www.caleffi.com

AngleMix™ and AngleMix+™ Thermostatic mixing valves

520 Series

ASSE 1017
NSF/ANSI/CAN 372

Function

The Caleffi AngleMix™ and AngleMix+™ 520 series thermostatic mixing valves are used in systems producing domestic hot water and easily mount to the top of water heaters. The mixed temperature outlet is inline with the hot water inlet, facilitating trouble-free connection and reducing space required for installation. These thermostatic mixing valves maintain the desired output temperature of the mixed water supplied at a constant set value compensating for both temperature and pressure fluctuations of the incoming hot and cold water. The mixing valve closes both inlet ports tight, eliminating temperature creep in recirculation loops. The AngleMix and AngleMix+ can also be used for temperature control in hydronic heating system applications. Also available as body only, for a wide variety of separately-ordered end connections, the angle style body design offers improved fluid dynamics for better performance and reduces installation labor and materials, eliminating a piping elbow in typical installations.

AngleMix versions features sizes ½", ¾" and 1" with 2.0 Cv, and AngleMix+ features a larger flow capacity 1" size, with 3.5 Cv.

The AngleMix and AngleMix+ comply with NSF/ANSI/CAN 372, low lead, as certified by ICC-ES, and complies with ASSE 1017, CSA B125.3, UPC, IPC, Low Lead Laws and listed by ICC-ES for use in accordance with the U.S. and Canadian plumbing codes.

Product range

AngleMix, see page 5 for flow rate and dimensions

520___A series: Adjustable three-way thermostatic mixing valve with mixed outlet temperature gauge and angle body..... union connections ½" and ¾" press, NPT male, sweat union, PEX crimp and expansion

520___AC series: Adjustable three-way thermostatic mixing valve with mixed outlet temperature gauge, angle body with inlet port check valves..... union connections ½" and ¾" press, NPT male, sweat union, PEX crimp and expansion

5206___A 001 series: Adjustable three-way thermostatic mixing valve with mixed outlet temperature gauge and angle body..... union connections 1" press, NPT male, sweat, PEX crimp and expansion

5206___AC 001 series: Adjustable three-way thermostatic mixing valve with mixed outlet temperature gauge, angle body with inlet port check valves.....union connections 1" press, NPT male, sweat, PEX crimp and expansion

Product range

AngleMix+, see page 7 for flow rate and dimensions

5206___A series: Adjustable three-way thermostatic mixing valve with mixed outlet temperature gauge and angle body..... union connections 1" press, NPT male, sweat union, PEX crimp and expansion

5206___AC series: Adjustable three-way thermostatic mixing valve with mixed outlet temperature gauge, angle body with inlet port check valves..... union connections 1" press, NPT male, sweat union. PEX crimp and expansion

Technical specification

Materials

Valve body:	DZR low-lead* brass
Shutter, seats and slide guides:	PSU
Springs:	stainless steel
Seals:	peroxode-cured EPDM
Adjustment knob:	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
Setting range:	95–150 ° F (35–65 ° C)
Tolerance:	±3 ° F (±2 ° C)

Max. working pressure (static): 150 psi (10 bar)
Max. working pressure (dynamic): 75 psi (5 bar)
Max. hot water inlet temperature: 195 °F (90 °C)
Max. inlet pressure ratio (H/C or C/H) for optimal performance: 2:1

Minimum temperature difference between hot water inlet and mixed water outlet for stable operation with balanced supply pressure conditions: 9 °F (5 °C)
Recommended minimum temperature difference between hot water inlet and mixed water outlet for optimal performance: 18 °F (10 °C)
Required minimum temperature difference between hot water inlet and mixed water outlet for thermal shut-off function: 18 °F (10 °C)

Flow coefficient:

AngleMix:	Cv=2.0 (Kv=1.7)
AngleMix+:	Cv=3.5 (Kv=3.0)

Minimum flow rate for stable operation with balanced supply pressure condictions:
AngleMix ½", ¾", 1" sizes: 0.5 gpm (2 l/min)
AngleMix+ 1" size: 1.0 gpm (4 l/min)
Maximum flow rate for temperature stability
AngleMix ½", ¾", 1" sizes: 9 gpm (34 l/min)
AngleMix+ 1" size: 16 gpm (60 l/min)

Mixed outlet temperature gauge: 2" diameter
Dual-scale 32 ° F to 210 ° F (0 °C to 100 °C)
Accuracy: 1% full-scale

Certifications:

1. ASSE 1017, CSA B125.3, UPC, IPC, IRC and NPC for use in accordance with U.S. and Canadian plumbing codes. Certified and listed by ICC-ES, File PMG 1357.
2. NSF/ANSI/CAN 372, US and Canadian Low-Lead and Lead-Free materials contents laws for drinking water system components. Certified by ICC-ES, PMG File 1360.
3. PEX crimp fittings certified to ASTM F 1807.
4. PEX expansion fittings certified to ASTM F 1960.

SAFETY INSTRUCTION

This safety alert symbol will be used in this manual to draw attention to safety related instructions. When used, the safety 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 preformed 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: If installed in an ASSE 1017 application, check valves shall be used.

CAUTION: When making the water connections, make sure that the pipwork connecting the thermostatic mixing valve is not mechanically overstressed. 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 (38 °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. Be sure water hardness is less than 10 grains.

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 WITH THE USER.

CONSIGNE DE SÉCURITÉ

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: S'il est installé dans un pays de ASSE 1017 application, vérifiez les robinets doivent être utilisés.

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 (38 °C) peutêtre 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 termostatico regolabile. Assurez-vous que la dureté de l'eau est inférieure à 10 grains.

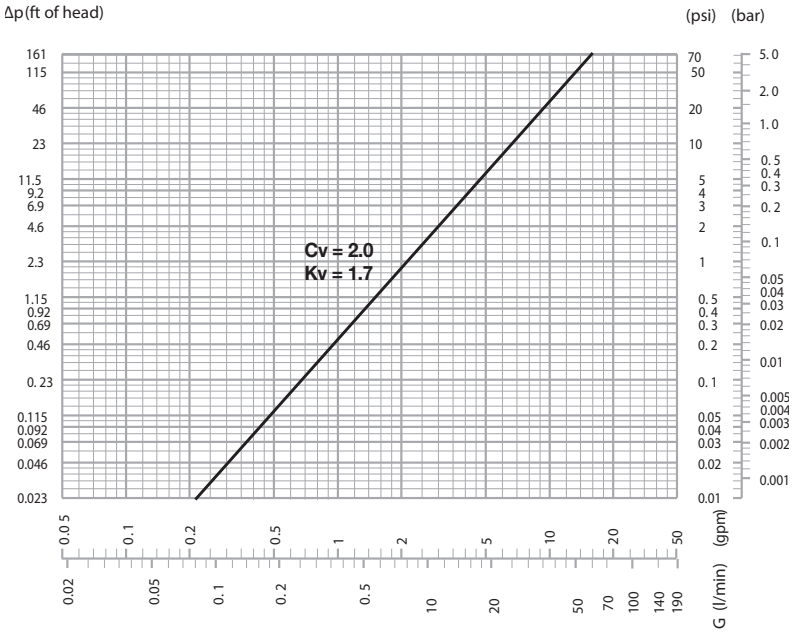
AVERTISSEMENT: La surface extérieure de l'appareil, en particulier les composants de type polymère, ne doit pas entrer en contact avec des substances chimiques, que ce soit volontairement ou accidentellement. Le produit et les additifs chimiques utilisés dans les canalisations d'eau - que ce soit pour 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.

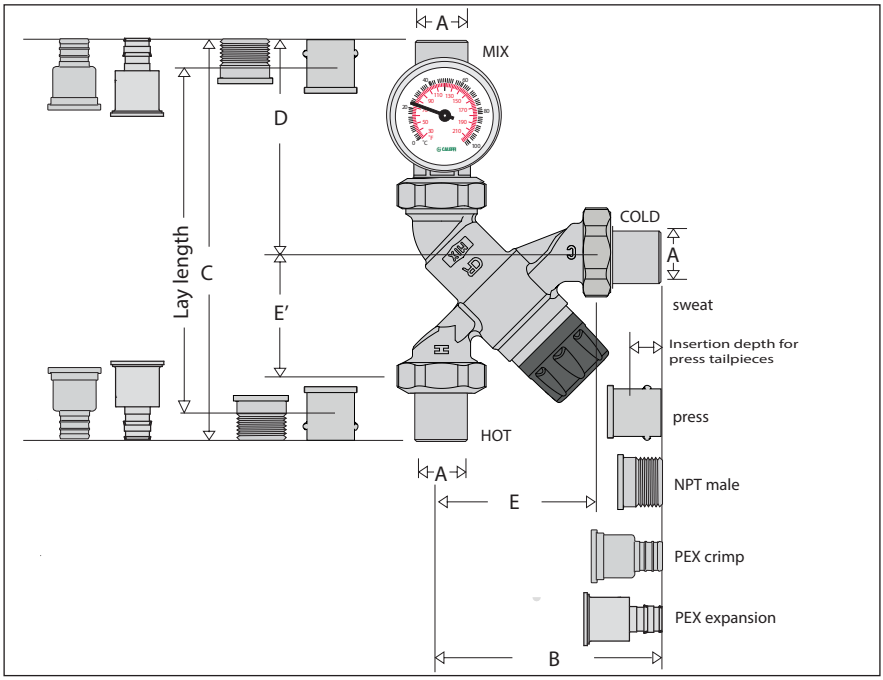
LAISSEZ CE MANUEL AVEC L'UTILISATEUR

AngleMix

Flow curve



Dimensions



Dimensions

AngleMix

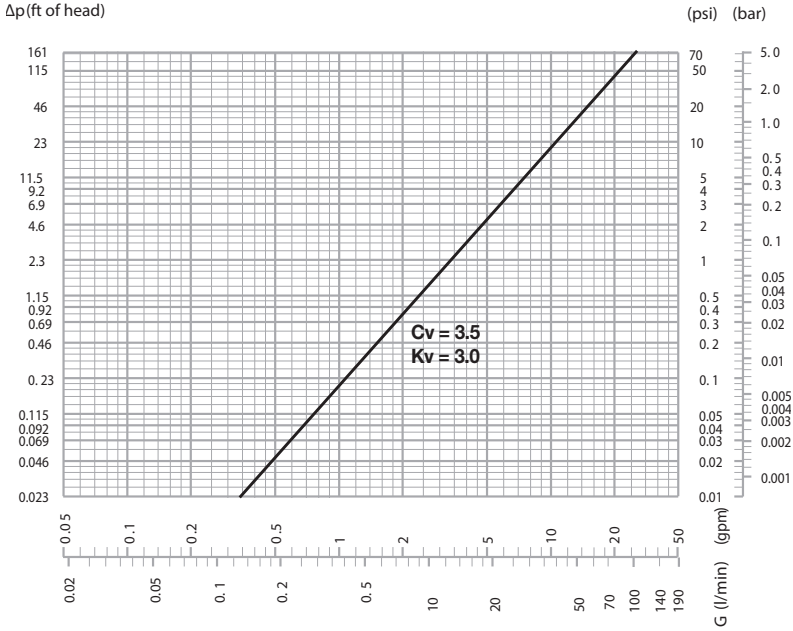
Code	A	B	C	D	E	E'	LL*	Insert. depth	Wt. (lb.)	Cv (Kv)
520410A	½" NPT male	4¼"	8¼"	4⅝"					1.7	
520410AC**	½" NPT male	4¼"	8¼"	4⅝"					2.2	
520414A	½" PEX crimp	4⅜"	8 9/16"	4 13/16"					1.6	
520414AC**	½" PEX crimp	4⅜"	8 9/16"	4 13/16"					2.1	
520415A	½" PEX exp	4⅜"	8⅝"	4⅞"					1.6	
520415AC**	½" PEX exp	4⅜"	8⅝"	4⅞"					2.1	
520416A	½" press	3¾"	7⅜"	4 3/16"			5⅝"	⅞"	1.8	
520416AC**	½" press	4¾"	9⅜"	5 3/16"			7⅝"	⅞"	2.3	
520419A	½" sweat	3 7/16"	6 1/16"	3 3/16"					1.7	
520419AC**	½" sweat	4 1/16"	7 5/16"	3 13/16"					2.2	
520510A	¾" NPT male	3¾"	7⅜"	4 3/16"					2.0	
520510AC**	¾" NPT male	4⅛"	8 1/16"	4 9/16"					2.5	
520514A	¾" PEX crimp	4⅜"	8 9/16"	4 13/16"					1.8	
520514AC**	¾" PEX crimp	4⅜"	8 9/16"	4 13/16"					2.3	
520515A	¾" PEX exp	4 5/8"	9 1/16"	5 1/16"	2 11/16"	2 1/16"			1.8	2.0 (1.7)
520515AC**	¾" PEX exp	5⅛"	10 1/16"	5 9/16"					2.3	
520516A	¾" press	4⅛"	8 1/16"	4 9/16"			6 3/16"	15/16"	2.0	
520516AC**	¾" press	5½"	10 13/16"	5 15/16"			8 15/16"	15/16"	2.5	
520519A	¾" sweat	3 1/16"	6⅜"	3 9/16"					2.0	
520519AC**	¾" sweat	4¼"	7½"	4⅛"					2.5	
520610A 001	1" NPT male	4"	7⅞"	4 7/16"					3.9	
520610AC 001**	1" NPT male	4 3/16"	8¼"	4⅝"					4.0	
520614A 001	1" PEX crimp	4⅜"	8 9/16"	4 13/16"					3.5	
520614AC 001**	1" PEX crimp	4⅜"	8 9/16"	4 13/16"					3.7	
520615A 001	1" PEX exp	5"	9 13/16"	5 7/16"					3.5	
520615AC 001**	1" PEX exp	5½"	10 13/16"	5 15/16"					3.7	
520616A 001	1" press	4¼"	8⅜"	4 11/16"			7 13/16"	1 1/16"	3.7	
520616AC 001**	1" press	5⅝"	11 1/16"	6 1/16"			10½"	1 1/16"	3.9	
520619A 001	1" sweat	4¼"	7½"	4⅛"					3.7	
520619AC 001**	1" sweat	4 7/16"	7⅞"	4 5/16"					3.8	

**Lay length for press tailpieces (hot inlet to mix oulet).*

***Inlet port check valves included.*

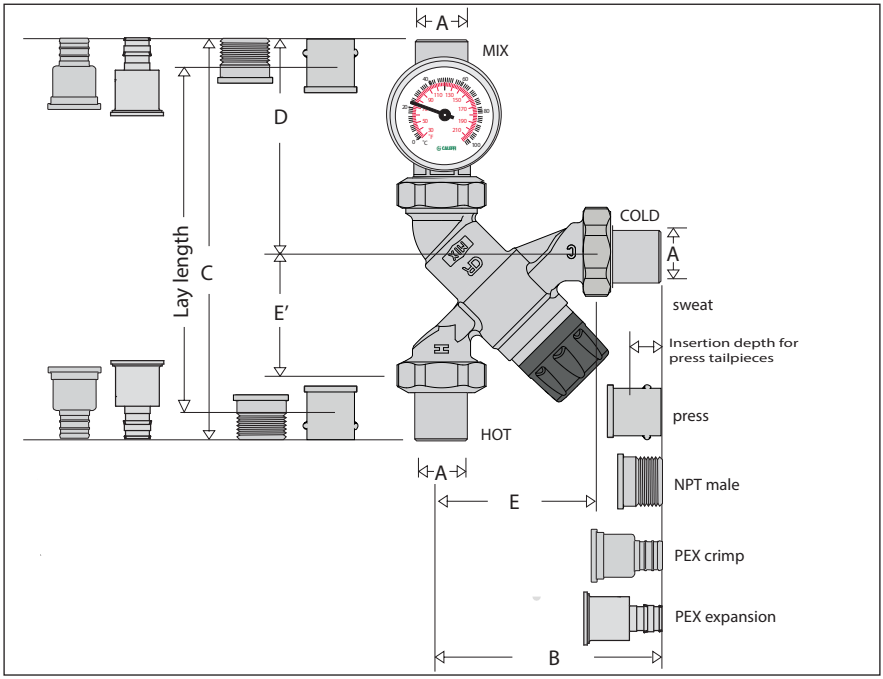
AngleMix+

Flow curve



AngleMix+

Dimensions



Code	A	B	C	D	E	E'	LL*	Insert. depth	Wt. (lb.)	Cv (Kv)
520610A	1" NPT male	5 13/16"	10 15/16"	5 7/8"	3 5/8"	2 7/8"			3.9	3.5 (3.0)
520610AC**	1" NPT male	5 13/16"	10 15/16"	5 7/8"					4.0	
520614A	1" PEX crimp	5 3/8"	10 1/16"	5 1/2"					3.5	
520614AC**	1" PEX crimp	7 13/16"	12 1/2"	5 1/2"					3.7	
520615A	1" PEX exp	4 7/8"	9 1/16"	5"					3.5	
520615AC**	1" PEX exp	7 5/16"	11 1/2"	5"					3.7	
520616A	1" press	5 3/8"	10"	5 1/2"			7 13/16"	1 1/16"	3.7	
520616AC**	1" press	7 3/4"	12 7/16"	5 1/2"			10 1/4"	1 1/16"	3.9	
520619A	1" sweat	4 1/16"	8 1/16"	4 3/4"					3.7	
520619AC**	1" sweat	7 1/8"	11 1/8"	4 3/4"					3.8	

**Lay length for press tailpieces (hot inlet to mix oulet).*
***Inlet port check valves included.*

Use

Caleffi AngleMix and AngleMix+ thermostatic mixing valves are engineered for installation at the point of distribution to regulate the temperature of the domestic hot water distributed within the downstream network. The AngleMix and AngleMix+ are not suitable for tempering water temperature at individual fixtures as a point-of-use valve. The AngleMix and AngleMix+ thermostatic mixing valves are not designed to offer protection against scalding. Where scald protection is necessary an ASSE 1070/ASME A112.1070/CSA B125.70 and CSA B125.3 certifed valve should be used. The Caleffi 5212 or 5213 series scald protection mixing valves meet this requirement. As a safety precaution, it is advisable to limit the maximum mixed water temperature at 120 °F when scald protection devices are not implemented at each fixture.

Caleffi AngleMix and AngleMix+ thermostatic mxing valves (520_AC series) with hot and cold inlet check valves are not recommended for use in hydronic systems.

Construction details

Thermal shut-off

In the event of accidental cold water supply failure, the valve will quickly close the hot inlet port to prevent the delivery of unsafe hot water. This is only guaranteed when there is a minimum temperature difference between the inlet hot water and the mixed temperature water delivery of 18 °F.

Body shape

The angle body configuration has improved fluid dynamics for better performance, and reduces installation labor and materials because the hot inlet port is in line with the mixed outlet port, eliminating a piping elbow as required for standard mixing valves. The cold inlet comes in the side.

Anti-scale materials

The materials used in constructing the mixing valve are designed to eliminate seizing due to limescale deposits. All functional parts have been made using a special anti-scale material with low friction coefficient, ensuring long life performance.

AngleMix™

Installation

Before installing a Caleffi AngleMix and AngleMix+ 520 series three-way thermostatic mixing valves, the system must be inspected to ensure that its operating conditions are within the range of the mixing valve, checking, for example, the supply temperature, supply pressure, etc.

Systems where the 520 series thermostatic mixing valve will be installed must be drained and cleaned out to remove any dirt or debris which may have accumulated during installation.

The installation of appropriately sized filters at the inlet from the main water supply is always advisable.

Caleffi AngleMix and AngleMix+ 520 series thermostatic mixing valves must be installed by qualified personnel in accordance with the diagrams in this brochure, taking into account all current applicable standards.

Caleffi AngleMix and AngleMix+ 520 series thermostatic mixing valves can be installed in any position, either vertical or horizontal, or upside down.

The following are shown on the thermostatic mixing valve body:
- Hot water inlet, marked “H”.
- Cold water inlet, marked “C”.
- Mixed water outlet, marked “MIX”.

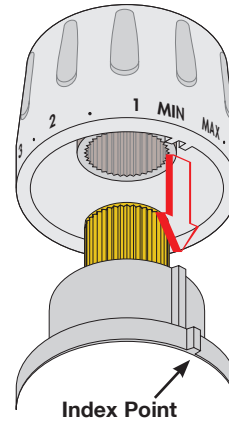
Locking the setting

1. Align the index point to the desired temperature setting by rotating the control knob.

2. Unscrew the head screw and remove the control knob.

3. Position the knob so that the boss, indicated by red arrow in figure, fits into the internal slot of the control knob.

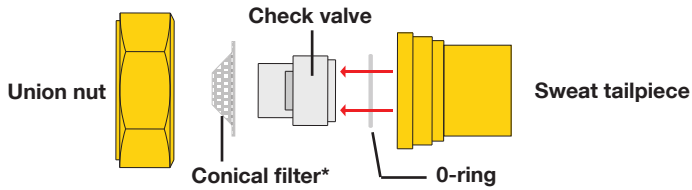
4. Tighten the head screw and the control knob will no longer be able to rotate to adjust the mixing setting.



Check valve

In systems with thermostatic mixing valves, check valves should be installed to prevent undesired backflow. In order to prevent undersirable backsiphonage, separate check valves should be installed in systems with AngleMix and AngleMix+ thermostatic mixing valves (these models do not contain check valves in the hot and cold inlet ports). As a convenience for easier installations, the Caleffi AngleMix and AngleMix+ code “520_AC” model series thermostatic mixing valves include integral check valves in the hot and cold inlet ports.

NOTE TO INSTALLER: DO NOT TEST FIT OR INSTALL CHECK VALVES BEFORE SOLDERING. IF INSTALLED, REMOVAL WILL REQUIRE DAMAGING THE CHECK VALVE AND IT WILL NO LONGER BE USABLE. (*Conical filters are not included in AngleMix+)



Commissioning

The Caleffi AngleMix and AngleMix+ 520 series thermostatic mixing valve must be commissioned in accordance with current standards by qualified personnel using temperature measuring equipment. Caleffi AngleMix and AngleMix+ 520 series come standard with an integral outlet port temperature gauge which provides a time-saving temperature setting process to get close to the desired temperature. Use of a digital thermometer is recommended for confirming the final setting of the mixed water temperature. After installation, the valve must be tested and commisioned in accordance with instructions given below, taking into account current applicable standards.

1) Ensure that the system is clean and free from dirt or debris before commissioning the thermostatic mixer.

2) It is recommended that the temperature is set using a suitable calibrated digital thermometer. The valve must be commissioned by measuring the temperature of the mixed water emerging at the point of use.

3) The maximum outlet temperature from the valve must be set accounting for fluctuations due to simultaneous use. It is essential for these conditions to be stabilized before commissioning.

4) Adjust the temperature using the adjusting knob on the valve. For safety reasons. it is advisable to limit the maximum mixed water temperature to 120 ºF in domestic hot water systems where anti-scald valves are not located at each fixture.

5) The temperature may be adjusted using the control knob.

a) Adjust the temperature of the mixed water to the desired value.
b) Measure and record the temperature at the cold and hot water inlets.
c) Measure and record the temperature of the water delivered from the tap at the lowest and highest flow rates.
d) Run a test of the thermal shut-off function. Close the cold water inlet shut-off valve and check the mixed water delivery. The delivery flow rate should quickly drop to zero.
e) Measure and record the maximum mixed water temperature. The temperature may not exceed the values permitted in any applicable legislation or code of practice.
f) Restore the cold water inlet supply and measure the water delivery temperature after it has stabilized. The final temperature measured in this test may not exceed the permitted values by ±3 °F (±2 °C).

In case of change to temperature setting, repeat tests in accordance with points d, e, f.
All the above information should be recorded in the commissioning report and updated in the maintenance report whenever the valve is worked on.

Temperature setting and locking

The control knob permits temperature setting between minimum and maximum in one turn (360°). It also has a tamper-proof system to lock the temperature at the set value. The temperature is set to the required value by means of the knob with the graduated scale, on the top of the valve.

Pos.	Min.	1	2	3	4	5	6	7	Max.
T (°F)	95	105	115	120	125	132	140	145	150
T (°C)	35	40	45	48	52	56	60	63	65

with: T_{HOT} = 158 °F (70 °C), T_{cold} = 59 °F (15 °C), P = 43 psi (3 bar)

Troubleshooting

Under normal operating conditions the Caleffi AngleMix and AngleMix+ 520 series thermostatic mixing valve will provide a very high level of performance. However, in some circumstances, where the following maintenance schedule is not followed problems may arise.

Recommended maintenance schedule:

Tests should be conducted regularly to monitor the thermostatic mixing valve performance, as deterioration of performance could indicate that the valve and/or the system require maintenance. If, during these tests, the temperature of the mixed water has changed significantly in comparison with the previous test, the details given in the installation and commissioning sections should be checked and maintenance conducted.

The following should be checked regularly to ensure that the optimum performance levels of the valve are maintained. Check every 12 months at least, or more often if necessary.

1) Check and clean the system filters, and the conical filters in AngleMix (2.0 Cv) models.

2) Check that any check valves positioned upstream of the Caleffi thermostatic mixing valve are operating correctly, without problems caused by impuritites.

3) Limescale can be removed from internal components of the thermostatic mixing valve by immersion in a suitable de-scaling fluid.

4) When the components which can be maintained have been checked, commission the valve.

Common troubleshooting symptoms:

Symptoms	Cause	Corrective action
Temperature will not adjust when adjustment knob is turned	a) Thermostatic element is calcified or full of lime/minerals.	- Soak body in a de-scaling fluid
Hot water at the cold taps	a) Operation of check valve is hindered; Check valve is not sealing correctly. b) Check valves not installed.	- Replace faulty check valve.
Fluctuating mixed water temperature	a) Erratic supply temperatures at the inlets of the mixing valve. b) Flow through the valve is less than it's minimum flow rate. c) Incorrect commissioning of the valve.	- Restore inlet conditions within the limits of the recirculation circuit.
Erratic flow of water from the valve	a) Flow through the valve is less than it's minimum flow rate. b) Fluctuations in the supply pressures/temperatures. c) Adverse effect created by other draw off points on the system.	- Stabilize inlet supply conditions.
No flow of water from the valve	a) In-line filters/strainers or inlet conical filters pllugged or blocked. b) Insufficient supply pressures. c) Debris obstructing valve operation.	- Clean filters/strainers and inlet conical filters (see page 10). - Restore inlet supplies. - Clean debris or scale from the valve.
Valve shut-off function not performed when tested	a) Mixing valve not properly installed per instructions. b) Minimum temperature difference not reached. c) Valve mechanism blocked by dirt.	- Re-install per instructions. - Increase hot water temperature. - Remove dirt/limescale from the valve.

LEAVE THIS MANUAL WITH THE USER.

Laissez ce manuel à la disposition de l'utilisateur.

01-2025

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