

www.caleffi.com

# TubMixer<sup>™</sup> High-flow scald protection three-way thermostatic mixing valve

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# 5213 Series



#### Function

The Caleffi 5213 TubMixer<sup>™</sup> is a temperature limiting thermostatic mixing valve designed to deliver safe, consistent, and controlled water temperatures. Engineered to comply with product standards, the valve is limited to outputting tempered water at 120°F. It features check valves on the inlets to prevent cross-connections. With an adjustable temperature setting and a durable temperature cartridge, it supports a wide flow range from 0.5 to 9 GPM for single to multi fixture applications. In the event of a hot or cold water supply failure, the valve automatically stops water flow from the mixed outlet. Its superior performance under varying water temperatures and pressures makes the TubMixer ideal for applications where precise temperature control and scald protection are critical, such as in hospitals, schools, and nursing homes.

The 5213 Series TubMixer complies with ASSE 1070/ASME A112.1070/ CSA B125.70, CSA B125.3, UPC, IPC, IRC and NPC compliance for use in accordance with U.S. and Canadian plumbing codes. Additionally, it is compliant with NSF/ANSI/CAN 372, US and Canadian Low-Lead and Lead-Free materials contents laws for drinking water system components. The product is certified and listed by ICC-ES.

#### ASSE 1070/ASME A112.1070/CSA B125.70

NSF/ANSI/CAN 372



#### Product range

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

and size <sup>3</sup>/8" compression union connection

# Technical specifications Materials:

Valve body and regulating spindle: Shutter, seat and slide guides: Springs: Seals: Cover: low-lead\* brass EN12164 CW724R PPO stainless steel peroxide-cured EPDM 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:

Temperature adjustment range: Temperature set: Temperature stability: Cold inlet temperature: Hot inlet temperature:	must be comm Mir	issioned on site to a Minimum 40 °F (4 ° iimum 120 °F (50 °C	85 – 120 °F (30 – 50 °C) achieve desired temperature ±3 °F (±2 °C) °C); Maximum 85 °F (30 °C) C); Maximum 185 °F (85 °C)	
Maximum working differential pres Minimum working differential pres	ssure: sure (dynamic):	Static: 150 psi (10 k	bar); Dynamic: 70 psi (5 bar) 1.5 psi (0.1 bar)	
Maximum unbalanced dynamic supply pressure (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 (				
Minimum flow rate for stable oper Maximum flow rate for stable oper	ation: ration:		0.5 gpm (2 l/min) 9 gpm (34 l/min)	
Outlet temperature gauge (optiona	al)	Dual-scale 32 °f	2" diameter - 212 °F and 0 °C - 100 °F Accuracy: 1% full-scale	
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#### Certifications:

1. ASSE 1070/ASME A112.1070/CSA B125.70, CSA B125.3, UPC, IPC, IRC and NPC compliance for use in accordance with U.S. and Canadian plumbing codes. Certified and listed by ICC-ES, PMG File 1358.

2. NSF/ANSI/CAN 372, Drinking Water Systems Components-Lead Content Reduction of Lead in Drinking Water, California Health and Safety Code 116875 S.3874, Reduction of Lead in Drinking Water Act, 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.



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.** 



**WARNING:** This product can expose you to chemicals including lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.



**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 mixing valve 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 pipework connecting the thermostatic mixing valve 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 (40 °C) can be dangerous. During the installation, commissioning and maintenance of the thermostatic mixing valve, take the necessary precautions to ensure that such temperatures do not endanger people.



**CAUTION:** To prevent any damage which will cause the electronic mixing valve to not operate correctly, treat highly aggressive water before entering the thermostatic mixing valve.



**WARNING:** The outer surface of the device, especially in polymer type components, must not come into contact with any chemical substance, either on purpose or accidentally. The system fluid and any chemical additives used within the water piping system – whether for washing or as protection – must be compatible with the materials used to make the device and with the function it performs.

Caleffi shall not be liable for damages resulting from stress corrosion, misapplication or misuse of it products.

## Leave this manual for the user.



Ce symbole d'avertissement servira dans ce manuel à attirer l'attention sur la sécurité concernant instructions. Lorsqu'il est utilisé, ce symbole signifie.

# ATTENTION! DEVENEZ ALERTE ! VOTRE SÉCURITÉ EST EN JEU ! NE PAS SUIVRE CES INSTRUCTIONS PEUT PROVOQUER UN RISQUE DE SECURITE.



**AVERTISSEMENT:** Ce produit peut vous exposer à des produits chimiques comme le plomb, qui est connu dans l'État de Californie pour causer le cancer, dommages à la naissance ou autre. Pour plus d'informations rendez-vous www.P65Warnings.ca.gov.



**ATTENTION:** Tous les travaux doivent être effectués par du personnel qualifié formé à la bonne application, installation et maintenance des systèmes conformément aux codes et règlements locaux.



**ATTENTION:** Si le réducteur de pression, termostatico regolabile, n'est pas installé, mis en service et entretenu correctement, selon les instructions contenues dans ce manuel, il peut ne pas fonctionner correctement et peut mettre en danger l'utilisateur.



ATTENTION: S'assurer que tous les raccordements sont étanches.



**ATTENTION:** Lorsque vous effectuez les raccordements d'eau, assurez-vous que la tuyauterie reliant le termostatico regolabile n'est pas mécaniquement des overstressed. Au fil du temps, ceci pourrait causer des ruptures, avec pour consequence des pertes en eau qui, à leur tour, peuvent causer des dommages à la propriété et/ou les gens.



**ATTENTION:** Les températures de l'eau supérieure à 100 °F (40 °C) peut être dangereux. Au cours de l'installation, mise en service et l'entretien de le réducteur de pression, le termostatico regolabile, prendre les precautions nécessaires afin de s'assurer que de tells températures ne compromettent pas les gens.



**ATTENTION:** Pour prévenir tout dommage qui provoque le mitigeur électronique à ne pas fonctionner correctement, le traitement de l'eau très agressive avant d'entrer dans la vanne de le termostatico regolabile.



**AVERTISSEMENT:** La surface extérieure de l'appareil, en particulier les composants de type polymère, ne doit pas entrer en contact avec des substances chimiques, que ce soit volontairement ou accidentellement. Le produit et les additifs chimiques utilisés dans les canalisations d'eau - que ce soit pour le lavage ou la protection - doivent être compatibles avec les matériaux utilisés pour la fabrication de l'appareil et avec la fonction qu'il remplit.

Caleffi ne pourra être tenue responsable des dommages résultant de la corrosion, d'une mauvaise utilisation ou une mauvaise utilisation des produits.

## LAISSEZ CE MANUEL AVEC L'UTILISATEUR

#### **Operating principle**

The thermostatic mixing valve mixes hot and cold water in such a way as to maintain constant set temperature of the 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 close the opposite inlet, stopping water discharging from the mixed water outlet. The Caleffi 5213 series TubMixer thermostatic mixing 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 curve



Flow should never exceed standards for pipe size and materials.

#### Flow rate

The Caleffi 5213 series TubMixer is a temperature limiting 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 minimun 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.

#### Exploded diagram

- 1 Protective cap
- 2 Temperature spindle locking nut
- 3 Temperature adjusting spindle
- 4 Upper body
- 5 O-ring seal
- 5a O-ring seal
- 6 Thermostatic element
- 7 Flow conveyor
- 8 Lower spring
- 9 Valve body
- 10 Union nut, quantity 3 per valve
- 11 Inlet port tailpiece with integral check valve, quantity 2 per valve
- 12 Inlet port conical filter, quantity 2 per valve
- 13 Posi-Stop™ union seals, on all ports
- 14 Outlet port tailpiece, quantity 1 per valve
- 15 Location where temperature gauge and adapter is installed



Press

#### **Replacement fittings**

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

#### **Replacement parts**



Replacement check valves for 5213 series TubMixer thermostatic mixing valves.



Conical inlet filter for 5213 series TubMixer thermostatic mixing valves.

NA10405...check valve for PEX, press fittings R39204.....check valve for sweat, NPT fittings NA10479...check valve for compression fittings

F52429.....conical filter

#### Installation

Before installing the Caleffi 5213 series TubMixer thermostatic mixing valve, carefully review the following instructions. The installer is responsible for ensuring that all aspects of the installation comply with current regulations and legislation.

The TubMixer should be installed in accordance with the relevant standards, codes of practice, and legislation for each state, as well as the details provided in this manual. Installation must be carried out by a licensed plumber.

Before installation, verify that the system operating conditions are within the recommended range for the valve. This includes checking supply temperatures, supply pressures, and conducting risk assessments as necessary.

Before installing the TubMixer, thoroughly flush and clean the supply system to remove any debris that may have accumulated during installation. Failure to do so can impact the valve's performance and void the manufacturer's warranty. In areas with aggressive water conditions, the water should be treated before entering the valve.

The valve can be installed in any position, either vertical or horizontal. Ensure that access to the valve remains unobstructed for any future maintenance of the valve or its associated fittings.

When designing or installing the system, all current regulations, such as the maximum allowable distance from the valve outlet to any terminal fitting, must be followed.

The hot and cold water supplies must be connected to the valve as indicated on the valve body. The inlets are marked with "H" for hot and "C" for cold, and the outlet is labeled "MIX."

If the incoming supply pressures are excessive, a Caleffi pressure reducing valve should be installed to bring the pressure within acceptable limits.

Any thermostatic mixing valve installation must include isolating valves, line strainers, and check valves at both inlets. Isolating valves allow the water supply to be shut off for servicing, strainers prevent debris from entering the valve, and check valves prevent cross-connection between the hot and cold supplies. The Caleffi 5213 series TubMixer comes with check valves pre-installed at the hot and cold inlets. For the sweat version, the check valve must be removed from the tailpiece before soldering and then reassembled afterward.

To maintain the TubMixer's performance, particularly in the event of a cold water failure, the hot water supply temperature at the valve's entry point should be at least 18°F higher than the set mixed water discharge temperature.

Scan to view 5213 TubMixer<sup>TM</sup>

The piping to and from the valve should not be used to support the valve's weight.

#### Installation diagrams







# Installation diagrams



## Dimensions



#### Dimensions

Code (1)	Α	В	С	D	E	LL(3)	Wt (lb)
<b>5213</b> 42A	1/2" MNPT	2 ¾"	5 <sup>9</sup> /16"	5 <sup>1</sup> /16"	3 <sup>1</sup> /8"		2.0
<b>5213</b> 42A 002				7 <sup>3</sup> /16 "	5 <sup>5</sup> /16"		
<b>5213</b> 52A	- 34" MNPT	2 ¾"	5 ½"	4 <sup>13</sup> /16 "	2 <sup>15</sup> /16"		
<b>5213</b> 52A 002				7"	5 <sup>1</sup> /16"		
<b>5213</b> 62A	1" MNPT	2 <sup>7</sup> /8"	5 ¾"	5 <sup>3</sup> /16 "	3 ¼"		
521362A 002				7 <sup>5</sup> /16 "	5 <sup>3</sup> /8 "		
<b>5213</b> 47A	1/2" PEX crimp	2 <sup>15</sup> /16"	5 <sup>7</sup> /8"	5 <sup>7</sup> /16"	3 ½"		
<b>5213</b> 47A 002				7 <sup>9</sup> /16"	5 <sup>11</sup> /16"		
<b>5213</b> 57A	<sup>3</sup> 4" PEX crimp	2 <sup>15</sup> /16" 5	<b>5 7</b> II	5 <sup>7</sup> /16"	3 ½"		
<b>5213</b> 57A 002			D'/8	7 <sup>9</sup> /16"	5 <sup>11</sup> /16"		
<b>5213</b> 67A		0"	0"	5 ½"	3 <sup>5</sup> /8"		
<b>5213</b> 67A 002	I PEX CIIIIp	3	0	7 <sup>11</sup> /16"	5 ¾"		
<b>5213</b> 48A		2 <sup>15</sup> /16"	5 <sup>7</sup> /8"	5 <sup>7</sup> /16"	3 <sup>9</sup> /16"		
<b>5213</b> 48A 002	<sup>1</sup> /2" PEX exp			7 <sup>5</sup> /8"	5 <sup>11</sup> /16"		
<b>5213</b> 58A	3/" DEV ovo	3 <sup>3</sup> /16"	6 <sup>3</sup> /8"	5 <sup>11</sup> /16"	3 ¾"		
<b>5213</b> 58A 002	%" PEX exp			7 <sup>13</sup> /16"	5 <sup>15</sup> /16"		
<b>5213</b> 68A	1" DEV ovid	3 ½"	6 <sup>15</sup> /16"	6"	4 <sup>1</sup> /16"		
521368A 002	I PEA exp			8 <sup>1</sup> /8"	6 ¼"		
<b>5213</b> 49A	1//" ow/oot	2 <sup>5</sup> /8"	5 <sup>5</sup> /16"	4 1⁄2"	2 <sup>9</sup> /16"	4 <sup>5</sup> /16"	
<b>5213</b> 49A 002	72 Sweat			6"	4 <sup>1</sup> /8"		
<b>5213</b> 59A	3/ " ovvoot	0.12	2 <sup>13</sup> /16" 5 <sup>9</sup> /16"	4 ¾"	2 <sup>13</sup> /16"		
<b>5213</b> 59A 002	% Sweat	2 10/16		6 <sup>1</sup> /8"	4 <sup>3</sup> /16"		
<b>5213</b> 69A	1	3 <sup>1</sup> /16"	6 <sup>1</sup> /16"	5 <sup>5</sup> /16"	3 <sup>3</sup> /8"	4 1⁄4"	
521369A 002	I sweat			6 <sup>7</sup> /16"	4 1⁄2"		
<b>5213</b> 46A		3 <sup>3</sup> /16"	6 <sup>5</sup> /16"	4 <sup>13</sup> /16"	2 <sup>15</sup> /16"	4 <sup>5</sup> /8"	
521346A 002	1/2 press			7"	5 <sup>1</sup> /16"		
<b>5213</b> 56A	3/ 1	3 ¼"	6 ½"	5 <sup>3</sup> /16"	3 ¼"	4 <sup>9</sup> /16"	]
<b>5213</b> 56A 002	34" press			7 <sup>5</sup> /16"	5 <sup>7</sup> /16"		
<b>5213</b> 66A	411.	4 <sup>1</sup> /8"	8 1⁄4"	5 ¾"	3 <sup>13</sup> /16"	6 <sup>7</sup> /16"	
521366A 002				7 <sup>15</sup> /16"	6"		
<b>5213</b> 33A (2)	<sup>3</sup> /8" comp	2 16"	5540"	5 <sup>1</sup> /16"	3 <sup>1</sup> /8"		
<b>5213</b> 33A 002 (2)		£ 12	0 / 10	7 <sup>3</sup> /16"	5 1⁄4"		

(1) Suffix 002 means the assembly includes a temperature gauge and adapter.

(2) Includes mounting bracket.(3) Lay length: Hot to Cold Inlets.

#### Commissioning

After installation, the valve must be tested and commissioned according to the procedure outlined below or as specified by the local authority having jurisdiction.

Review and understand these instructions before commissioning the Caleffi 5213 series TubMixer thermostatic mixing valve. If any aspect of the installation or system does not meet the products requirements or specifications as listed, the valve must not be used until the installation or system meets them.

1. Ensure the system is thoroughly cleaned and free from debris before commissioning the thermostatic mixing valve.

2. Use a suitably calibrated and accurate digital thermometer to measure temperatures during commissioning. The valve is commissioned by measuring the mixed water temperature at the outlet.

3. In compliance with anti-scald requirements, the water installation must deliver hot water at the outlet not exceeding:

- 120°F (49°C) or as specified by the authority having jurisdiction.

4. When setting the temperature of multiple valves, account for potential fluctuations within the system due to simultaneous demand.

5. Once supply temperatures are stabilized and normal operating conditions are established, the valve can be commissioned. Follow the temperature adjustment procedure on page 14.

#### Commissioning procedure

- I. Set the mixed water discharge temperature to the required temperature.
- II. Measure and record the temperatures of the hot and cold water supplies at the valve inlets.
- III. Measure and record the temperatures of the water discharging from the largest and smallest volume draw-off points.
- IV. Perform the thermal shut-off test by isolating the cold water supply to the TubMixer and monitoring the mixed water temperature. The outlet flow should rapidly stop.
- V. Measure and record the maximum mixed water temperature. It should not exceed the limits specified by the applicable standard or code of practice for your jurisdiction.
- VI. Restore the cold water supply to the valve and measure and record the outlet temperature after the mixed water temperature has stabilized. The final temperature during this test should not exceed +3 °F.

6. Once the desired temperature is reached, lock the adjustment spindle in place using the supplied locking nut.

7. After setting the desired temperature, remove the cap from the temperature adjustment spindle and reattach it to the valve in its original position to prevent unauthorized tampering.

Record the above information in the Commissioning Report and update the Service Report whenever work is performed on the valve..

#### Temperature adjustment



View of temperature adjustment spindle after cap is removed.

Inserting cap onto temperature adjustment spindle.

Rotation of cap to adjust mixed temperature outlet.

Locking temperature adjustment spindle with locking nut.

#### Maintenance

Regular in-service tests should be conducted to monitor and record the valve's performance. Any deterioration in performance may indicate the need for valve servicing and/or water supply maintenance.

If the mixed water temperature has changed significantly from previous commissioning results, record the change before re-adjusting the temperature. If the final mixed water temperature exceeds permitted values, verify the details in the Installation and Commissioning sections of this manual to determine if service work is required.

The following actions are recommended at least every 12 months, or more frequently if necessary, to ensure optimal valve performance.

With reference to the exploded diagram on page 7:

1. The inlet conical filters (12) on both the hot and cold water supplies can be removed for cleaning by unscrewing the inlet union nuts and separating from the connected tailpiece.

2. The integrated check valves (11) can be accessed by unscrewing the union nut and removing the conical filter. Once the filter is removed, the check valve can be taken out from the tailpiece for replacement.

3. If service is required, the internal components of the valve can be disassembled for cleaning and de-scaling:

I. Remove the valve cap (1) and the locking nut (2).

II. Use a suitable wrench to remove the upper body (4).

III. Remove parts (6)(7)(8), noting their correct orientation.

IV. Clean all signs of scale and dirt from the internal components using a suitable de-scaling solution.

V. Reassemble all the components.

After completing servicing, follow the commissioning details from the previous section.

If the valve still does not function correctly, it may be necessary to replace the thermal element or other components. For assistance, contact Caleffi Technical Support at 1-414-338-6338 or email techsupport.us@caleffi.com.

## Troubleshooting

Under normal operating conditions, the Caleffi 5213 series TubMixer thermostatic mixing valve will deliver optimal performance. However, if the recommended maintenance plan is not properly followed, the following issues may arise.

Symptoms	Potential cause	Corrective action		
Hot water at the cold taps	I. Check valves are fouled or not sealed correctly.	Replace check valves.		
	II. Check valves not installed.			
Fluctuating mixed water temperature	I. Variable inlet supply temperatures.	Adjust circuit conditions to align with product specifications.		
	II. Minimum flow rate not achieved.			
	III. Incorrect commissioning of the valve.			
Variable flow of water from the valve	I. Minimum flow rate not achieved.	Stabilize inlet supply conditions.		
	II. Variations in supply pressures or temperatures.			
	III. Impact from other draw-off points in the system.			
No water flow from the valve	I. System strainers or filters blocked.	Clean system components.		
	II. Insufficient supply pressures.	Restore inlet supply pressures.		
	III. Debris obstructing valve cartridge.	Clean debris or scale from valve.		
Valve shut-off function does not operate during testing	I. Mixing valve not properly installed.	Re-install per instructions.		
	II. Minimum temperature difference not achieved.	Increase hot water temperature.		
	III. Debris obstructing valve cartridge.	Clean debris or scale from valve.		

# NOTES



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For Technical Support call 1-414-338-6338, or email techsupport.us@caleffi.com

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