

Under-boiler polyphosphate dispenser Caleffi XP

5459 series



Function

The polyphosphate dispenser limits limescale formation in the domestic water system and in the devices connected to it. It is installed on the domestic cold water pipe supplying the instantaneous boiler. It helps to maintain the original heat exchange performance levels of the generator and heat exchanger in the DHW production circuit over time. It also combats corrosion and progressively cleans up systems which are already experiencing some limescale build-up, in addition to susceptible parts.

The dosage of polyphosphates in the water is proportional to the amount of cold water passing through the device.

Equipment for domestic use, for the treatment of potable water.

CONFORMS TO:

- Italian D.M. 25/2012 "Technical provisions concerning equipment designed for the treatment of water intended for human consumption"
- Italian D.M. 6th April 2004, no. 174.
- Article 9 of Italian Leg. Decree no. 31, 2001.

PATENT PENDING

Product range

Code 545950 Under-boiler polyphosphate dispenser complete with a polyphosphate crystal refill. _____ DN size 15 (1/2")
Code F0001503 Polyphosphate crystal refill.

Technical specifications

Materials

Body: brass EN 12165 CW617N, chrome plated
Fittings: brass EN 12165 CW617N, chrome plated
Hydraulic seals: EPDM
Ball: brass EN 12165 CW617N
Ball valve lever: PA66G30
Crystals: polyphosphate salts for potable water conforming to standard UNI EN 1208
Salt container: PA12
Dark-coloured pellets: EPDM

Connections

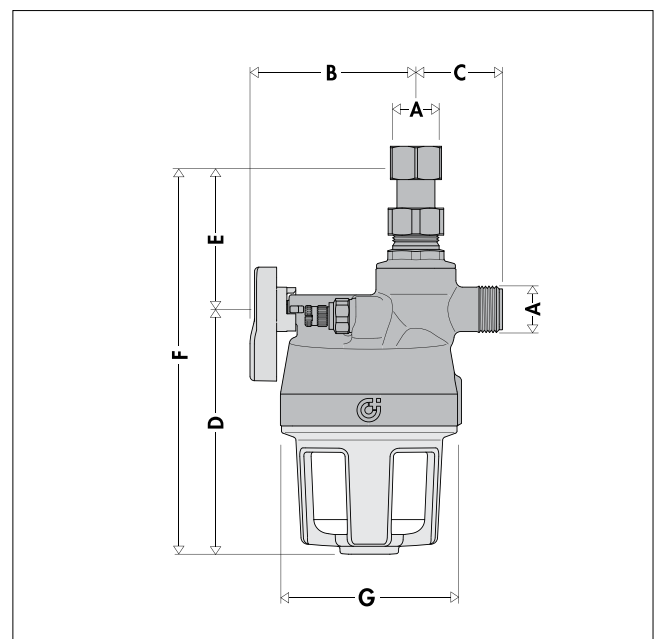
- boiler side: 1/2" M (ISO 228-1)
- cold water side: 1/2" M (ISO 228-1)
- fitting (supplied): 1/2" F - 1/2" F

Performance

Media: potable water for domestic use
Maximum working pressure: 6 bar
Working temperature range: 5-30 °C
Ambient temperature range: 5-40 °C
Maximum crystal refill contents: 140 g
Average crystal refill shelf life: 35-40 m³ domestic hot water (*)
(* data referring to water with an average hardness of 12°f, pH 7, temperature 20 °C and average domestic hot water usage.

We do not recommend heating domestic hot water to over 70 °C, to avoid compromising the properties of the polyphosphates.

Dimensions



Code	A	B	C	D	E	F	G	Mass (kg)
545950	1/2"	75	39	110	63	173	Ø80	1,2

Operating principle

Scaling is the result of calcium and magnesium (the salts that cause hardness) becoming deposited on the pipe walls, heat exchanger surfaces and control and regulation components.

The amount of deposit depends on:

- the water temperature
- the water hardness
- the volume of water used.

Unlike other salts, calcium and magnesium salts become less soluble as temperature increases. For this reason, all systems in which water is heated, especially those used for domestic hot water production, are at risk of scaling.

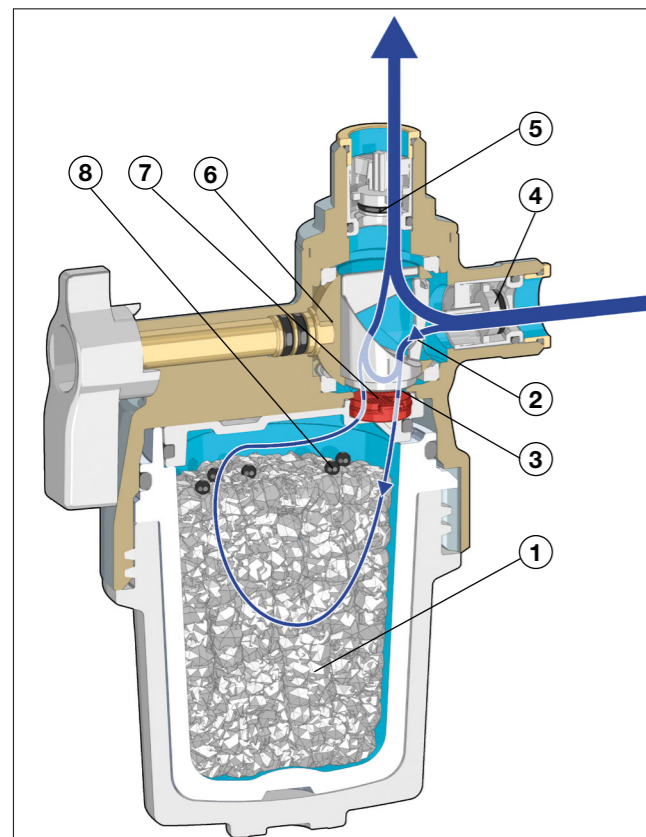
The parameter to monitor is the total hardness, the sum of the concentration of calcium and magnesium ions responsible for scaling. Calcium and magnesium bicarbonates are chemically balanced with the calcium and magnesium carbonates, water and carbon dioxide.

As temperature increases, the soluble bicarbonates become insoluble carbonates, forming limescale and releasing carbon dioxide.

Sodium and potassium polyphosphates (food polyphosphates) inside the container (1) combine with calcium and magnesium ions (in the water) to form a chemical compound similar to limescale but which cannot adhere to piping surfaces.

A shielding is then formed which prevents the precipitation of calcium and magnesium and the consequent formation of limescale deposits. The polyphosphates, moreover, get deposited on the surface of the pipes forming a protective film to protect them from scaling and to eliminate the limescale already deposited.

The use of polyphosphates is classed as a chemical conditioning treatment (as expressed in UNI 8065) which is based on the dispensing of salts in proportion to the amount of cold water passing through the device, without changing the water hardness.



- 1) Polyphosphate crystals
- 2) First Venturi
- 3) Second Venturi
- 4) Upstream check valve
- 5) Downstream check valve
- 6) Ball shut-off valve
- 7) Strainer
- 8) Dark-coloured pellets: (refill indicators)

Normative references for using chemical additives in domestic hot water

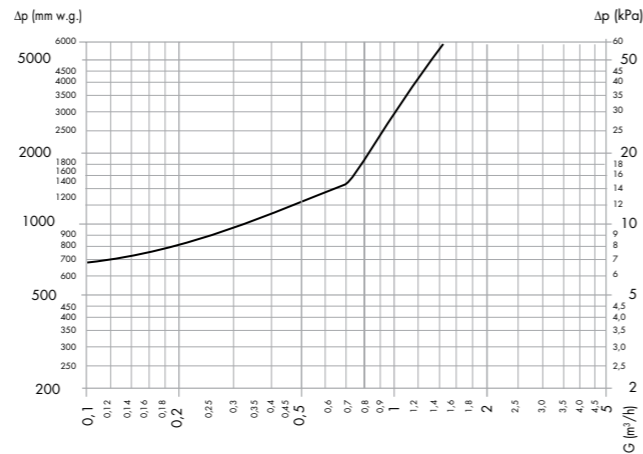
The **Ministerial Decree dated 26th June 2015**, Annex 1 to chapter 2.3.5, introduced the chemical treatment requirement for every type of system, actually reads:

"In relation to the quality of the water used in thermal systems for winter climate control, with or without domestic hot water production, without prejudice to the application of technical standard UNI 8065, a chemical conditioning treatment is always required".

Technical standard UNI 8065:2019, in chapter 7.3.1, specifies that, regardless of the hardness value and the potential of the domestic hot water production system, chemical conditioning treatments are compulsory, for both new and existing systems. A softening treatment is also compulsory for a firebox heating capacity over 100 kW and a total hardness over 15 °f.

Chemical additives must be measured out to obtain the desired effects without compromising potability requirements in any way.

Hydraulic characteristics



Construction details

Double Venturi proportional dosage

To keep the polyphosphate dosage efficient, dispensing must take place continuously and in a controlled manner, both with the minimum flow rate at the tap and with a variable water flow rate. This dosage maintains the protective film on the pipes and combats the precipitation of salts.

The Caleffi double Venturi proportional dispensing system features full mechanical operation and does not require an electric supply. Part of the inlet water flow passes through the first Venturi (2) and only a minimal part passes through the second Venturi (3).

This innovative **double Venturi proportional dispensing system** allows a very precise dosing of polyphosphates, just underneath the average value of 5 mg/l (expressed as P₂O₅).

Design

The special white and chrome-plated finish means that the dispenser easily adapts to the domestic environment. Its very small dimensions make it suitable for installation on most wall-mounted boilers, regardless of whether they are installed in new or renovated systems. It can be installed underneath the boiler, next to the 5459 series magnetic dirt separator strainer.



Check valve

As required by current regulations, the dispenser has two check valves: one at the inlet (4), upstream of the shut-off ball (6), to ensure the non-return of the water treated in the system and one downstream (5), to limit the dispersion of salts inside the pipes in the case of prolonged inactivity.

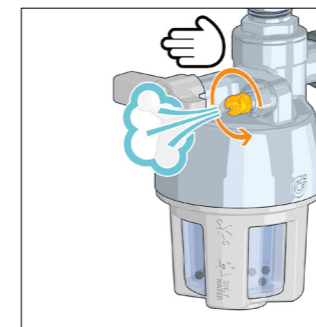
Shut-off valve

The special shape of the shut-off valve makes it possible to refill the polyphosphates and clean the internal elements by draining just the water inside the salt container, without having to ass other shut-off elements.



Air vent

The air vent makes it possible to eliminate air from the container while refilling the polyphosphates and to lower the pressure inside the device before refilling takes place.

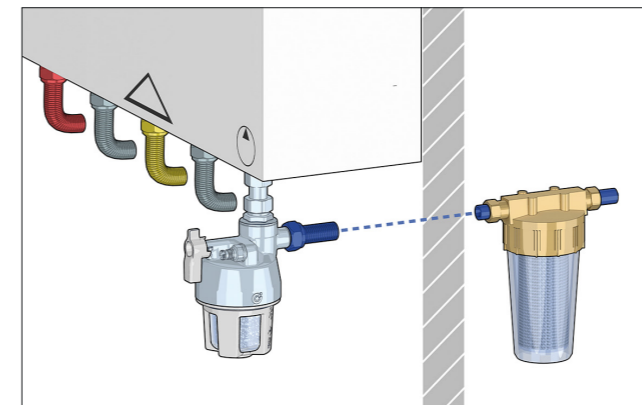


Installation

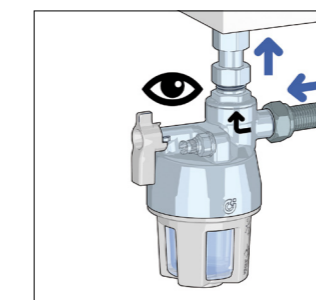
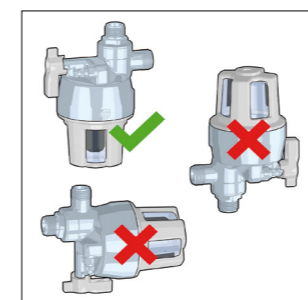
The polyphosphate dispenser is installed on the cold water pipe supplying the systems requiring protection.

We recommend installing a domestic water strainer on the supply line, upstream of the dispenser. Sand and impurities in the dispenser strainer may affect the proper dosage and consumption of salts.

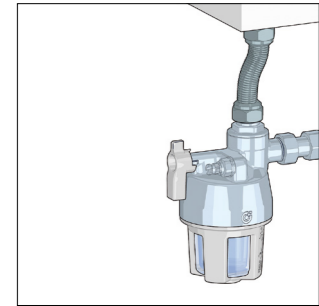
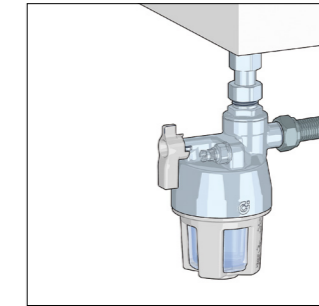
Check whether its is necessary to use a water hammer arrester device to protect the polyphosphate dispenser.



The dispenser must only be installed vertically and not upside down, observing the flow direction indicated by the arrows on the valve body. Do not install the polyphosphate dispenser in areas which may be subject to frost, or where it would be directly exposed to atmospheric agents.



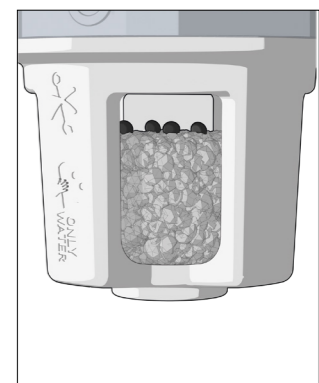
The tailpiece with captive nut provided allows the device to be connected directly to the boiler. Alternatively, the device can be connected using a hose fitting.



Polyphosphate refill

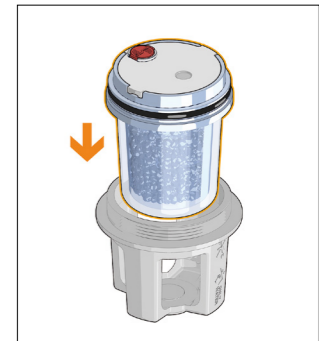
The polyphosphate fill status can be checked easily through the clear windows, which can be used to check the level of the dark-coloured pellets (8). If the fill level is over 60 % of the total volume, the dark-coloured pellets may not be visible, as they are located at the top.

Refilling is required when the dark-coloured pellets are deposited at the bottom of the salt container.



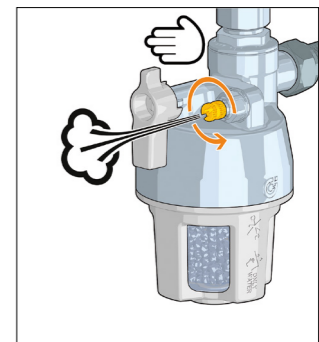
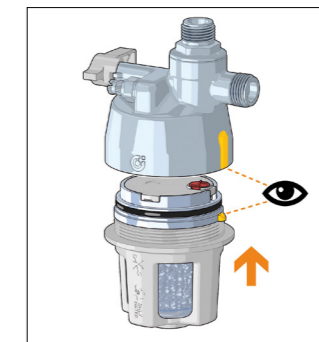
To carry out the refill procedure, simply:

- 1) Pour the polyphosphate crystals into the container and fill to the top with water.
- 2) Fit the cover and position the salt container in the container support.



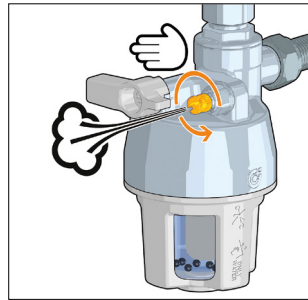
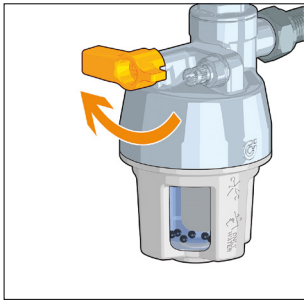
- 3) Fit the salt container into the valve body, making sure the notches are positioned correctly.

- 4) Screw the salt container support onto the valve body by hand and open the shut-off valve. Purge the air in the salt container using the purge cap.



Maintenance

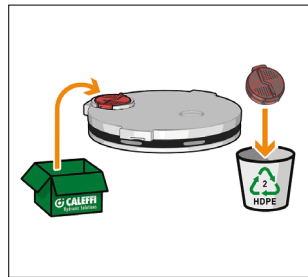
Always carry out maintenance operations after closing the shut-off valve and discharging the pressure using the purge cap. Prevent any dripping using a suitable collection tool.



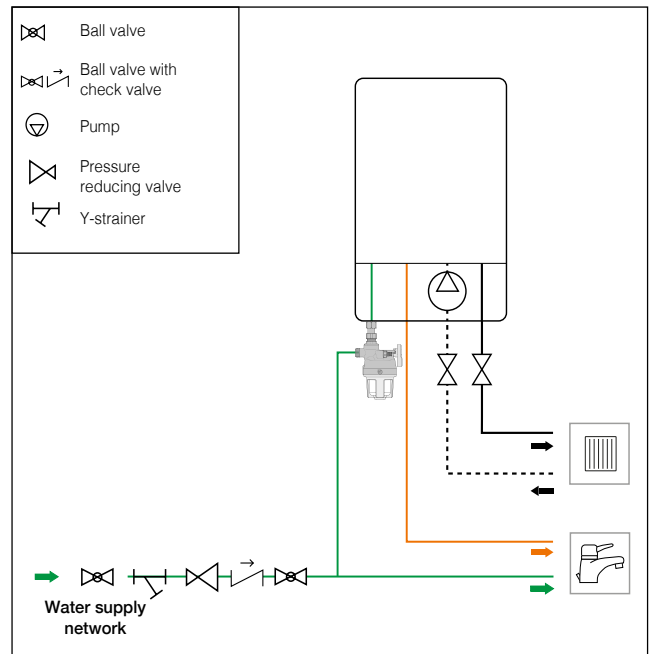
During refilling, replace the internal strainer to ensure correct product operation.

Only use a cloth dampened with water to clean the polyphosphate dispenser and the boiler or its accessories.

DO NOT USE ALCOHOL, CHEMICAL PRODUCTS OR DETERGENTS of any type.



Application diagram



Maintenance after extended stoppage periods

Stoppage > 1 week

After a period of inactivity longer than 1 week, we recommend flushing with domestic hot water.

Stoppage > 6 months

After a period of inactivity longer than 6 months, the salts inside the device must be replaced and the salt container washed thoroughly.

WARNINGS

This device needs regular maintenance in order to guarantee the potable water requirements for the treated water and to maintain the improvement features as declared by the manufacturer.

Caleffi only approves authentic spare cartridges code F0001503 for use in this device. The use of other products, in addition to invalidating the warranty, may seriously damage the dispenser; this presents a risk to the health of people and may compromise proper system operation.

Accessories



Polyphosphate crystal refill.
Complete with spare internal strainer.
For dispenser code 545950.

Code

F0001503 140 g

SPECIFICATION SUMMARY

Code 545950

Under-boiler polyphosphate dispenser Caleffi XP. Body made of chrome-plated brass EN 12165 CW617N, Fitting made of chrome-plated brass EN 12165 CW617N. Connections for boiler side 1/2" M (ISO 228-1), system return side 1/2" M (ISO 228-1), fitting (supplied) 1/2" F - 1/2" F. EPDM hydraulic seals. PA salt container. Ball made of brass EN 12165 CW617N. Ball valve lever made of PA66G30. Medium potable water for domestic use. Maximum working pressure 6 bar. Working temperature range 5–30 °C. Average crystal refill shelf life: 35–40 m³ of domestic hot water (data referring to water with an average hardness of 12°f, pH 7, temperature 20 °C and average domestic hot water usage). Complete with a polyphosphate crystal refill.

Code F0001503

Polyphosphate crystal refill for potable water compliant with standard UNI EN 1208, for dispenser code 545950. Complete with spare internal strainer. Contents 140 g.

We reserve the right to make changes and improvements to our products and the related technical data in this publication, at any time and without prior notice. The website www.caleffi.com always has the most up-to-date version of the document, which should be used for technical verifications.