Non-controllable backflow preventer with different pressure zones, type CAa

573 series

01008/17 GB
replaces dp 01008/07 GB

ISO 9001 FM 21654

Function

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

This particular series of backflow preventers is certified as conforming to the performance requirements of the European standard EN 14367.

1.57/19918

Product range

573 series Non-controllable backflow preventer with different pressure zones, type CAa — sizes 1/2", 3/4"

Technical specifications

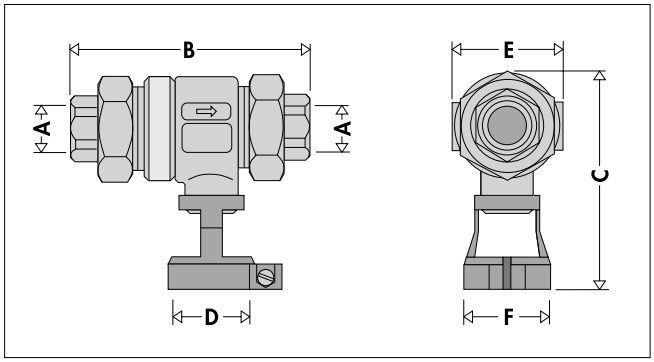
Materials

Body:	dezincification resistant alloy CR EN 12165 CW602N
Central obturator seat:	dezincification resistant alloy CR EN 12164 CW602N
Check valve body:	POM
Springs:	stainless steel
Diaphragm:	shaped NBR
O-Ring seals:	NBR
Seals:	asbestos-free NBR
Strainer:	stainless steel

Performance

Medium:	drinking water
Nominal pressure:	PN 10
Maximum working temperature:	65°C
Acoustic group:	II
Threaded connections:	1/2", 3/4" F with union

Dimensions



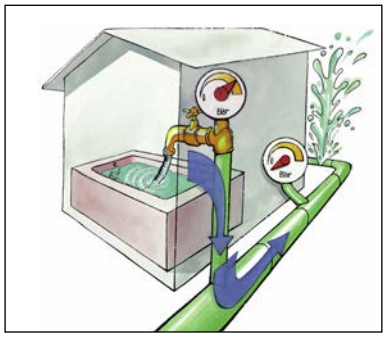
Code	A	B	C	D	E	F	Mass (kg)
573400	1/2"	119,5	113,5	Ø 40	54	Ø 44	1,3
573500	3/4"	119,5	113,5	Ø 40	54	Ø 44	1,3

Backflow

Drinking water 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 than that in the plumbing circuit receiving the supply (back siphonage). 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 plumbing circuit receiving the supply rises (back pressure) due, for example, to water being pumped from a well.

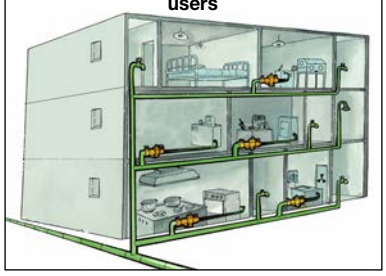


Risk assessment

Given the potential dangers of the phenomenon and the requirements of current regulations, the risk of pollution caused by backflow must be assessed on the basis of the type of system and the characteristics of the fluid 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 supply line 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 mains supply or in the internal plumbing 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 building with multiple users



Use of type CA backflow preventers - European reference standards EN 1717 and EN 14367

Proper use of the type CA backflow preventer is regulated by the new European regulations on prevention of pollution from Backflow.
The reference standard is *EN 1717: 2000 "Protection against pollution of potable water in water 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: Fluid 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: Fluid that represents a slight health risk due to the presence of one or more harmful substances.

Category 4: Fluid 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: Fluid 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 plant systems.
CA type backflow preventers are used to protect against risk of contamination by waters of up to category 3. For water of category 4, it is necessary to use a backflow preventer of type BA For category 2 water, it is sufficient to use an EA type controllable check valve or an EC type controllable double check valve.

The table given below, named "Protection matrix", associates the various types of system with the relative categories of fluid, and has been drawn up based on the indications provided in the European regulations
The new European standard EN 14367 – *"Devices to prevent pollution by backflow of potable water. Non-controllable backflow preventer with different pressure zones. Family C – Type A"* establishes the functional, dimensional and mechanical features that must be satisfied by non-controllable backflow preventers with different pressure zones, type CA.

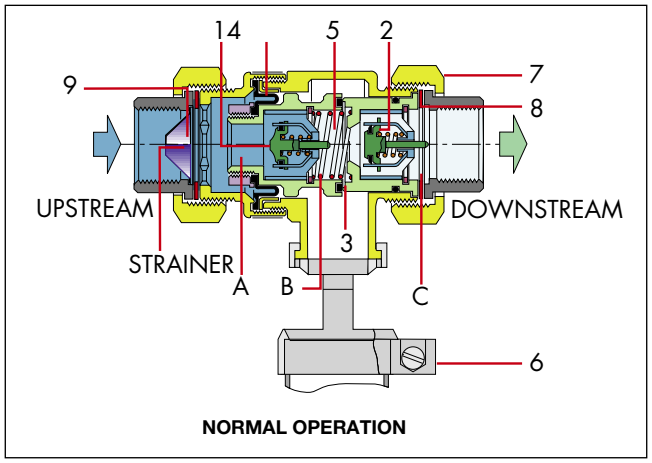
Protection matrix		
System type	**Fluid cat.**	
	2	3
General		
Hot and cold water mixing devices in domestic water systems	*	
Water cooling devices for air conditioning units, without additives	*	
Sterilisers for packaged or disinfected materials	*	
Water in primary domestic heating system circuits, without additives	*	
Domestic, residential or commercial gardens		
Hand-held fertiliser sprayers for use in domestic gardens		*
Watering systems, without fertilisers or insecticides, with sprinkler fixed to the ground at a depth of not more than 150 mm	*	
Water softeners		
Domestic water softeners regenerated with common salt *		
Commercial water softeners (only regenerated with common salt)		*
Commercial applications		
Automatic dispensers **with** injection of ingredients or CO_2		*
Automatic dispensers **without** injection of ingredients or CO_2	*	
Machines to wash out drink distribution pipes in restaurants		*
Hairdresser rinsing systems	*	
Medical		
X-ray machine cooling systems	*	
Food applications		
Ice-making machines	*	
Large kitchen machines with automatic filling systems	*	
Household applications		
Water in sinks, baths and showers	*	
Domestic dishwashers and washing machines		*
Flexible pipes with controlled flow spray nozzles or stop cock		*
Domestic dialysis machines		*

Operating principle

The CA type non-controllable backflow preventer with different pressure zones includes: 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). The discharge device (3) is located in the intermediate zone. The discharge device (3) is connected directly to the diaphragm (4). This mobile assembly is opened and closed by the difference in pressure between upstream and downstream of the check valve and by the counter spring (5).

Correct flow conditions

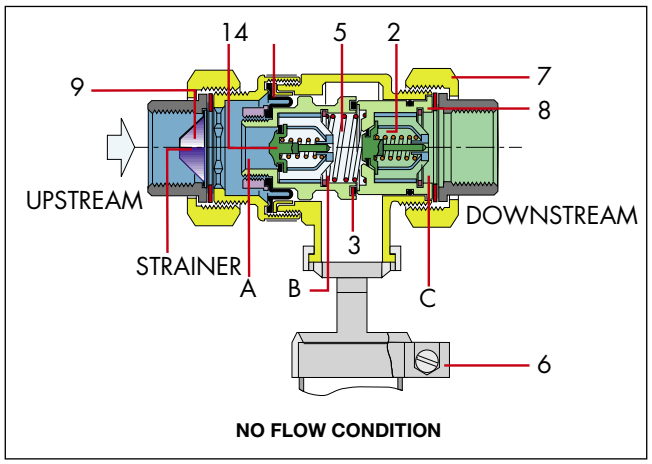
Under correct conditions of flow, both check valves are open, while the pressure in the intermediate chamber (B) is always lower than the pressure upstream (A) due to a calculated loss of head at the first check valve (1)
As a result, this pressure difference acts on the internal membrane (4) and generates a force that keeps the drain valve closed (3), communicating with the atmosphere, pressing on the counter spring (5).



NORMAL OPERATION

No flow conditions

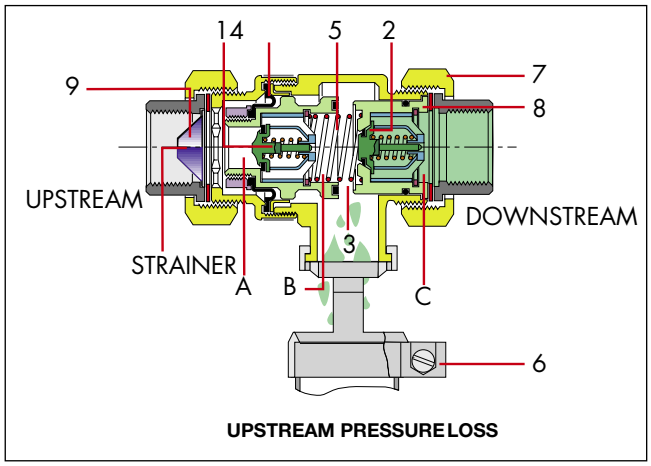
The check valves (1) and (2) are now closed. Due to the difference in pressure that still exists between the upstream zone (A) and the intermediate zone (B), the drain valve (3) remains closed.



NO FLOW CONDITION

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 pressure Δp, existing between the upstream (A) and intermediate (B) zones reaches a value just below the one pre-calculated for the counter spring (5). Drainage continues until the intermediate chamber of the backflow preventer is empty.
This creates a (safety) air zone and prevents the contaminated water of the circuit, coming from zone (C), from returning into the water distribution mains, also in case of check valve (2) failure.
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.



UPSTREAM PRESSURE LOSS

Downstream overpressure

If the pressure in the downstream zone (C) increases until it exceeds the upstream pressure value (A), the check valve (2) closes, thus preventing the water that has already been sent to the user from flowing back towards the water main.
Should check valve (2) have a slight sealing problem, or in general should any other malfunction occur in the backflow preventer, the latter will always shut off (disconnect) the connection between the user and the water main.
In fact the backflow preventer was designed with all the construction solutions required for a positive action device; the best possible safety conditions are therefore ensured under all conditions.

Construction details

Corrosion-proof materials

The materials used to manufacture the backflow preventers must be immune from corrosion caused by contact with potable water, and these characteristics must be maintained over time. For this reason, they are made using dezincification resistant alloy CR for the body (7), the central obturator seat (8) and the check valves (1-2), and stainless steel for the springs and strainer.

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 drinking water.

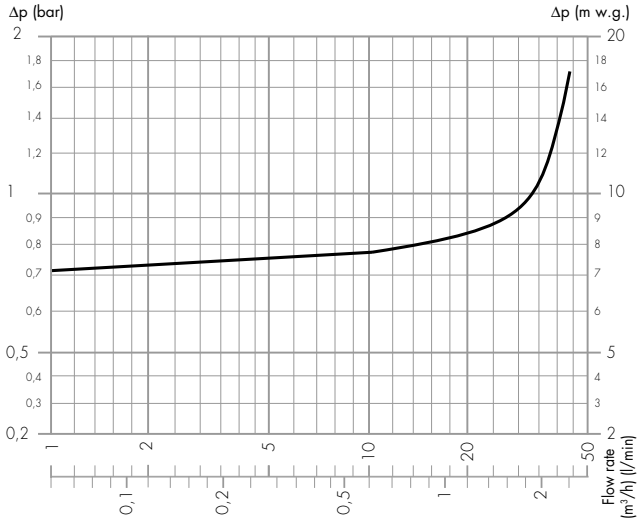
Stainless steel strainer

The backflow preventer is fitted with a stainless steel strainer (9) upstream, to prevent impurities or dirt from causing damage to the check valve seals (1-2) or the central obturator internal mechanism (8) over time.

Certification

The 573 series non-controllable backflow preventer with different pressure zones, type CA, class “a”, is certified as compliant with the specific national and European product standards laid down by the following Bodies: NF - SVGW - BELGAQUA - KIWA - ACS - VA.

Hydraulic characteristics

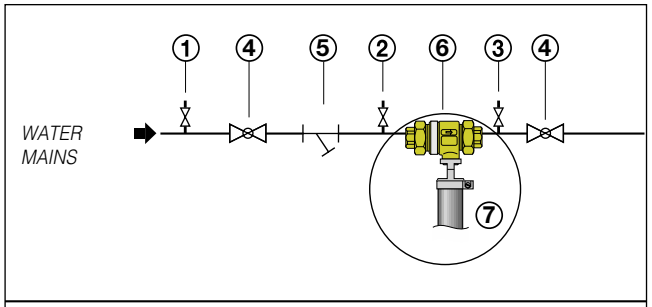


Installation

The backflow preventer must be installed horizontally after a shut-off valve upstream and an inspectable strainer; another shut-off valve must be installed downstream.

The unit must be installed in an accessible area that is large enough to prevent it getting submerged by any accidental flooding.

In addition there must be adequate waste pipe for medium drained from the unit to flow away.



1 Water mains control cock
2 Upstream control cock
3 Downstream control cock
4 Upstream/downstream shut-off valve
5 Y-strainer
6 Backflow preventer, 573 series with inspectable strainer at the inlet
7 Drain to sewer

Before installing the backflow preventer it will be necessary to clean the piping with a high-capacity jet of water Poor cleaning of the system can easily impair the operation of the unit.

For the protection of the public mains the disconnection unit must be installed after the water meter, whereas in order to protect the tap water 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.

Operating control procedure

1. Drain control operation When there are drops in pressure in the water supply mains, therefore upstream from the valve, the drain valve must open and let the water contained in the valve body run out.

   a. Close the shut-off valves upstream and downstream (4)
   b. Open the upstream control cock (2).

The water contained in the valve body should now flow out, indicating that the device has tripped and has opened the drain valve

2. Check the tightness of the second check valve. When back pressure is applied on the downstream side of the valve, the second check valve must close to prevent the water from flowing back:

   a. Close the shut-off valves downstream and upstream from the backflow preventer.
   b. Open the upstream control cock (2).
   c. Install a by-pass hose joining the control cock (1) to the other control cock (3) downstream and open them both to carry the mains pressure downstream of the second check valve.

No water must come out of the drain valve, thereby indicating that the second check valve does not leak

SPECIFICATION SUMMARY

Series 573

Non-controllable backflow preventer with different pressure zones. CAa type. To EN 14367. Connections 1/2" (and 3/4") F with union. Body and central obturator seat in dezincification resistant alloy. POM check valves body. Stainless steel springs and strainer. NBR shaped diaphragm and O-Ring seals. Non-asbestos fibre gaskets. Medium drinking water. Nominal pressure PN 10. Maximum working temperature 65°C. Acoustic group II.

Caleffi S.p.A.
S.R. 229 n. 25 · 28010 Fontaneto d'Agogna (NO) · Italy
Tel. +39 0322 8491 · Fax +39 0322 863723
info@caleffi.com · www.caleffi.com