

Scald Protection Three-Way Thermostatic Mixing Valve

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5213 Series

Installation, commissioning and servicing instructions



ASSE 1070

Function

Scald Protection Three-Way Thermostatic mixing valves are used in applications where the user must be protected from the danger of scalding caused by hot water.

The Caleffi 5213 series provides water at a safe and usable temperature in situations where the control of the temperature of the water discharging from a terminal fitting is of the utmost importance, i.e. within hospitals, schools, nursing homes, etc.

The valve is designed to prevent the flow of water discharging from the mixed water outlet in the event of the failure of hot or cold supply.

The Caleffi 5213 series is a high performance thermostatic mixing valve and is ASSE 1070 listed.

The valve is complete with check valve at both hot and cold inlets.

Product range

5213 series scald protection three-way thermostatic mixing valve.
Union thread NPT male connections, sizes 1/2", 3/4", 1";
Union sweat connection, size 1/2", 3/4", 1".

Technical characteristics

Materials:	- Valve body and Regulating Spindle:	low-lead brass (<0.25% Lead content)
	- Internal shutter:	PPO
	- Sealing elements:	EPDM
	- Cover:	ABS
Temperature adjustment range:		85–120°F (29–49°C)
Temperature set:		must be commissioned on site to achieve desired temperature
Temperature control:		±3°F (±2°C)
Cold inlet temperature:		Minimum 39°F (4°C); Maximum 85°F (29°C)
Hot inlet temperature:		Minimum 120°F (49°C); Maximum 185°F (85°C)
Maximum working pressure:		Static 140 psi (10 bar); Dynamic 70 psi (5 bar)
Minimum working pressure (dynamic):		1.5 psi (0.1 bar)
Maximum unbalanced dynamic supply (hot/cold or cold/hot):		6:1
Minimum temperature differential between hot water inlet and mixed water outlet to ensure thermal shutoff function:		18°F (10°C)
Minimum temperature differential between mixed water outlet and cold water inlet to ensure stable operation:		9°F (5°C)
Minimum flow rate for stable operation:		1 gpm (4 l/min)
Certified to:		ASSE 1070 Listed
Lead Plumbing Law Compliance:		(0.25% Max. weighted average lead content)
- Lead Plumbing Law Certified by IAPMO R&T		



SAFETY INSTRUCTION

This safety alert symbol will be used in this manual to draw attention to safety related instructions. When used, the safety alert symbol means **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED! FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN A SAFETY HAZARD.**



CAUTION: All work must be performed by qualified personnel trained in the proper application, installation, and maintenance of systems in accordance with all applicable codes and ordinances.



CAUTION: If the thermostatic mixer is not installed, commissioned and maintained properly, according to the instructions contained in this manual, it may not operate correctly and may endanger the user.



CAUTION: Make sure that all the connecting pipework is water tight.



CAUTION: When making the water connections, make sure that the mixer connecting pipework is not mechanically over-stressed. Over time this could cause breakages, with consequent water losses which, in turn, could cause harm to property and/or people.



CAUTION: Water temperatures higher than 100°F can be dangerous. During the installation, commissioning and maintenance of the thermostatic mixer, take the necessary precautions to ensure that such temperatures do not endanger people.



CAUTION: In the case of highly aggressive water, arrangements must be made to treat the water before it enters the thermostatic mixer, in accordance with current legislation. Otherwise the mixer may be damaged and will not operate correctly.

Leave this manual for the user.

Operating Principle

A thermostatic mixing valve mixes hot and cold water in such a way as to maintain constant set temperature of the mixed water at the outlet.

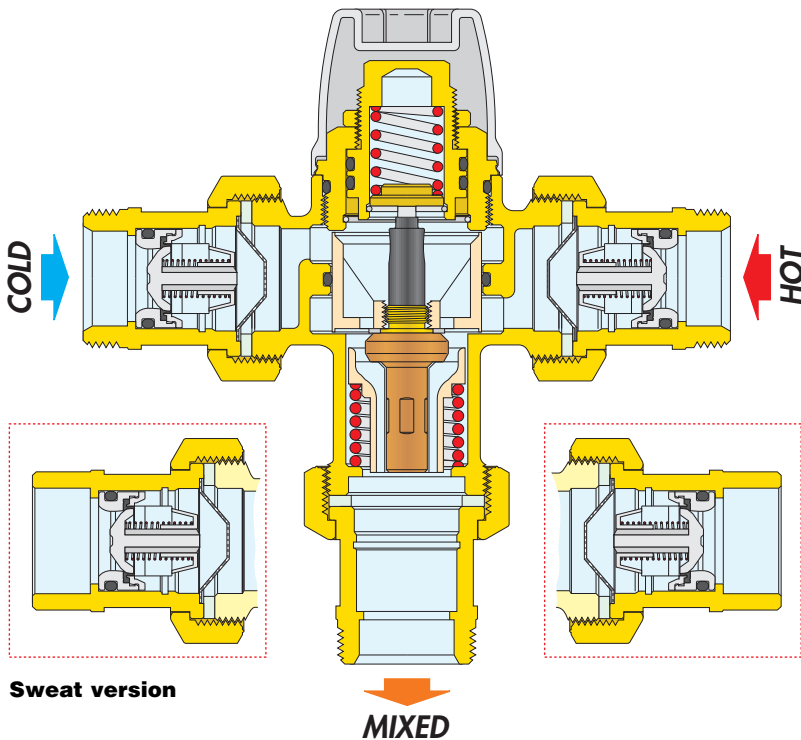
A thermostatic element is fully immersed into the mixed water. This element then contracts or expands causing movement of the piston, closing either the hot or cold inlets, regulating the flow rates entering the valve.

If there are variations of temperature or pressure at the inlets, the internal element automatically reacts to restore the original temperature setting.

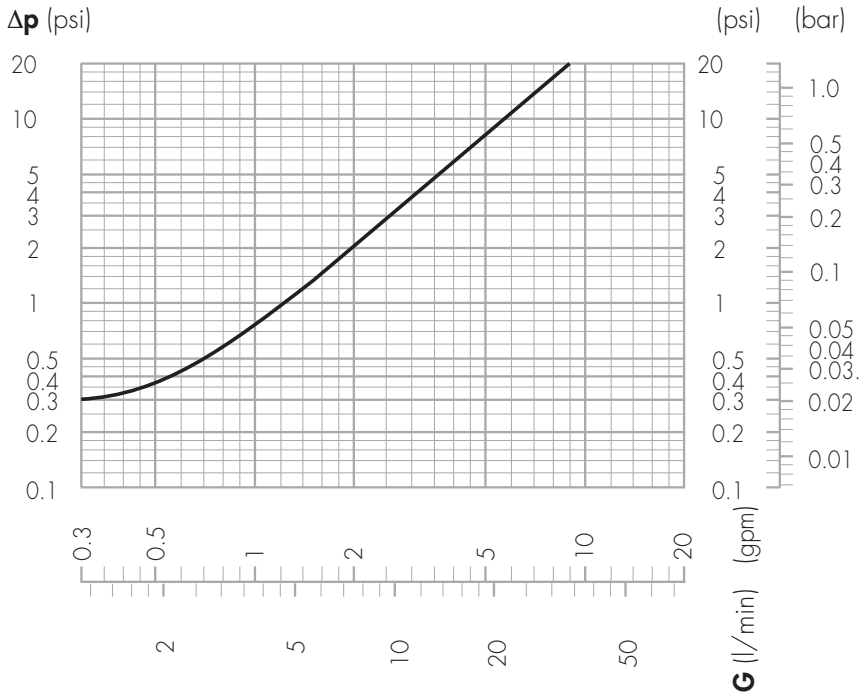
Thermal shutoff

In the event of a failure of either the hot or cold supply, the piston will shut off, stopping water discharging from the mixed water outlet.

The Caleffi valve requires a minimum temperature differential from hot inlet to mixed water outlet of 18°F (10°C) to ensure the correct operation of the thermal shutoff feature.



Flow rate graph



1/2", 3/4", 1" • Cv= 2 • Kv=1.7 (m³/h)

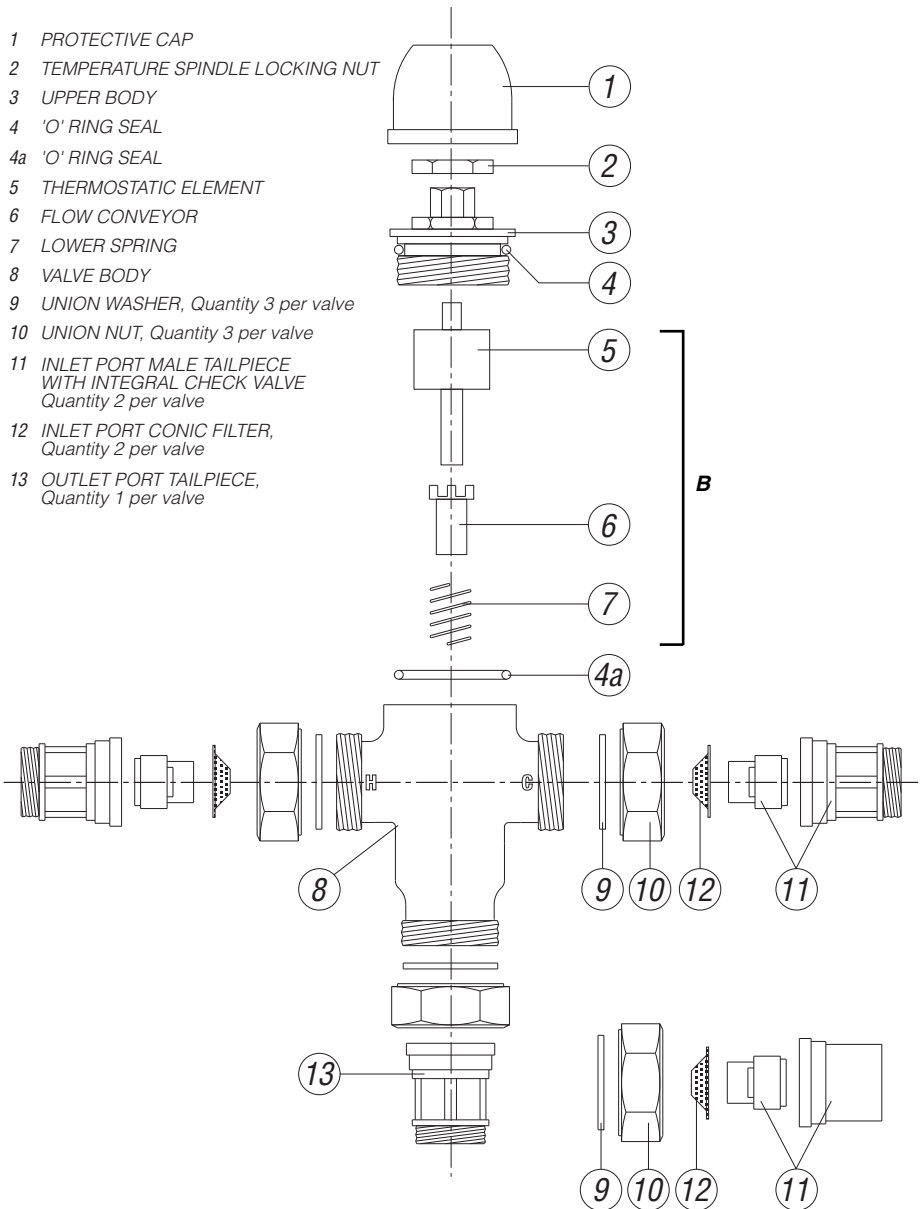
Flow rate-use

The Caleffi 5213 series is a thermostatic mixing valve suitable for **single or multiple point of use applications** in accordance with installation rules and indications specified in ASSE 1070 standards.

The system must be sized taking into account the current legislation with regard to the nominal flow rate of each outlet.

Exploded diagram

- 1 PROTECTIVE CAP
- 2 TEMPERATURE SPINDLE LOCKING NUT
- 3 UPPER BODY
- 4 'O' RING SEAL
- 4a 'O' RING SEAL
- 5 THERMOSTATIC ELEMENT
- 6 FLOW CONVEYOR
- 7 LOWER SPRING
- 8 VALVE BODY
- 9 UNION WASHER, Quantity 3 per valve
- 10 UNION NUT, Quantity 3 per valve
- 11 INLET PORT MALE TAILPIECE WITH INTEGRAL CHECK VALVE
Quantity 2 per valve
- 12 INLET PORT CONIC FILTER, Quantity 2 per valve
- 13 OUTLET PORT TAILPIECE, Quantity 1 per valve



Sweat version

Fittings table

Item number	Item description	Item Q.ty per Valve	1/2"		3/4"		1"	
			NPT 521342A	Sweat 521349A	NPT 521352A	Sweat 521359A	NPT 521362A	Sweat 521369A
9	Union Washer	3	R50055					
10	Union Nut 1"	3	R61008/C					
11	Inlet Male Tailpiece with Check Valve	2	59893A	59904A	59840A	59905A	59894A	59906A
12	Inlet conic filter	2	R52429					
13	Outlet Tailpiece	1	R31981	NA10002	R31901A	NA10003	59817A*	59834A*

*Tailpiece fitting with integral union nut - 1" NPT and Sweat models require only 2 separate 1" union nuts (item 10)

Installation

The following instructions must be read prior to the installation of a Caleffi valve 5213 series. The installer should also be aware of his responsibility and duty of care to ensure that all aspects of the installation comply with current regulations and legislation.

The Caleffi 5213 series should be installed using the appropriate Standard, Code of Practice and legislation applicable to each state and following the details in this manual.

The Caleffi 5213 series must be installed by a licensed plumber.

Prior to the installation of the Caleffi 5213 series valve, the system must be checked to ensure that the **system operating conditions fall within the recommended operating range of the valve, i.e. verify supply temperatures, supply pressures, risk assessments, etc.**

The supply system into which the Caleffi 5213 series is to be installed must be thoroughly flushed and cleaned to remove any debris which may accumulate during the installation. Failure to remove any debris will affect the performance and the manufacturer's warranty on the product.

In areas that are subject to high levels of aggressive water, provision must be made to treat the water prior to it entering the valve.

The valve can be installed in any position, whether vertical or horizontal. It is essential that the access to the valve is not obstructed for future maintenance that may be required to the valve or associated fittings.

It is essential that when the installation is designed and/or installed, all current legislation is noted, e.g. the maximum distance from the outlet of the valve to any terminal fitting.

The connecting hot and cold water supplies must be connected to the valve strictly in accordance with the indications on the body of the valve.

The inlets of the valves are clearly marked with the letter H (Hot) and C (Cold).

The outlet is marked with the word MIX.

Where one or both the incoming supply pressures are excessive, a Caleffi pressure reducing valve should be fitted to reduce the pressure(s) within the limits.

Any thermostatic mixing valve must be installed with isolating valves, line strainers and check valves at both the inlets. Isolating valves are required so that the water supply to the valve can be isolated in the event that servicing is required. Strainers are required to prevent debris from entering the valve. Check valves are required to both hot and cold inlets to prevent cross-connection.

The Caleffi 5213 series is supplied complete with the check valves at the hot and cold inlets.

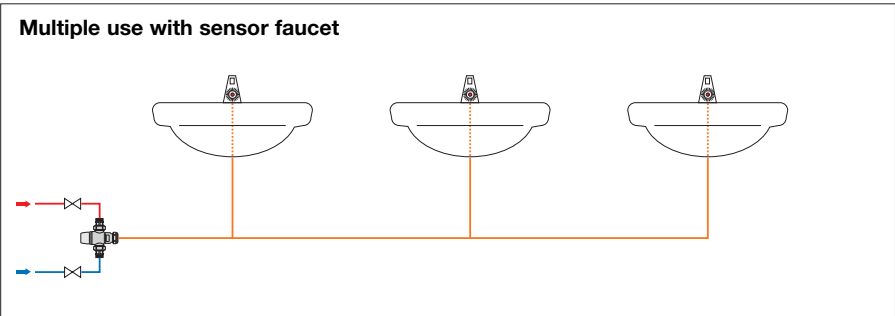
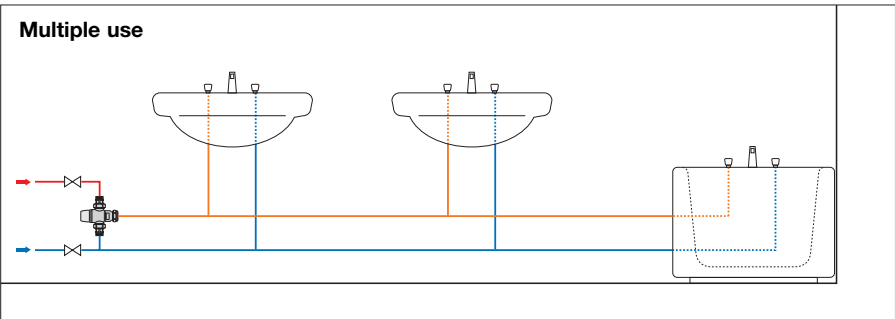
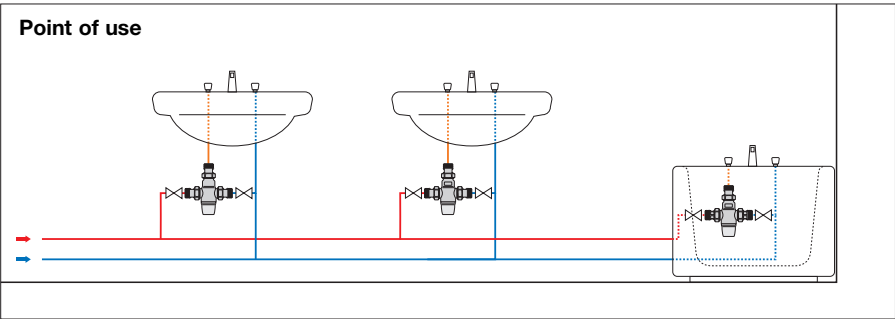
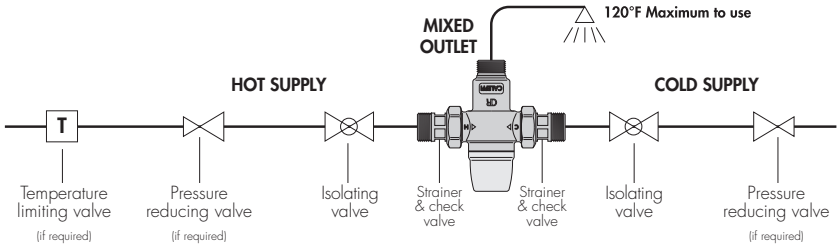
The check valve of the sweat version must be dismantled from the tail piece before soldering and then reassembled.

To ensure that the performance of the Caleffi 5213 series valve is maintained (in the event of cold water failure), the temperature of the hot water supply at the point of entry to the valve must be a minimum of 18°F higher than the set mixed water discharge temperature.

The pipework to and from the valve must not be used to support the weight of the valve.

If the valve is not installed correctly, it will not function correctly and may put the user in danger.

Installation diagram



Commissioning

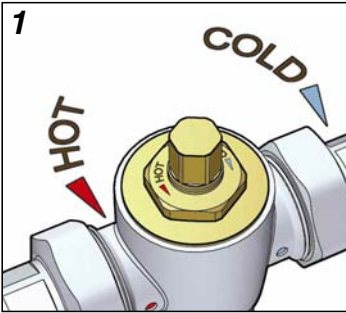
Upon completion of the installation, the valve should be tested and commissioned as per the procedure outlined below or as specified by the local authority.

The following instructions should be read and understood prior to commissioning the Caleffi 5213 series valve. If, under any circumstances, there are aspects of the installation/system which do not comply with our requirements or the specifications as laid down, the valve must not be put into service until the installation/system does comply.

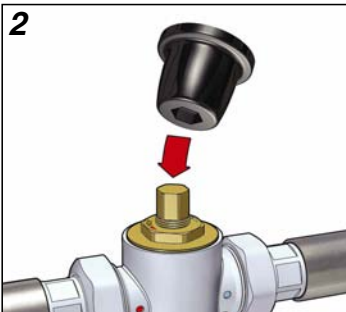
- 1) Ensure that the system is thoroughly clean and free from debris prior to commissioning the thermostatic mixing valve.
- 2) We recommend that the commissioning of temperatures is carried out using a suitably calibrated and accurate digital thermometer.
The valve is commissioned by measuring the mixed water temperature at the outlet.
- 3) In accordance with the anti-scald requirements, water installation shall deliver hot water at the outlet of the sanitary fixtures used primarily for personal hygiene purposes at a temperature not exceeding:
 - 120°F (49°C) or as specified by authority having jurisdiction.
- 4) The temperature at the outlet of each valve must be set taking into consideration any fluctuations which may occur within the system due to simultaneous demand.
- 5) Once the supply temperatures are stabilised and the normal operating conditions are established, the valve can be commissioned. Due to the unique design of the cap, the temperature setting can be adjusted by removing the cap from the valve body and reversing the cap onto the temperature adjustment spindle. We suggest that the following sequence is followed when commissioning the valve.
 - a) Set the mixed water discharge temperature to the required temperature.
 - b) Measure and record the temperature of hot and cold water supplies at the connections to the valve.
 - c) Measure and record the temperature of the water discharging from the largest and smallest volume draw off points.
 - d) Perform the thermal shut-off test. Isolate the cold water supply to the Caleffi valve and monitor the mixed water temperature. The outlet flow should quickly cease flowing.
 - e) Measure and record the maximum mixed water temperature. The temperature should not exceed the temperature allowed by the applicable standard or code of practice for each state.
 - f) Restore the cold water supply to the valve and measure and record the outlet temperature after the mixed water temperature has stabilised. The final temperature found during this test should not exceed the permitted values +3°F.
- 6) Once the desired temperature has been reached, the adjustment spindle can be locked in position using the locking nut supplied with the valve.
- 7) Once the desired temperature is established, remove the cap from the temperature adjustment spindle and secure the head back on to the valve into its original position to prevent tampering by unauthorised persons.

We recommend that the above information is recorded in the Commissioning Report and updated on the Service Report when any work is carried out on the valve.

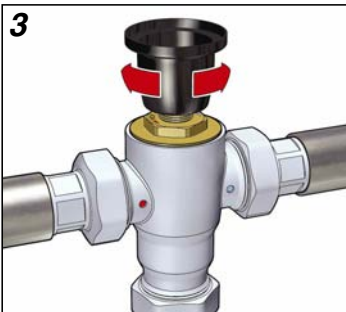
Temperature adjustment



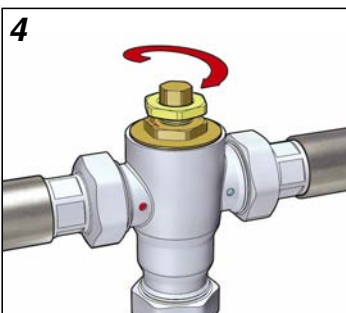
◀ View of temperature adjustment



◀ Fitting temperature adjustment cap



◀ Temperature adjustment cap in place



◀ Locking adjustment spindle with locking nut

Maintenance

In service tests should be carried out regularly to monitor and record the performance of the valve. Deterioration in performance can indicate the need for servicing of the valve and/or water supply. If, during these tests, the mixed water temperature has changed significantly from the previous test results, record the change before re-adjusting the mixed water temperature. If the final mixed water temperature is greater than the permitted values, we recommend that the details quoted in Installation and Commissioning sections are verified and that service work is required.

We recommend that at least every 12 months, or more frequently if the need arises, that the following aspects are checked to ensure that the optimum performance level of the valve is maintained.

With reference to the exploded diagram on page 5:

- 1) On the Caleffi 5213 series valves, the inlet conic filters (12) on both the hot and cold water supplies can be removed for cleaning by unscrewing the inlet union nuts and carefully pulling apart the connecting pipework.
- 2) The built in check valves (11) on the Caleffi 5213 series valves can be accessed in a similar way to 1) to ensure freedom of operation and correct working.
- 3) In case of service work, the internal components of the valve can be dis-assembled for cleaning and descaling:
 - a) Remove the cap of the valve (1) and the locking nut (2)
 - b) Remove the upper body (3) using a suitable spanner
 - c) Remove parts 5-7 noting the correct orientation
 - d) Remove all signs of scale and dirt from the internal part using a suitable de-scaling solution.
 - e) Re-assemble all the components

Once the serviceable items have been dealt with we recommend that the commissioning details as stated previously are repeated ensuring that a suitably accurate thermometer is used.

Should the valve still not function correctly, it may be necessary to replace the thermal element or other components. Refer to spare part kits and contact Service Department for details and advices.

Spare parts

With reference to the exploded diagram, the spare parts are available on request for Caleffi 5213 series valves, see table on page 6.

Troubleshooting

Under normal operating conditions the Caleffi 5213 series thermostatic mixing valve will provide a very high level of performance. However, in some circumstances, when our maintenance plan is not followed, the following problems may arise.

Symptom	Cause	Corrective action
Hot water at the cold taps	a) Operation of the insert check valve is hindered; check valve is not sealing correctly. b) Check valves not fitted.	<ul style="list-style-type: none"> • Replace faulty check valves
Fluctuating mixed water temperature	a) Erratic supply temperatures at the inlets of the valve. b) Starvation of the water supplies at the inlets of the valve. c) Incorrect commissioning of the valve.	<ul style="list-style-type: none"> • Restore inlet conditions within the limits of the valve.
Erratic flow of water from the valve	a) Insufficient water supplies. b) Fluctuations in supply pressures/temperatures. c) Adverse effect created by other draw off points on the system.	<ul style="list-style-type: none"> • Stabilize inlet supply conditions.
No flow of water from the valve	a) In-line filters blocked. b) Insufficient supply pressures. c) Debris obstructing valve operation.	<ul style="list-style-type: none"> • Clean filters. • Restore inlet supplies. • Clean debris or scale from valve.
Valve does not shutoff when tested	a) Installation not in accordance with our recommendations. b) The minimum temperature differential not achieved. c) Internal mechanism hindered by debris.	<ul style="list-style-type: none"> • Install as outlined in the instructions. • Raise hot water temperature. • Clean debris or scale from valve.



Caleffi North America, Inc.
3883 West Milwaukee Road
Milwaukee, WI 53208
T: 414.238.2360 F: 414.238.2366