

TubMixer™

High Flow Scald-Protection Thermostatic Mixing Valves



01092/23.1 NA

Replaces 01092/23 NA



ASSE 1070
NSF/ANSI/CAN 372



Function

Thermostatic mixing valves are used in applications where the user must be protected from the danger of scalding caused by hot water. The Caleffi TubMixer™ 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 fixture 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 TubMixer is an adjustable high-flow point-of-use thermostatic mixing valve for Roman Tubs and other high flow fixtures. Wide flow ranges from 0.5 GPM for one fixture up to 9 GPM for higher demands.

The valve complies with standards ASSE 1070, ASME A112.1070, CSA B125.70, CSA B125.3, NSF/ANSI/CAN 372 and codes IPC, IRC, UPC and NPC certified by ICC-ES (temperature cannot exceed 120°F). The valve is complete with check valve at both hot and cold inlets.

Product range

5213A series TubMixer high-flow scald protection three-way thermostatic mixing valve with optional dual-scale outlet temperature gauge.
Union thread NPT male connections, sizes ½", ¾", 1"; Union sweat connection, sizes ½", ¾", 1"; Union PEX crimp and expansion connections, sizes ½", ¾", 1"; Compression union, size ¾".

Technical specifications

Materials

| | |
|---------------------|--|
| Body: | low-lead cast brass* (<0.25% lead content) |
| Regulating spindle: | low-lead cast brass* (<0.25% lead content) |
| Internal shutter: | PPO |
| Sealing elements: | peroxide-cured EPDM |
| Cover: | ABS |

* Meets the "lead free" requirement of Section 1417 of the Safe Drinking Water Act (SDWA)
This product has a weighted average lead content of less than 0.25% for its wetted surfaces contacted with consumable water.

Performance

| | |
|--|---|
| Suitable fluids: | water |
| Maximum working pressure (static): | 150 psi (10 bar) |
| Maximum working pressure (dynamic): | 70 psi (4.8 bar) |
| Minimum working pressure (dynamic): | 1.5 psi (0.1 bar) |
| Temperature adjustment range: | 85 to 120 °F (30 to 50 °C) |
| Temperature set: | must be commissioned on site to achieve desired temperature setting |
| Temperature control accuracy: | ±3 °F (±2 °C) |
| Minimum cold inlet temperature: | 39 °F (4 °C) |
| Maximum cold inlet temperature: | 85 °F (29 °C) |
| Minimum hot inlet temperature: | 120 °F (49 °C) |
| Maximum hot inlet temperature: | 185 °F (85 °C) |
| 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 operation: | 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: | 0.5 gpm (2 l/min) |
| Maximum flow rate for stable operation: | 9 gpm (34 l/min) |

Outlet temperature gauge (optional) 2" diameter

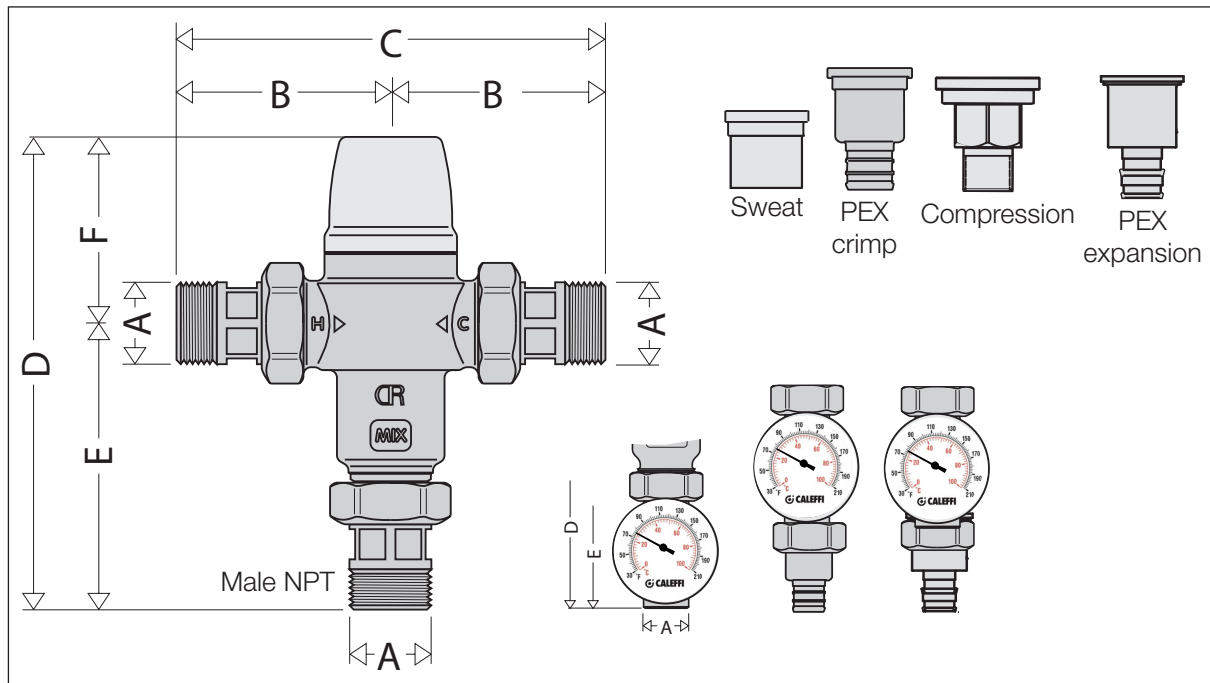
Connections

Main connections: ½", ¾", 1" union PEX crimp, PEX expansion, NPT male and sweat ¾" union compression

Certifications

1. Complies with codes IPC, UPC, IRC, NPC and standards ASSE 1070, ASME A112.1070, CSA B125.70, CSA B125.3, as certified by ICC-ES, file PMG-1358.
2. Complies with standard NSF/ANSI/CAN 372, Drinking Water System Components- Lead Content Reduction of Lead in Drinking Water Act, California Health and Safety Code 116875 S.3874, Reduction in Drinking Water Act, Vermont Act 193 - The Lead in Plumbing Supplies Law and Maryland's Lead Free Law HB.372, as certified by ICC-ES, file PMG-1360.
3. PEX crimp fittings certified to ASTM F 1807.
4. PEX expansion fittings certified to ASTM F 1960.

Dimensions

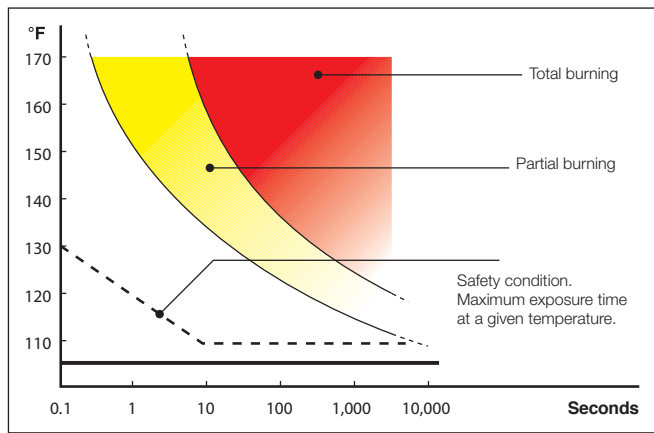


| Code (1) | A | B | C | D | E | F | Wt (lb) |
|--------------------|--------------|----------|----------|----------|----------|----------|---------|
| 521342A | ½" MNPT | 2 13/16" | 5 11/16" | 4 5/16" | 3" | 1 15/16" | 2.0 |
| 521342A 002 | | | | 5 11/16" | 4 3/8" | | |
| 521352A | ¾" MNPT | 2 13/16" | 5 11/16" | 4 5/16" | 3" | | |
| 521352A 002 | | | | 6 5/16" | 5" | | |
| 521362A | 1" MNPT | 2 13/16" | 5 7/8" | 5 3/16" | 3 ¼" | | |
| 521362A 002 | | | | 6 9/16" | 4 5/8" | | |
| 521347A | ½" PEX crimp | 3" | 6" | 5 ½" | 3 5/8" | | |
| 521347A 002 | | | | 7 ¾" | 5 5/8" | | |
| 521357A | ¾" PEX crimp | 3" | 6" | 5 ½" | 3 5/8" | | |
| 521357A 002 | | | | 7 ¾" | 5 5/8" | | |
| 521367A | 1" PEX crimp | 3 1/16" | 6 1/8" | 5 9/16" | 3 11/16" | | |
| 521367A 002 | | | | 7 13/16" | 5 15/16" | | |
| 521348A | ½" PEX exp | 3 1/8" | 6 ¼" | 4 5/8" | 2 11/16" | | |
| 521348A 002 | | | | 6" | 4 1/16" | | |
| 521358A | ¾" PEX exp | 3 ¾" | 7 ½" | 5 3/8" | 3 7/16" | | |
| 521358A 002 | | | | 7 3/8" | 5 7/16" | | |
| 521368A | 1" PEX exp | 4 1/16" | 8 1/8" | 6 1/16" | 4 1/8" | | |
| 521368A 002 | | | | 7 7/16" | 5 ½" | | |
| 521349A | ½" sweat | 2 11/16" | 5 7/16" | 4 5/8" | 2 11/16" | | |
| 521349A 002 | | | | 6" | 4 1/16" | | |
| 521359A | ¾" sweat | 2 7/8" | 5 ¾" | 4 13/16" | 2 15/16" | | |
| 521359A 002 | | | | 6 13/16" | 4 15/16" | | |
| 521369A | 1" sweat | 3 1/8" | 5 5/16" | 5 3/8" | 3 ¼" | | |
| 521369A 002 | | | | 7 3/8" | 4 5/8" | | |
| 521333A (2) | ¾" comp | 2 11/16" | 5 3/8" | 5 3/16" | 3 5/16" | | |
| 521333A 002 (2) | | | | 6 ½" | 4 11/16" | | |

(1) Suffix 002 means configuration includes outlet temperature gauge adapter with temperature gauge.

(2) Includes mounting bracket.

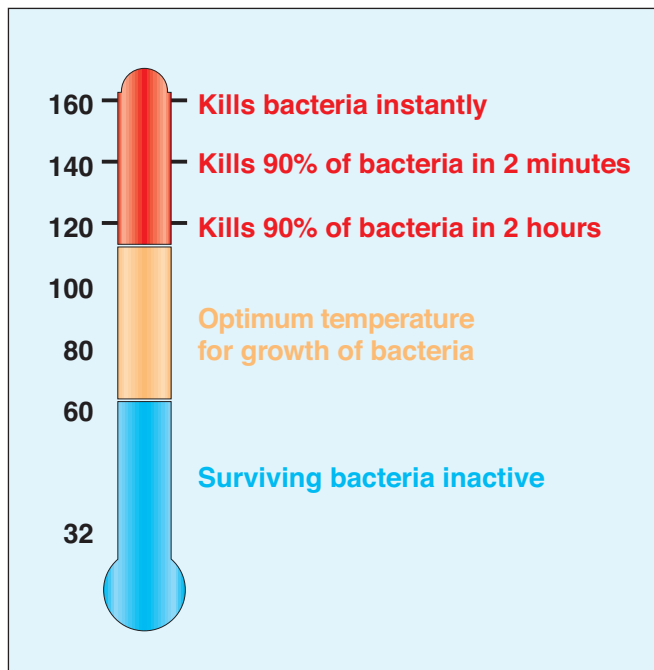
Temperature — exposure time



Thermal disinfection

The diagram shows the behavior of the bacteria Legionella Pneumophila when the temperature conditions of the water in which it is contained vary.

In order to ensure proper thermal “disinfection”, the values must not be below 140 °F.



Exposure time for partial burns

| Temperature | Adult | Children 0-5 years |
|-------------|--------|--------------------|
| 160 °F | 1 sec | -- |
| 150 °F | 2 sec | 0.5 sec |
| 140 °F | 5 sec | 1 sec |
| 130 °F | 30 sec | 10 sec |
| 120 °F | 5 min | 2.5 min |

Legionella-scalding risk

In systems producing domestic hot water with storage, in order to avoid the dangerous infection known as Legionella, the hot water must be stored at a temperature of at least 140 °F. At this temperature it is certain that the growth of the bacteria causing this infection will be totally eliminated. At this temperature, however, the water cannot be used directly.

As shown on the diagram, temperatures of more than 120°F can cause burning very quickly. For example, at 130 °F partial burning will occur in approximately 30 seconds, while at 140 °F partial burning will occur in approximately 5 seconds. The time may be reduced by 50 percent or more for children and elderly people.

In view of the above, it is necessary to install a thermostatic mixing valve which can:

- reduce the temperature at the point of use to a value lower than that of storage and suitable for users. For safety reasons, it is advisable to limit the mixed water temperature to 120 °F;
- maintain a constant temperature when the incoming pressure and temperature conditions vary.

Operating principle

The controlling element of the three-way thermostatic mixing valve is a thermostatic sensor fully immersed in the mixed water outlet tube which, as it expands or contracts, continuously establishes the correct proportion of hot and cold water entering the valve. The regulation of these flows is by means of a piston sliding in a cylinder between the hot and cold water passages. Even when there are pressure drops due to the drawing off of hot or cold water for other uses, or variations in the incoming temperature, the thermostatic mixing valve automatically regulates the water flow to obtain the required temperature.

Construction details

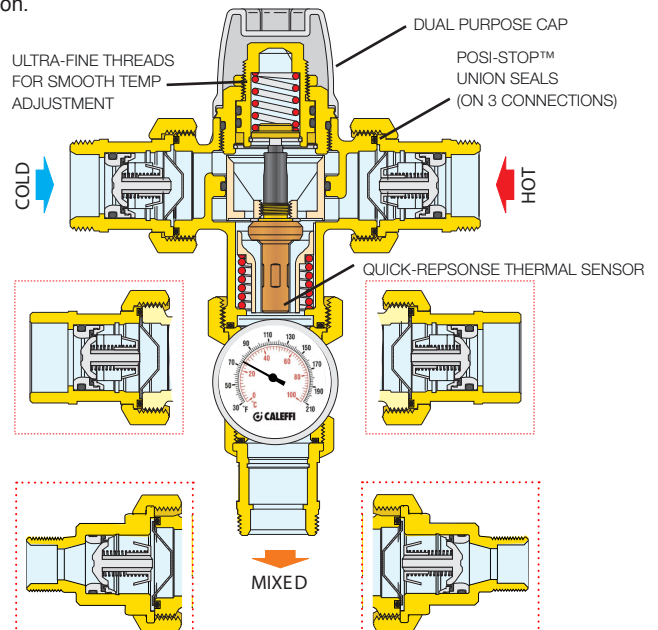
Anti-scale materials

The material used in the construction of the Caleffi TubMixer 5213 series thermostatic mixing valve reduces jamming caused by lime deposits. All the working parts are made of a special anti-scale material, with a low friction coefficient, assuring stable temperature control and long operating life.

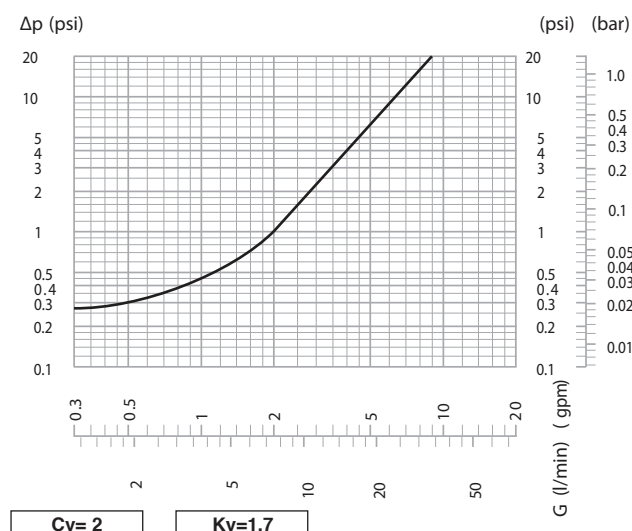
Thermal shutoff

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

The Caleffi Tubmixer 5213 series thermostatic mixing 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 function.



Flow curve



Flow rate-use

The Caleffi TubMixer 5213 series is a thermostatic mixing valve suitable for **point of use application**. For this reason, the flow rate through the valve is the same as that of the final outlet, e.g. mixer or tap for washbasin, shower or bath. In order to ensure the set temperature, the thermostatic mixing valve must have a minimum flow rate of 0.5 gpm (2 l/min).

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

Public buildings, hospitals, schools

In these applications, for the type of users of hot water such as children, elderly or disabled people, the risk of being scalded is very high. In these installations, the two supply lines of the hot water from storage and of the cold water can have different origin and work at different pressures.

In the event of failure of the cold or hot water supply, the thermostatic mixing valve shuts off the water flow from the outlet, thus avoiding possible scalding or thermal shocks.

Installation

Before installing a Caleffi TubMixer 5213 series thermostatic mixing valve, the system must be inspected to ensure that operating conditions are within the range of the thermostatic mixing valve, checking, for example, the supply temperature, supply pressure, etc.

Systems where the TubMixer is installed must be drained and cleaned out to remove any dirt or debris which may have accumulated during installation.

The installation of filters of appropriate capacity at the inlet of the water from the water main supply is always advisable.

Caleffi TubMixers must be installed by qualified personnel in accordance with the diagrams in this brochure, taking into account all current applicable standards.

Caleffi TubMixers can be installed in any position, either vertical or horizontal.

The following is displayed on the thermostatic mixing valve body:

- Hot water inlet, marked "H" (Hot).
- Cold water inlet, marked "C" (Cold).
- Mixed water outlet, marked "MIX".

Check valves

In order to prevent undesirable cross flow, check valves should be installed in systems with thermostatic mixing valves. The Caleffi TubMixer 5213 series is supplied complete with the check valves at the hot and cold inlets. ASSE 1070 certification requires this.

Commissioning

In view of the special purpose of the thermostatic mixing valve, it must be commissioned in accordance with current standards by qualified personnel using suitable temperature measuring equipment. Use of a digital thermometer is recommended for measurement of the mixed water temperature.

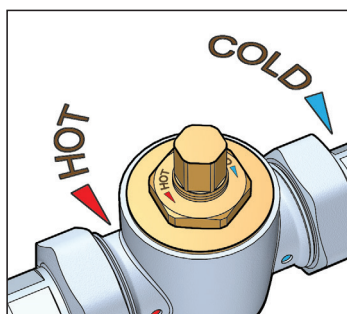
Temperature adjustment

Temperature setting can be adjusted by removing the cap from the valve body and reversing the cap onto the temperature adjustment spindle.

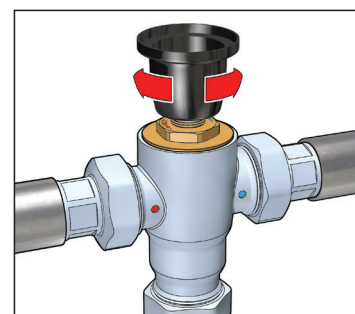
In accordance with the anti-scald requirements, mixed water at the outlet of the sanitary fixtures must not exceed the following values:

- 120 °F (49 °C) for domestic or normal buildings
- 110 °F (43.3 °C) for hospitals or special buildings
- 100 °F (38 °C) for children

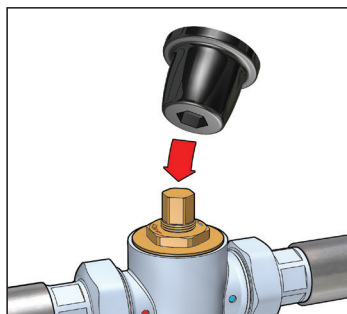
Temperature setting can then be locked at the desired value using the locking nut.



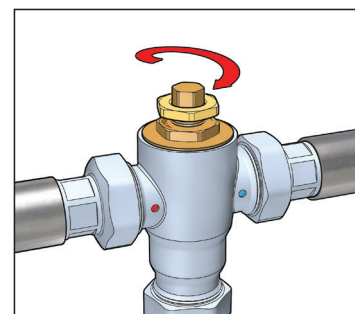
View of temperature adjustment



Attaching temperature adjustment cap



Temperature adjustment cap in place



Locking adjustment spindle with locking nut

Replacement fittings

Refer to the current Caleffi Plumbing and Hydraulics Catalog for replacement union nuts and tailpieces by size and connection style.

Replacement parts



Replacement check valves for 5213 series TubMixer thermostatic mixing valves.

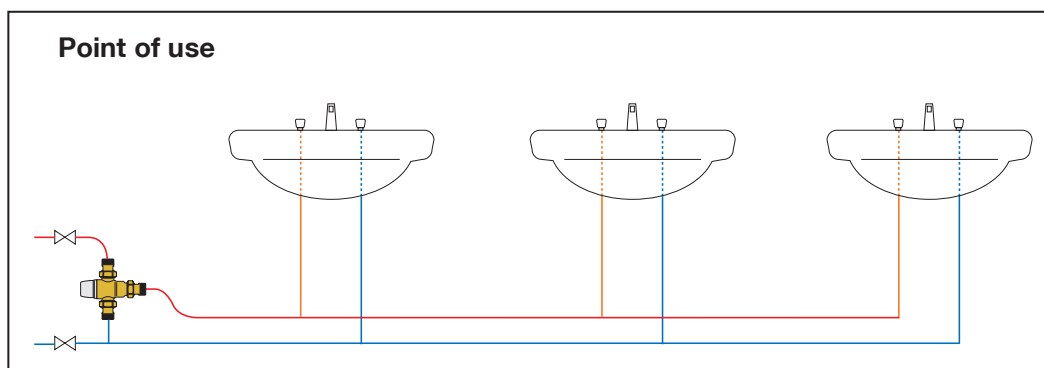
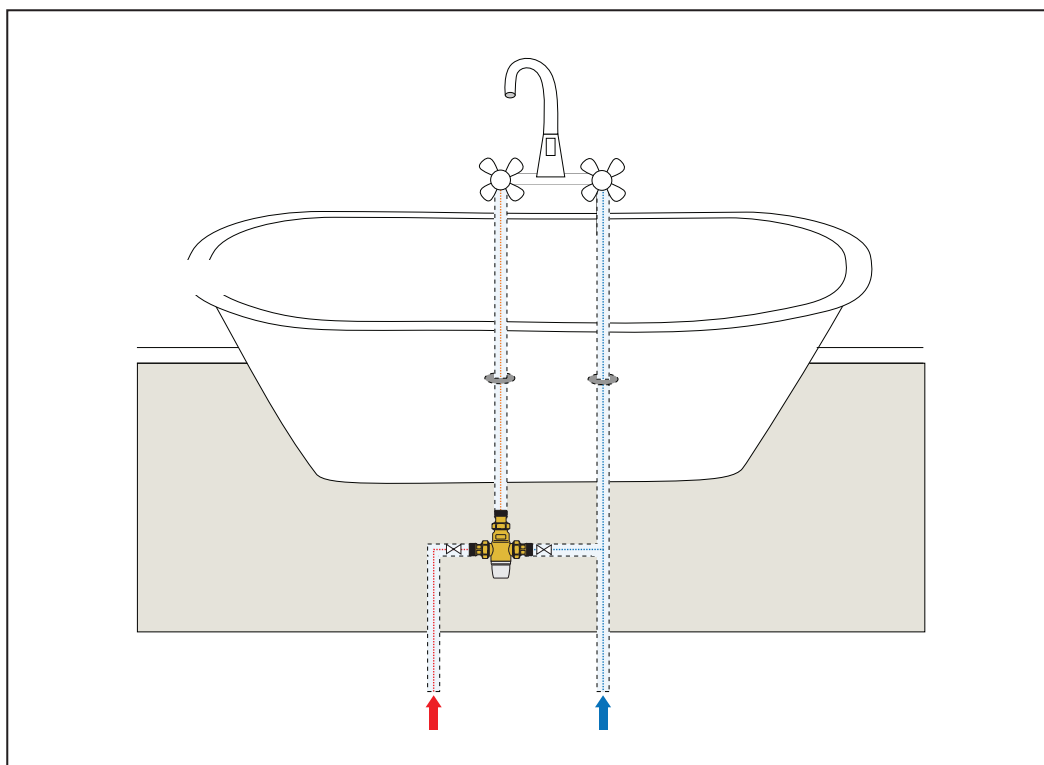


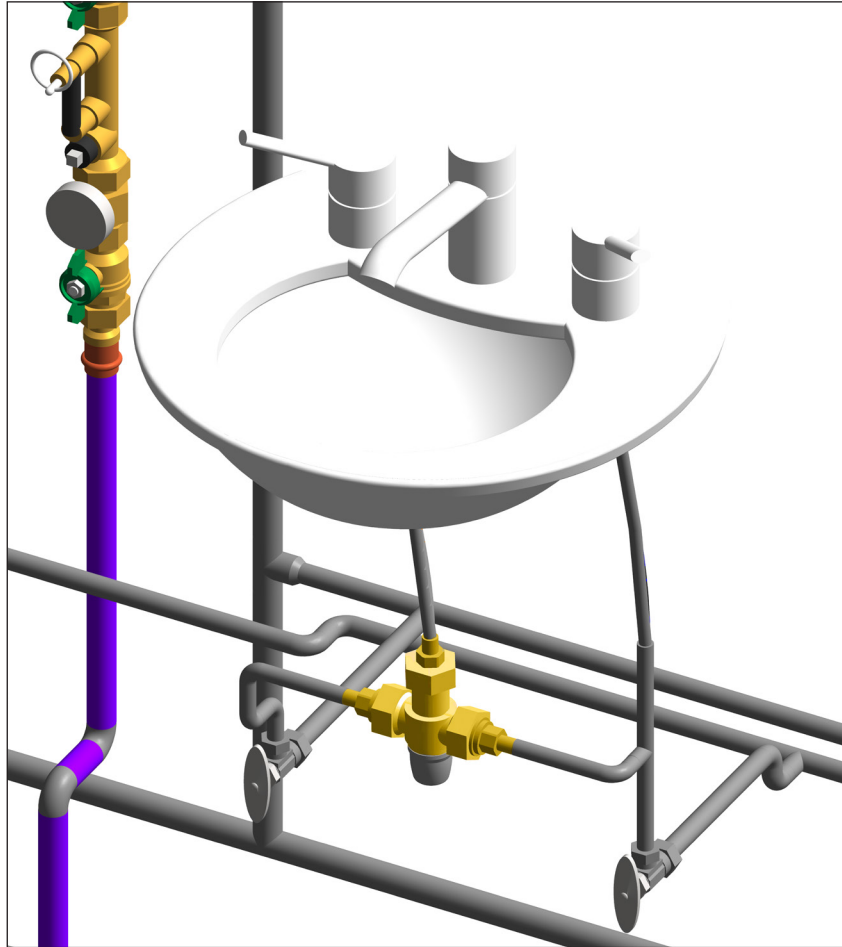
Replacement conical inlet filter for 5213 series TubMixer thermostatic mixing valves.

NA10405..... check valve for PEX fittings
R39204..... check valve for sweat, NPT fittings
NA10479..... check valve for 521333A

F52429.....conical filter

Application Diagrams





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SPECIFICATION SUMMARY

TubMixer 5213 series

High flow scald-protection point-of-use thermostatic mixing valve certified by ICC-ES to ASSE 1070, ASME A112.1070, CSA B125.70. CSA B125.3 (temperature cannot exceed 120 degrees F) and NSF/ANSI/CAN 372. Meets codes IPC, IRC, UPC and NPC for use in accordance with the US and Canadian plumbing codes. Sizes ½ inch, ¾ inch and 1 inch with NPT male threaded, sweat, PEX crimp and PEX expansion union and 3/8 inch compression union connections. Low lead brass body. Shutter in PPO anti-scale plastic. Seals peroxide-cured EPDM. Maximum working temperature 185 degrees F (85 degrees C). Setting range 85 degrees F to 120 degrees F (30 degrees C to 50 degrees C). Tolerance ±3 degrees F (±2 degrees C). Maximum working pressure 150 psi (10 bar). Minimum flow rate for stable operation 0.5 gpm (2 l/min). Maximum flow rate for stable operation 9 gpm (34 l/min). Provided with tamper-proof setting lock and check valves at the inlets. Provide with optional mixed outlet dual-scale temperature gauge, 30 to 210 degrees F scale and 0 to 100 degree C scale, 2 inch diameter, accuracy-1% full-scale.

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. The technical brochure on www.caleffi.com always has the most up-to-date version of the document, which should be used for technical verification.



Caleffi North America, Inc.
 3883 W. Milwaukee Road, Milwaukee, WI 53208
 Tel: 414-238-2360 · Fax: 414-238-2366
 Technical Support: 414-338-6338 / techsupport.us@caleffi.com
sales@caleffi.com · www.caleffi.com
 © Copyright 2023 Caleffi North America, Inc.