Non-controllable backflow preventer with different pressure zones (CA type)

573 series

cert. n° 0003 ISO 9001

01008/07 GB

Function

The backflow preventer is a protective plumbing device capable of preventing backflow of polluted water into the mains water system. This type of backflow may occur due to changes in pressure in the distribution network that cause water to flow backwards. The preventer, which is fitted between the mains and the user system in water distribution systems, creates a safety separation area that prevents any contact between the water in the two systems.

This particular series of backflow preventers is certified as conforming to the performance requirements of standard NF P 43.009, with certification in progress according to standard EN 14367

Product range

Series 573 Non-controllable backflow preventer with different pressure zones, CA type — size 1/2", 3/4"

Technical specifications

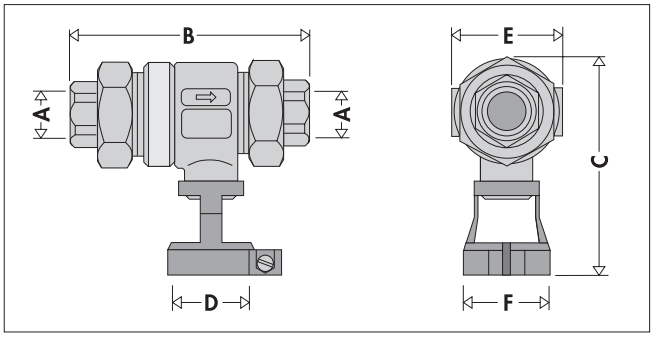
Materials

Body:	dezincification-resistant alloy CR EN 12165 CW602N
Seat of central obturator:	dezincification-resistant alloy CR EN 12164 CW602N
Check valve body:	POM
Springs:	stainless steel
Diaphragm:	shaped NBR
O-Ring seals:	NBR
Gaskets:	non asbestos NBR
Strainer:	stainless steel

Performance

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

Dimensions



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

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:

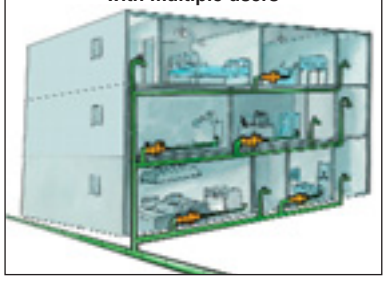
a) the pressure in the mains system is less that in the plumbing circuit receiving the supply (back syphonage). This situation may occur when there is a pipe breaking in the mains system or when demand on the mains supply from consumers is very heavy.
b) the pressure in the plumbing circuit receiving 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 users



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

Proper use of the CA type backflow preventer is regulated by the new European standards on prevention of pollution from backflow.
The reference standard is *EN 1717: 2000 "Protection against polution of drinking water in water systems and general requirements for the devices used 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 used for human consumption provided by a water company.

Category 2: Fluid that does not present health hazard, as per 1, the quality of which has been compromised due to changes in temperature, taste, odour or appearance.

Category 3: Fluid that represents a slight health hazard due to the presence of one or more harmful substances.

Category 4: Fluid that represents a 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 that represents a severe health hazard due to the presence of microbiological or viral elements.

According to this classification, suitable backflow prevention devices must be inserted in water distribution 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 BA type. For water of category 2 on the contrary it is sufficient to use a controllable check valve of EA type or a controllable double check valve of EC type.

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 standards.
Standard NF P 34.009 and 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 requirements that must be satisfied by non-controllable backflow preventers with different pressure zones of CA type.

Protection matrix

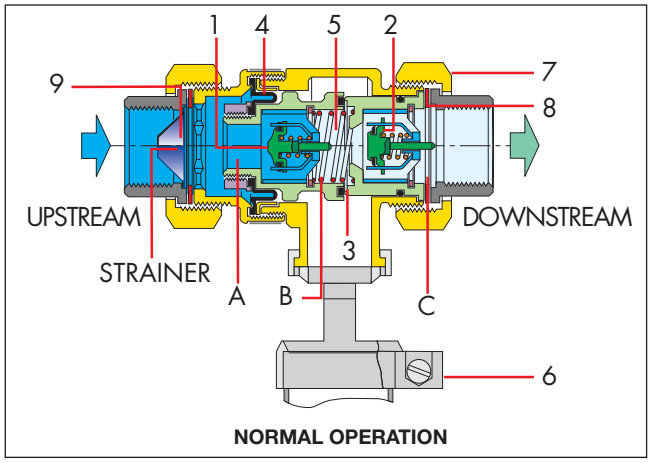
Type of plant	**Fluid cat.**	
	2	3
General		
Hot and cold water mixing devices in domestic water systems	*	
Water cooling devices for air conditioning units, without additives	*	
Sterilisers for packed or disinfected materials		*
Water in primary domestic heating system circuits, without additives		*
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	*	
Medicine		
X-ray machine cooling systems	*	
Food applications		
Ice-making machines	*	
Large kitchen machines with automatic filling system	*	
Domestic applications		
Water to 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 non-controllable reduced pressure zone backflow preventer, CA type comprises: a check valve upstream (1); a check valve downstream (2); a discharge device (3).
The two check valves mark the limits of three different zones, in each of which there is a different pressure: upstream or inlet area (A); intermediate zone, also known as the zone of different pressure (B); 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 conditions of flow

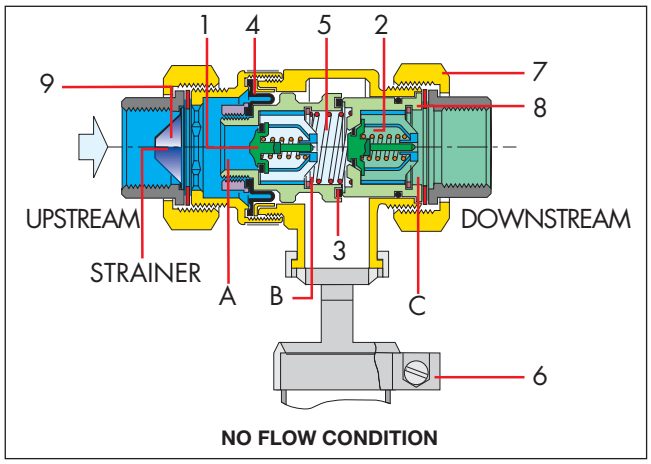
Under correct conditions of flow, both check valves are open, while the pressure in the intermediate chamber (B) is always lower than the pressure upstream (A) due to a calculated loss of head at the first check valve (1).
As a result, this pressure difference acts on the internal diaphragm (4) and generates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



NORMAL OPERATION

No flow conditions

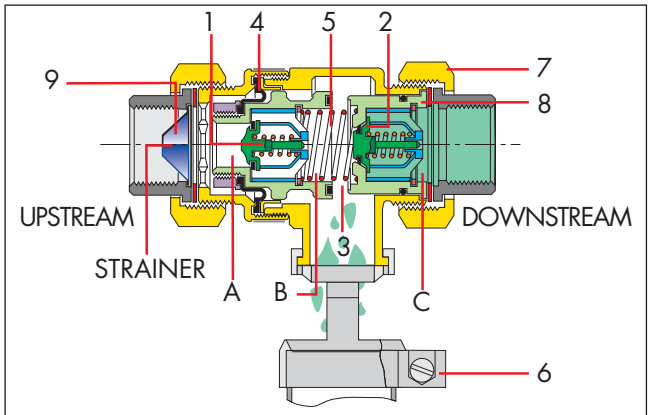
The check valves (1) and (2) are now closed. Due to the difference in pressure that still exists between the upstream zone (A) and the intermediate zone (B), the discharge valve (3) remains closed.



NO FLOW CONDITION

Upstream pressure loss

As the pressure upstream decreases, both the check valves close. The discharge valve (3) opens at the moment in which the difference in pressure Δp, existing between the upstream (A) and intermediate areas (B) reaches a value just below the one 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 if the downstream check valve (2) fails.
When the situation returns to normal (upstream pressure higher than the downstream pressure), the discharge valve closes again and the backflow preventer is once again ready to work.



UPSTREAM PRESSURE LOSS

Downstream pressure increase

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 problem with seal, 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.
The backflow preventer has been made with all the constructional features typical of positive acting devices; this means it ensures that optimum safety conditions are maintained in all situations.

Construction details

Corrosion-proof materials

The materials used to manufacture the backflow preventers must be insensitive to corrosion caused by contact with drinking water, and these characteristics must be maintained over time. For this reason, they have been 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 regulations regarding compatibility for use with drinking water.

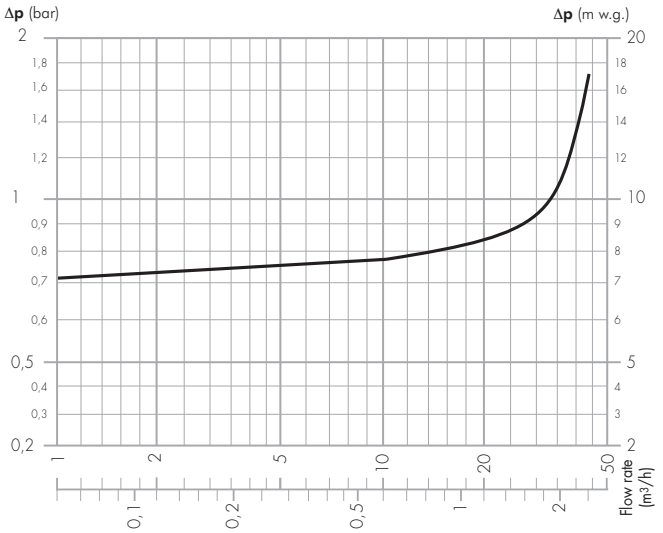
Stainless steel strainer

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 non-controllable backflow preventer with different pressure zones CA type 573 series is certified as in compliance with the specific national and European product requirements by the following Bodies: NF - SVGW - BELGAQUA - KIWA - SITAC - ACS.

Hydraulic characteristics

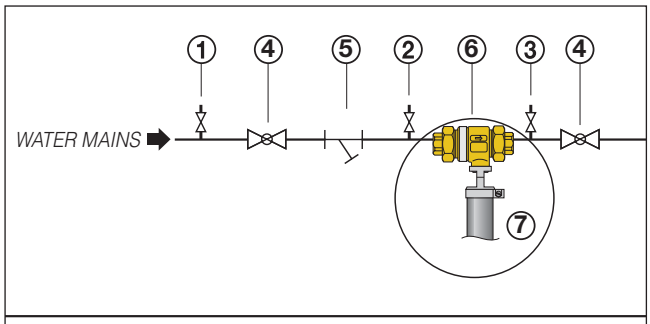


Installation

The backflow preventer unit must be installed horizontally after a shut-off valve upstream and an inspectable filter; 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 series 573 with inspectable filter at 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 seal 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 disconnection unit.
   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 SUMMARIES

573 series

Non-controllable backflow preventer with different pressure zones. CA Type. Complies with NF P 43.009.
Connections 1/2" (and 3/4") F with union. Body and seat of central check valve in dezincification-resistant alloy. POM check valve 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.

CALEFFI

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