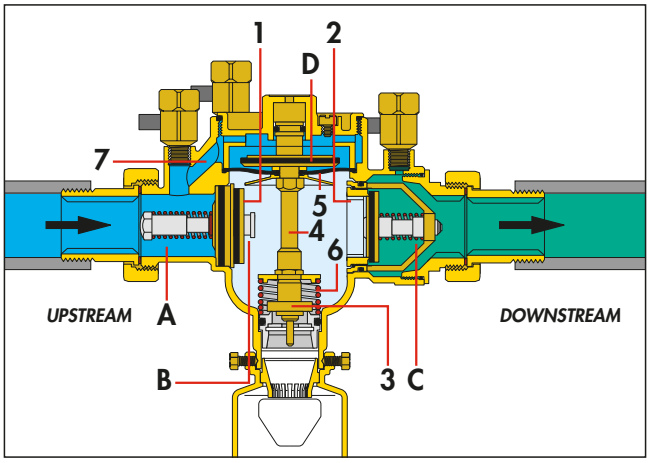
Normal flow conditions

Under conditions of normal flow, both check valves are open, while the pressure in the intermediate chamber (B) is always lower that the inlet pressure by at least 140 mbar due to the pressure loss caused by the check valve (1).
In the top 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 push 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 discharge valve is therefore held in the closed position.



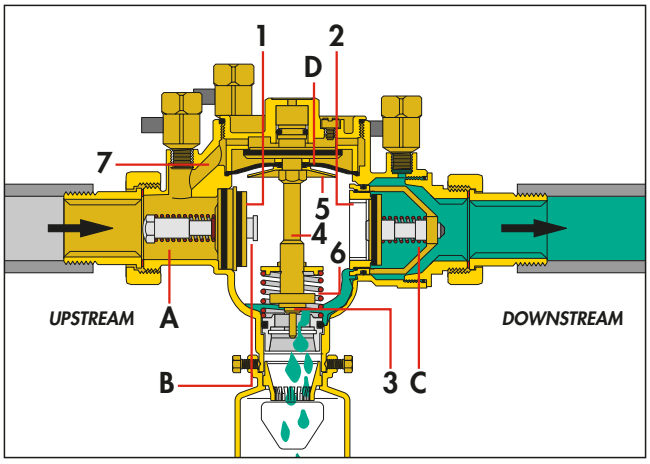
No flow conditions

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



Upstream pressure loss

Both check valves close as the pressure upstream drops. The discharge valve (3) opens when the difference in pressure ΔP, between the upstream and the intermediate zones falls, drops below 140 mbar.
Under these conditions the action exerted by the pressure difference ΔP on the diaphragm (5), becomes weaker than that exerted by the spring (6), and the discharge 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 discharge valve closes and the backflow preventer is again ready to operate.



Downstream back 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 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 receiving 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.

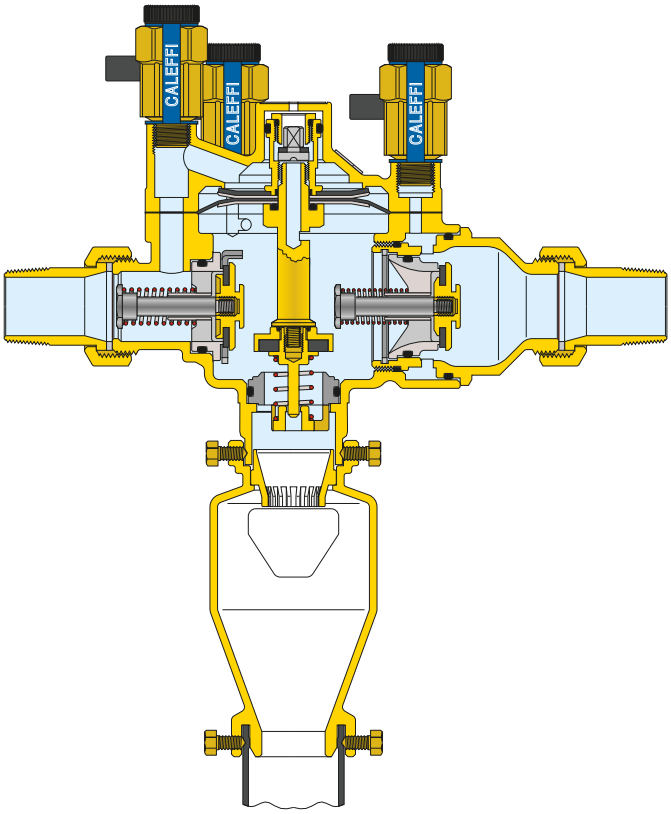
Constructional details

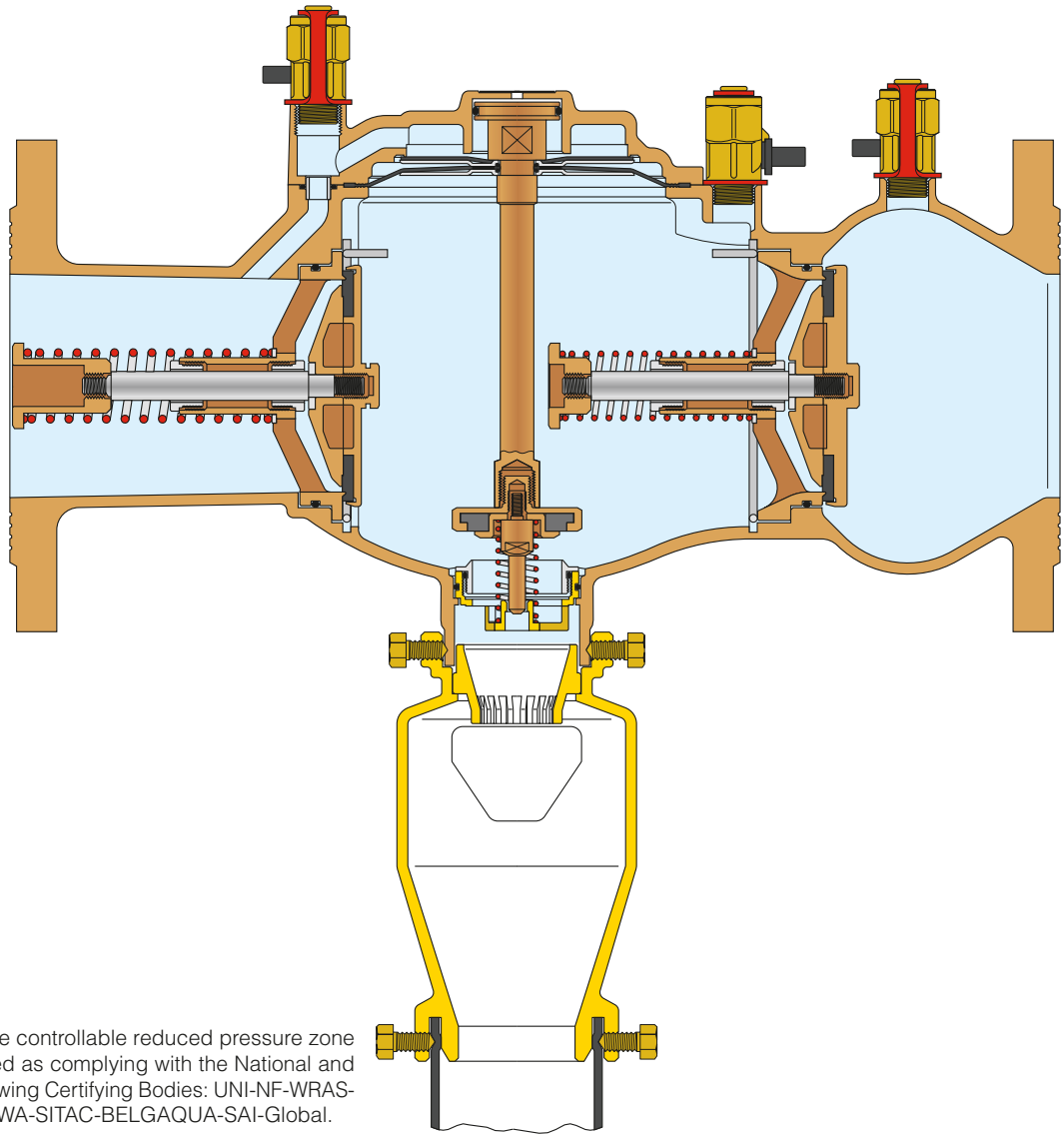
Discharge funnel
In compliance with standard EN 1717 backflow from the connected pipe must be prevented during discharge and this must occur without any external water spillage. Consequently the tundish connected to the discharge pipe must be of an appropriate size with special openings to create the necessary air gap and it must be equipped with a proper flow conveyor.

Anti-corrosion materials
The materials used to manufacture the backflow preventers must be corrosion resistant due to contact with drinking water.
They are therefore constructed using an dezincification resistant alloy CR, bronze and stainless steel to ensure longlasting high performance.

Elastomers complying with food regulations
The elastomers employed for the water seals are approved by Certifying Bodies in compliance with the most recent regulations governing compatibility for use with drinking water.

Easy maintenance
The backflow preventer is inspected periodically during its normal operating life to check that it is functioning correctly. Should the need arise, dismantling and maintenance operations are simple and easy to perform with components that are easy to inspect and replace without disconnecting the valve body from the pipework.

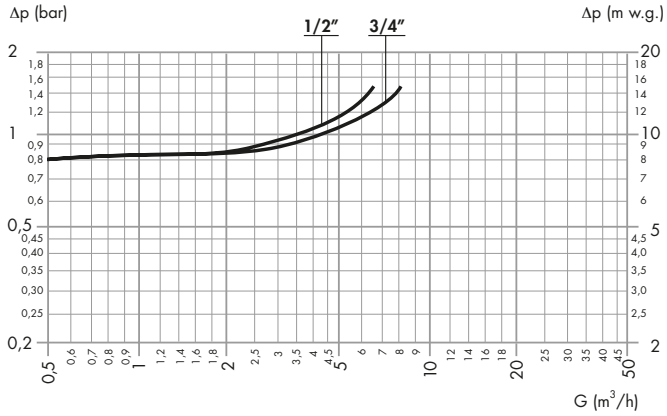


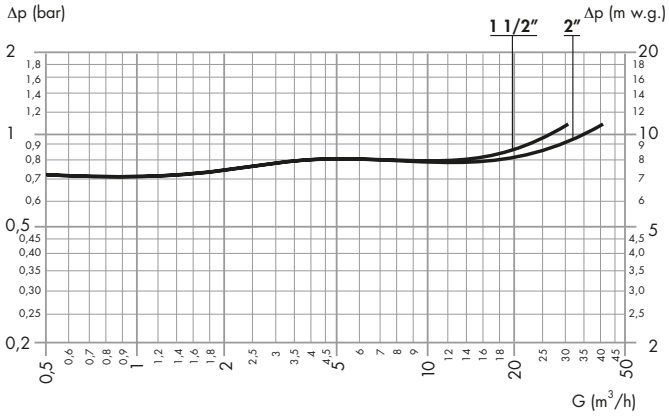


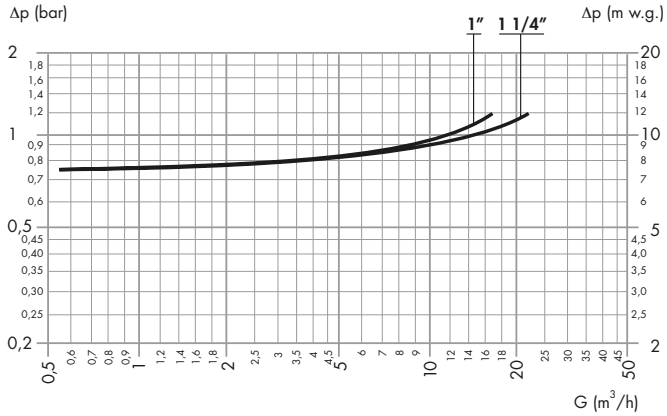
Certification

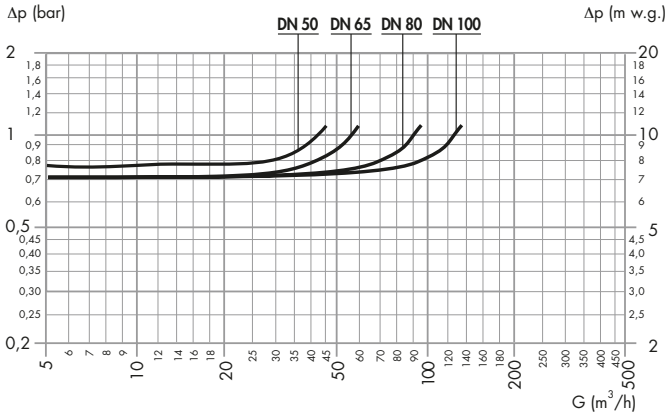
The series 574 and 575 BA type controllable reduced pressure zone backflow preventers are certified as complying with the National and European standards by the following Certifying Bodies: UNI-NF-WRAS-KIWA-DVGW-SVGW-OVGW-KIWA-SITAC-BELGAQUA-SAI-Global.

Hydraulic characteristics





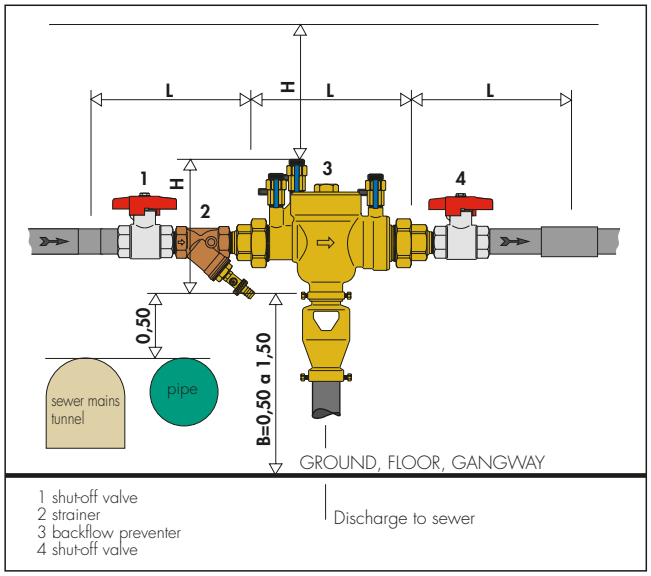


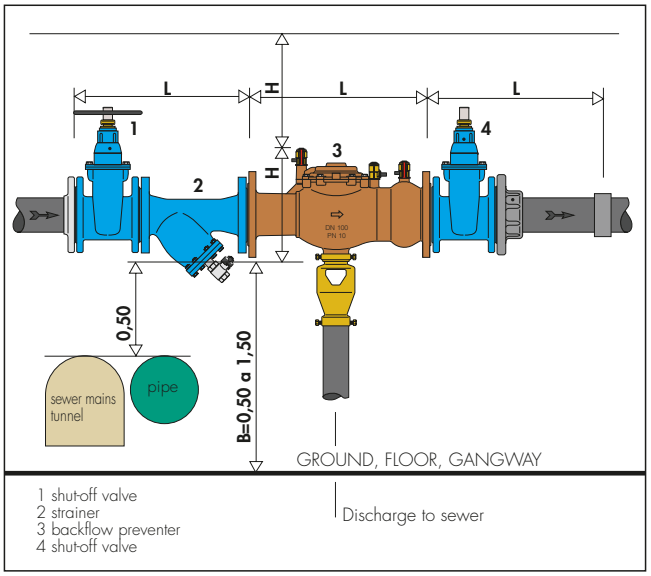


Series 570	Kv (m³/h)									
	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	DN 50	DN 65	DN 80	DN 100
Strainer	4,5	8	11	16	22	25	104	180	258	365
Shut-off valve	7	11	20	35	49	80	300	610	950	1.700

Installation

Backflow preventers must be installed by qualified personnel in accordance with current norms and regulations.
They must be installed downstream from a shut-off valve and from a strainer with a discharge that can be inspected and another shut-off valve must be fitted downstream from it. The unit must be installed in an accessible position, appropriately located to avoid possible immersion due to accidental flooding (see diagram).
The device must be fitted horizontally. The discharge tundish must comply with standard EN 1717 and be connected to the sewage piping. Before installing the backflow preventer and the strainer, the pipework must be flushed with a large flow rate.
When used to protect the mains supply, backflow preventers must be installed downstream from the water meter, whereas when used to protect the potable water supply system for internal usage, they are installed at the limit of the zone where pollution might occur, e.g. central heating systems, garden irrigation systems, etc.





Inspection and maintenance

The backflow preventer is a safety device and requires periodical inspection.
The first sign of poor functioning, generally caused by the presence of foreign bodies (sand or other impurities), is seen with a constant discharge from the discharge valve. This discharge is only a first alarm and does not mean in any way that the backflow preventer is not safe but the device and the strainer upstream from it requires dismantling and cleaning. A quick method of inspection (requires less than 15 minutes) is described in the table below.
N.B. If water is discharged from the discharge valve, a strong flow of water is recommended by turning on one or more taps since this is often sufficient to expel foreign bodies and return everything to normal.

Control instrumentation (code 575000)

The periodical (annual) control instrumentation consists of the following:

- Upstream pressure gauge
- Downstream pressure gauge
- Differential pressure gauge

The flexible tubes and necessary connections are included as well as accessories useful for dismantling the unit.
The instrumentation comes in its own case.

QUICK INSPECTION METHOD

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

OPERATION	FINDINGS	PROBABLE CAUSE	DECISION
1 Close the downstream shut-off valve	Constant discharge	Upstream check valve or discharge valve do not seal	Dismantle and check
	No constant discharge		Move to step 2
2 Close the upstream shut-off valve and open the test cock for checking the upstream pressure (on the front flange)	The discharge valve does not open or better there is a minor discharge and lasts more than one minute	Discharge valve is blocked	Dismantle and check
	The discharge valve opens suddenly and the unit empties in less than one minute		Move to step 3
3 Open the downstream shut-off valve.	Continuous discharge	Downstream check valve is leaking	Dismantle and check
	No discharge		Put back into operation

N.B. : During normal operation there should be no constant discharge.
If there is a constant discharge dismantle and inspect the device.

SPECIFICATION SUMMARIES

Series 574

Controllable reduced pressure zone backflow preventer (BA type). EN 12729 certified. 1/2" M (1/2"-3/4" M) threaded connections with union. Body, cover and discharge valve seat in dezincification resistant alloy. Check valve spindle and springs in stainless steel. Seals in NBR. Max. working temperature 65°C. Max. working pressure 10 bar. Positive action safety device in compliance with standard EN 12729. Complete with upstream, intermediate and downstream pressure test ports and discharge tundish with collar fitting to pipe.

Series 574

Controllable reduced pressure zone backflow preventer (BA type). EN 12729 certified. 1" M (1"-1 1/4" M) threaded connections with union. Body and cover in dezincification resistant alloy. Check valve spindle, discharge valve seat and springs in stainless steel. Seals in NBR. Max. working temperature 65°C. Max. working pressure 10 bar. Positive action safety device in compliance with standard EN 12729. Complete with upstream, intermediate and downstream pressure test ports and discharge tundish with collar fitting to pipe.

Series 574

Controllable reduced pressure zone backflow preventer (BA type). EN 12729 certified. 1 1/2" M (1 1/2"-2") threaded connections with union. Body and cover in bronze. Check valve spindle, discharge valve seat and springs in stainless steel. Seals in NBR. Max. working temperature 65°C. Max. working pressure 10 bar. Positive action safety device in compliance with standard EN 12729. Complete with upstream, intermediate and downstream pressure test ports and discharge tundish with collar fitting to pipe.

Series 575

Controllable reduced pressure zone backflow preventer (BA type). EN 12729 certified. DN 50 (DN 50÷DN 100) PN 16 flanged connections. Body and cover in bronze. Check valve spindle, discharge valve seat and springs in stainless steel. Seals in NBR. Max. working temperature 65°C. Max. working pressure 10 bar. Positive action safety device in compliance with standard EN 12729. Complete with upstream, intermediate and downstream pressure test ports and discharge tundish with collar fitting to pipe.

Series 570

Assembly fitted with backflow preventer. 1/2" F (1/2"÷2" F) threaded connections. Max. working temperature 65°C. Max. working pressure 10 bar. Consisting of:
- Controllable reduced pressure zone backflow preventer (BA type). EN 12729 certified. M threaded connections with union. Body in dezincification resistant alloy. Check valve spindle, discharge valve seat and springs in stainless steel. Seals in NBR. Positive action safety device in compliance with standard UNI 9157. Complete with upstream, intermediate and downstream pressure test ports and discharge tundish with collar fitting to pipe.
- Y strainer. Body in bronze. Mesh in stainless steel. Seal in Saital K. Filter mesh 0,8 mm.
- Upstream and downstream shut-off ball valves. Brass body. Chrome plated.

Series 570

Assembly fitted with backflow preventer. DN 50 (DN 50÷DN 100) PN 16 flanged connections. Max. working temperature 65°C. Max. working pressure 10 bar. Consisting of:
- Controllable reduced pressure zone backflow preventer (BA type). EN 12729 certified. Body and cover in bronze. Check valve spindle, discharge valve seat and springs in stainless steel. Seals in NBR. Positive action safety device in compliance with standard EN 12729. Complete with upstream, intermediate and downstream pressure test ports and discharge tundish with collar fitting to pipe.
- Y strainer. Body in cast iron GG 25. Epoxy resin coated. Mesh in stainless steel. Filter mesh: 0,7 mm (DN 50-DN 65), 0,9 mm (DN 80-DN 100). Complete with 1/2" F discharge valve connection.
- Upstream and downstream shut-off valves. Body in ductile iron GGG 40. Epoxy resin coated. Control spindle seal in NBR.

Series 5750

The periodical (annual) control instrumentation consists of the following:
upstream pressure gauge 0÷10 bar; downstream pressure gauge 0÷10 bar; differential pressure gauge 0÷1.000 mbar; flexible hoses and connectors to pressure test ports; instrument case.

CALEFFI

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