

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



573 series



01328/16 GB



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.



Product range

573 series Non-controllable backflow preventer with different pressure zones, type CAa _____ sizes DN 15 (1/2"), DN 20 (3/4")

Technical specifications

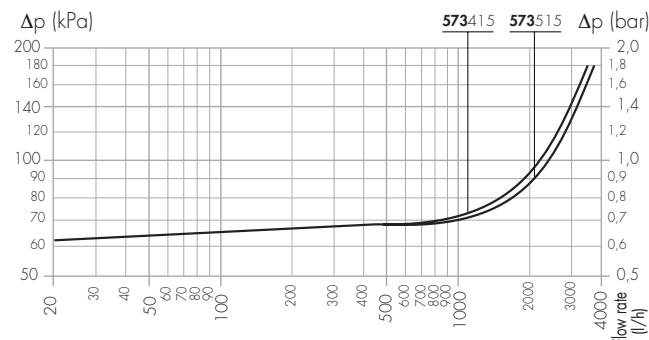
Materials

Body: brass EN 12165 CW617N
 Seat of central obturator and check valves: dezincification resistant alloy **CR**
 EN 12164 CW724R
 Check valve body: PSUG20
 Springs: stainless steel EN 10270-3 (AISI 302)
 Membrane: EPDM
 O-Ring seals: EPDM
 Seals: NBR
 Strainer: stainless steel EN 10088-2 (AISI 304)

Performance

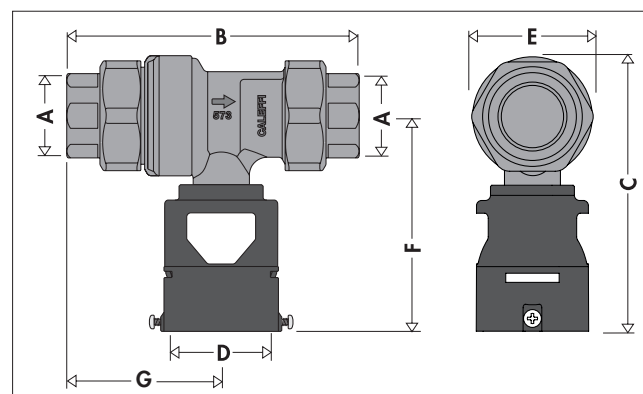
Medium: potable water
 Nominal pressure: PN 10
 Maximum working temperature: 65°C
 Acoustic group: II
 Conforms to standards: EN 14367
 Certification: NF, ACS, KIWA, BELGAQUA, SVGW, SITAC
 Threaded connections: 1/2", 3/4" F (ISO 228-1) with union

Hydraulic characteristics



Code	573415	573515
Size	DN 15	DN 20
Connections	1/2"	3/4"
G (m³/h) with Δp = 1 bar	2,2	2,4

Dimensions



Code	DN	A	B	C	D	E	F	G	Mass (kg)
573415	15	1/2"	114,5	108	Ø 40	47,8	84,4	60,5	0,73
573515	20	3/4"	114,5	108	Ø 40	47,8	83,9	60,5	0,73

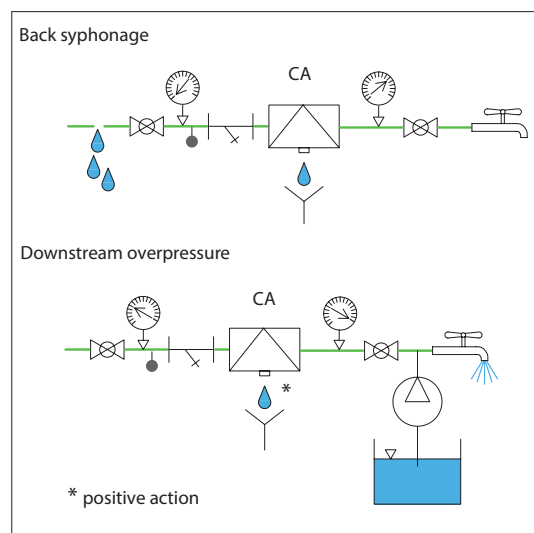
Backflow

Potable water, flowing in the mains supply network, may suffer from hazardous pollution mainly caused by the return of contaminated medium from downstream systems directly connected to the main supply. This phenomenon, termed "backflow", occurs when:

- the pressure in the mains system is lower than the pressure in the downstream hydraulic circuit (back syphonage). This situation may occur when there is a pipe breaking in the mains system or when demand on the mains supply network by consumers is very heavy.
- the pressure in the downstream circuit rises (counter pressure/downstream overpressure) due, for example, to a water inlet pumped from a well.

Risk assessment

Given the potential danger of the phenomenon and the requirements of current regulations, the risk of pollution by backflow must be assessed on the basis of the type of system and the characteristic of the medium 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 supply Company. The device must be located along the supply line at those points at risk of backflow which would be hazardous to human health.



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

The use of the CA type backflow preventer is regulated by European regulations concerning the prevention of water pollution by 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".

This standard classifies the water in the systems 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 representing some human health hazard 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 circuits.

CA type backflow preventers are used to protect against risk of contamination by waters of up to category 3. For category 4 water, use a BA type backflow preventer. 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 below, called the "Protection matrix", associates the various types of system with the related fluid categories, and was created based on the indications provided in European standard EN 1717 and in Local Regulations. The table is not comprehensive, and checks should be conducted at the time of application to ensure compliance with any local standards or regulations.

European standard EN 14367 – "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.

According to product standard EN 14367, CA type backflow preventers are further subdivided into classes "a" and "b" according to the following technical requirements:

- backflow preventers in Family C, Type A, class "a", for general use, shall be capable of working at any pressure up to 1 MPa (10 bar), with any pressure variation up to 1 MPa (10 bar), at a supply temperature limit of 65°C and 90°C for one hour;
- backflow preventers in Family C, Type A, class "b", for specific use, shall be capable of working at any downstream pressure up to 0,3 MPa (3 bar) and with any downstream pressure variation up to 0,3 MPa (3 bar). CAb type backflow preventers, with specific hydraulic characteristics but no acoustic requirements, are intended for use as charging units in boilers for heating or heating/domestic hot water production. Such boilers can have a maximum power output of 70 kW and maximum working temperature of 110°C.

Protection matrix		
System type	Fluid category	
General	2	3
Hot and cold water mixing devices in domestic water systems		*
Water cooling devices for air conditioning units, without additives		*
Filling of heating systems without additives		*
Domestic water softeners regenerated with common salt		*
Commercial water softeners (only regenerated with common salt)		*
Water in sinks, bathtubs and showers		*
Domestic dishwashers and washing machines		*
Domestic or residential gardens		
Hand-held fertiliser sprayers for use in domestic gardens		*
Catering		
Automatic water dispensers without addition of ingredients or CO ₂	*	
Ice-making machines	*	
Large kitchen appliances with automatic filling systems	*	
Medical		
Domestic dialysis machines		*

Operating principle

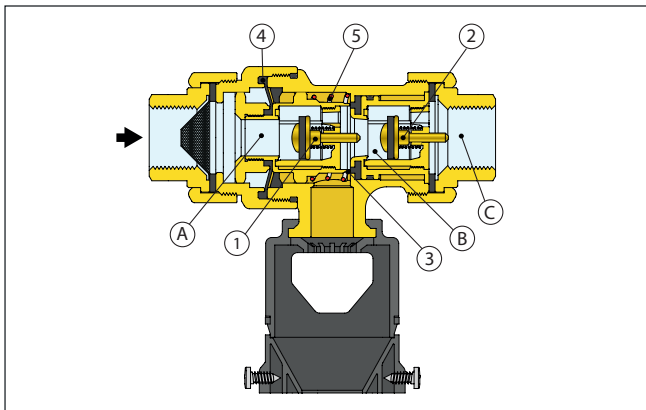
The CA type non-controllable backflow preventer with different pressure zones includes: an upstream check valve (1), a downstream check valve (2), a discharge device (3).

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

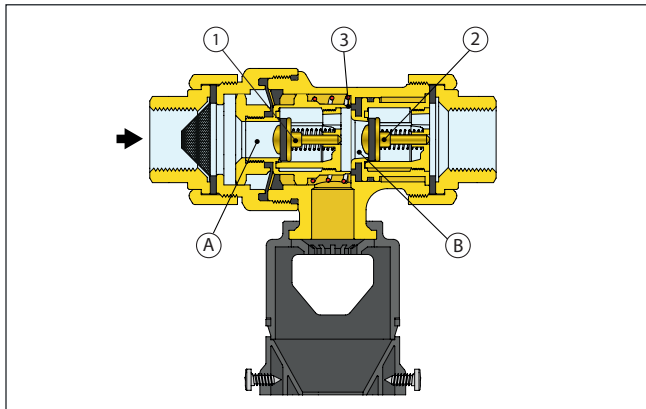
Under correct conditions of flow, both check valves (1 and 2) are open, while the pressure in the intermediate chamber (B) is always lower than the pressure upstream (A) due to a pre-calculated head loss at the first check valve (1).

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).



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.

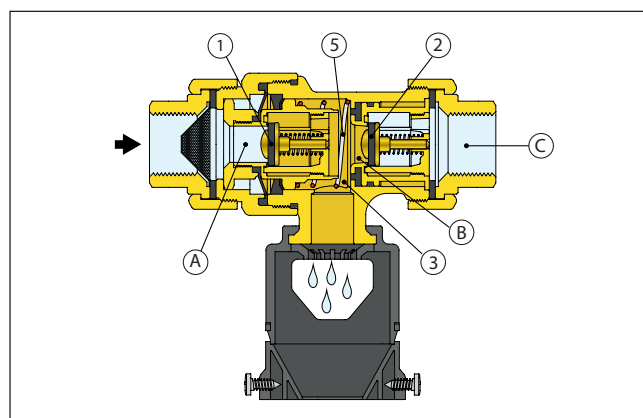


Upstream pressure loss

Both check valves (1 and 2) 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.



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

Dezincification resistant material with very low lead contents (Low Lead).

The material used to make the backflow preventer parts in contact with water is perfectly in line with normative provisions concerning contact with potable water. This is an alloy with very low lead contents and dezincification resistant properties.

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 for the parts in contact with water, 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 potable 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.

Discharge tundish

In compliance with standard EN 1717, backflow from the connected pipe must be prevented during water discharge from the backflow preventer, and discharge must occur without any water sprinkling to the outside. 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 suitable flow conveyor.

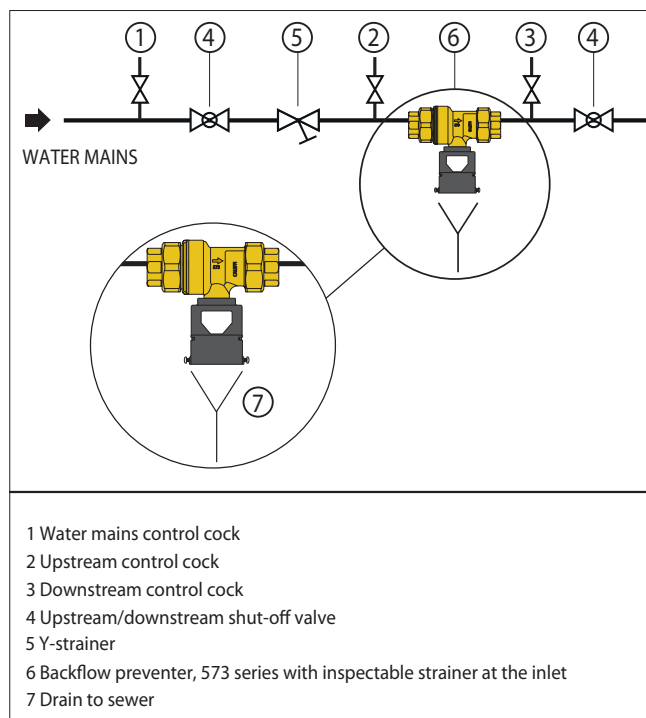
Certification

The 573 series non-controllable backflow preventer with different pressure zones, type CA, class "a", is certified as compliant with national and European product requirements by the following certifying body: NF, ACS, KIWA, BELGAQUA, SVGW, SITAC.

Installation and maintenance procedures (operation check)

Installation

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



The unit must be installed in an accessible area that is large enough to prevent it getting submerged by any accidental flooding. The discharge valve must be appropriately connected to a drain.

For the protection of the public water mains the backflow preventer must be installed downstream of the water meter. In order to protect the domestic water outlets of the internal network it should be installed at the limit of the areas where there may be contamination, for example: filling of heating systems without additives, domestic washing machines and dishwashers, etc.

Before installing the backflow preventer flush the pipe with a high capacity flow rate: the lack of cleaning can easily result in impaired operation of the product.

According to EN 806-5, inspection procedures must be carried out once every six months. The maintenance (operation check) procedures should be carried out at least once a year.

Inspection

Check for possible changes in the use of the water downstream from the device and the suitability of the unit to protect the water mains. Check accessibility to the protection unit, ventilation of the place of installation, that the installation position is not subject to immersion in the case of flooding, protection against frost and excessively high temperature conditions.

Check functionality of the components of the protection unit (valves, strainer, pressure test ports), vertical positioning of the drain, the distance of the device from the drainage conveyance system and the surface conditions (corrosion or deterioration).

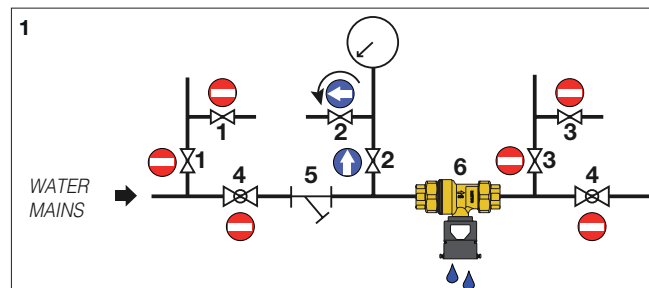
Any potential backflow can be no greater than the device's drainage capacity: also check the ability of the drainage circuit to receive the discharged water and the presence of water in the syphon, if fitted.

Maintenance (operation check)

1. Discharge checking operation (disconnection).

A pressure drop in the water mains upstream of the valve must cause the drain valve to open, with consequent emptying of the water contained in the valve body:

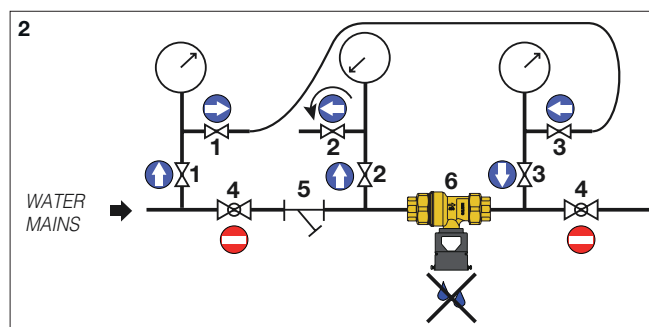
- Close the shut-off valves upstream and downstream (4) of the backflow preventer.
- Open the control cock (2) to lower the upstream pressure. The device should react by opening the drain valve to discharge the water contained in the valve body.



2. Check the tightness of the second check valve.

In case of counter pressure downstream of the backflow preventer, the second check valve must close to prevent reverse flow of the water:

- Close the shut-off valves upstream and downstream (4) of the backflow preventer.
- Open the control cock (2) to lower the upstream pressure.
- Install a by-pass hose to connect control cock (1) to control cock (3) downstream: open both cocks to carry the mains pressure downstream of the second check valve. If, after having emptied the intermediate chamber, there is no more water discharge from the drain valve, this means that the second check valve is working correctly.



If symptoms of incorrect operation persist after having performed the checking procedure described above, the entire backflow preventer must be replaced with a new device, since it is not possible to access the internal components to replace individual parts.

SPECIFICATION SUMMARY

Series 573

Non-controllable backflow preventer with different pressure zones. Type CAa. To EN 14367 standard. Connections 1/2" (and 3/4") F with union. Brass body. Central obturator seat and check valve in dezincification resistant alloy. Body of check valves in PSUG20. Stainless steel springs and strainer. EPDM shaped membrane and O-ring seals. NBR seals. Medium drinking water. Nominal pressure PN 10. Maximum working temperature 65°C. Acoustic group II.

We reserve the right to make changes and improvements to the products and related data in this publication, at any time and without prior notice.