PivotMixer™ water heater tank and heat pump mixing valve

520 series

01413/24 NA

ASSE 1017
NSF/ANSI/CAN 372

Function

The Caleffi PivotMixer™ combines the AngleMix™ three-way point-of-distribution thermostatic mixing valve with a cold water cross and pivoting brass connectors for easy installation directly on typical electric water heaters and heat pump water heaters. It has unique ¾" pivot connectors that adapt to heater nipples spaced from 3" to 8" on-center. The cross for the cold water supply contains an integral check valve for the flow to the mixing valve and ½" NPT female threaded recirculation tap. The PivotMixer maintains 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 also features a thermal shut-off function that operates in the event of a cold water supply failure at the inlet. The angle style body design offers improved fluid dynamics for better performance and reduces installation labor and materials. The mixing valve has been certified to ASSE 1017 and Low Lead Plumbing Law by ICC-ES. It complies with codes IPC, IRC, NPC and UPC for use in accordance with US and Canadian plumbing codes, and standard NSF/ANSI/CAN 372, governing low lead material content.

Product range

52051_AP series	Kit containing adjustable three-way thermostatic mixing valve, angle body with cold water cross and pivot connectors
	.....connections ¾" NPT female to water heater; ¾" sweat, press, and NPT male union to system

Technical specifications

Materials

Valve body:	DZR low-lead* brass
Cold water cross body:	DZR low-lead* brass
Pivot connectors:	DZR low-lead* brass
Shutter, seats and slide guides:	PSU
Springs:	stainless steel
Seals:	peroxide-cured EPDM
Adjustment knob	ABS
Recirculation port plug:	low-lead* brass

* 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)
Minimum flow to ensure optimal performance:	0.5 gpm (2 L/min)
Outlet temperature gauge:	2" diameter
	Dual-scale 32 °F - 210 °F (0 °C –100 °C)
	Accuracy: 1% full-scale

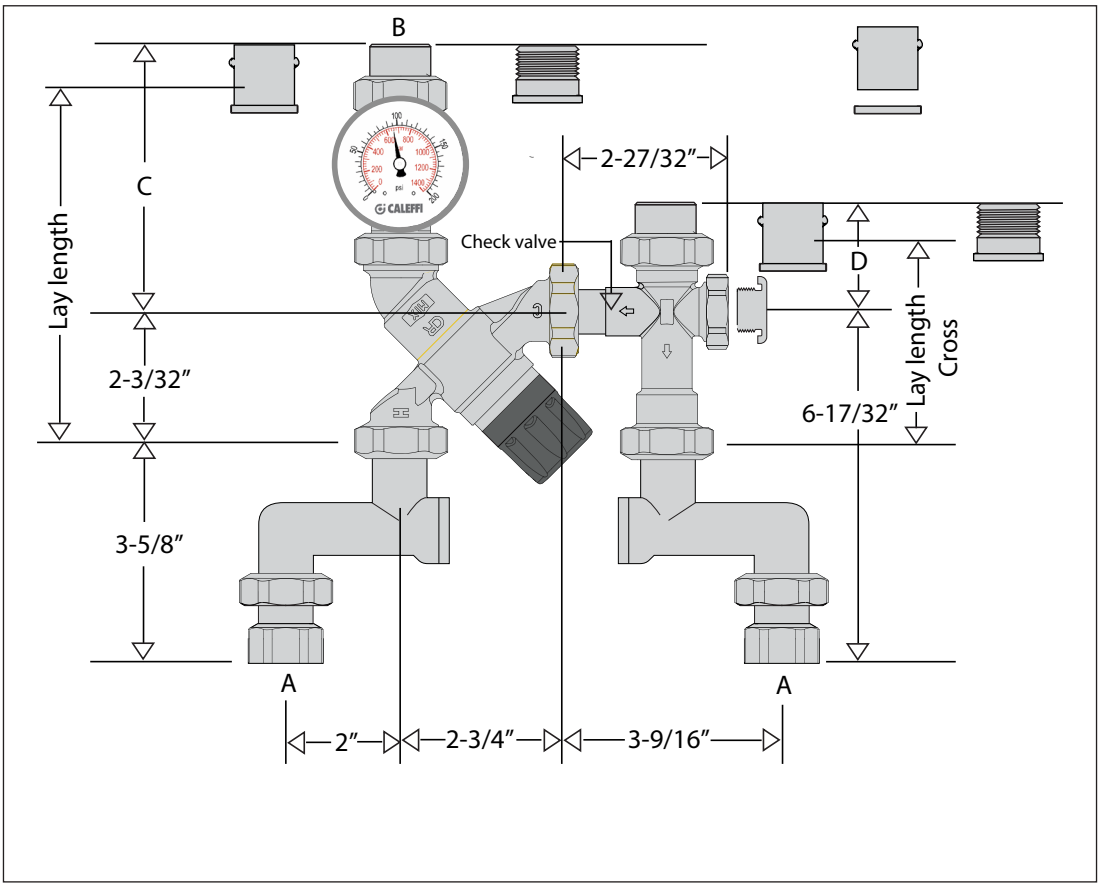
Certifications

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, Drinking Water System Components-Lead Content Reduction of Lead in Drinking Water Act, California Health and Safety Code 116875 S.3874, Reduction of Lead in Drinking Water Act, certified by ICC-ES, file PMG-1360.

Connections

to water heater:	
- NPT female union:	¾"
to mix temperature outlet and cold water inlet	
- sweat union:	¾"
- press union:	¾"
- NPT male union:	¾"
recirculation inlet port in cross:	
- NPT female (plug included)	½"

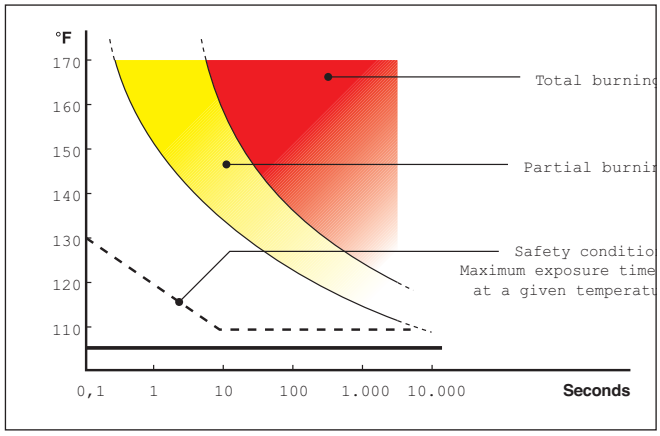
Dimensions



Code	A	B	C	D	Wt. (lb.)
520510AP	¾" NPTF	¾" NPTM	4 3/16"	2”	4.5
520516AP	¾" NPTF	¾" PRESS	4 17/32"	2 13/32"	4.4
520519AP	¾" NPTF	¾" SWT	3 5/16"	1 15/16”	4.1

Lay length (hot inlet to mix oulet) for press: 5 11/16"; for sweat: 4 11/16".
Lay length (Cross) for press: 3 9/32”; for sweat: 3 17/32”.

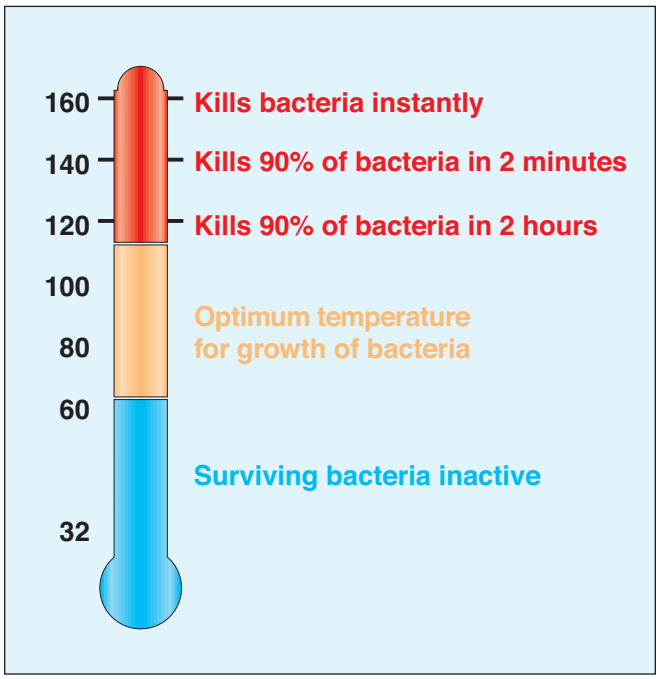
Temperature — exposure time



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.



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.

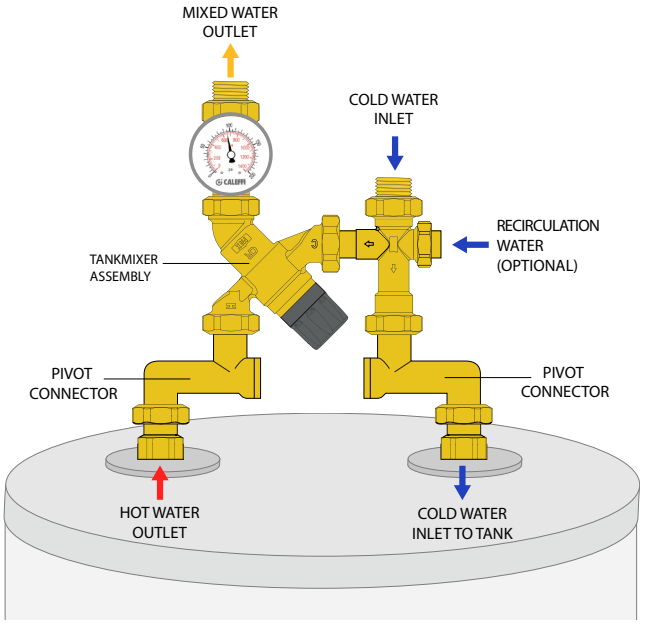
As shown on the diagram opposite, temperatures of more than 120°F can cause burning very quickly. For example, at 130°F partial burning will occurr in approximately 30 seconds, while at 140°F partial burning will occurr in approximately 5 seconds. The time may be reduced by 50 percent or more for children 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 sanitary users. For safety reasons, it is advisable to limit the mixed water temperature to 120°F when point-of-use anti-scalding thermostatic mixing valves are not present at all fixtures.
- maintain the temperature constant when the incoming pressure and temperature conditions vary.

Operating principle

The thermostatic mixing valve mixes hot and cold water to maintain a consistent temperature for the hot fixtures of the plumbing system. The PivotMixer point of distribution mixing valve assembly also includes a cold water cross, with check valve, and pivot connectors for easy installation to most electric and heat pump water heaters. It connects to the heater's 3/4" male nipples and is available with a variety of mixed water outlet and cold water inlet pipe connection types. It provides increased usable hot water capacity on existing or new high efficiency water heaters by allowing water to be stored at a higher temperature and safely delivered at lower adjustable temperatures to all fixtures. In addition, it can be used to reduce legionella growth by allowing the water heater thermostat to be set at 140 °F. The unique ¾" pivot connectors adapt to heater nipples spaced from 3" to 8" on-center. The PivotMixer has a recirculation port that can be plugged or used for connecting to a hot water recirculation loop.



Construction details

Anti-scale materials

The material used in the construction of the Caleffi PivotMixer™ 520 series (TankMixer subassembly pictured to the right) thermostatic mixing valve reduces jamming caused by lime deposits. All the working parts such as shutter, seats and slide guides are made of a special anti-scale polymer material, with a low friction coefficient, assuring long term performance.

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.

Thermal shut-off

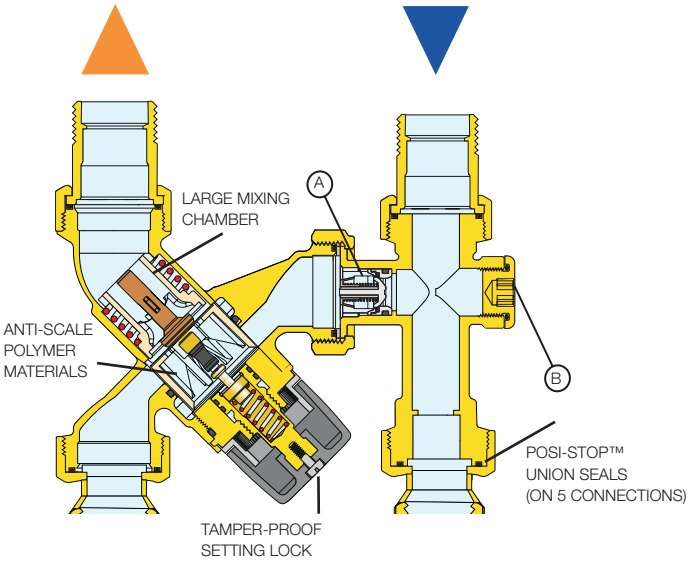
In the event of accidental cold water supply failure, the shutter seals off the hot water passage, thus preventing the delivery of mixed temperature water. This is only guaranteed when there is a minimum temperature difference between the inlet hot water and the mixed temperature water delivery of 18 °F. Additionally, the tight closing hot inlet port prevents temperature creep in recirculation applications.

Check valve

In systems with thermostatic mixing valves, check valves should be installed to prevent undesired backflow. The cold water cross of the PivotMixer assembly comes with an integral check valve (A) on the outlet port to the mixing valve.

Recirculation port

The PivotMixer™ 52051_AP series comes standard with a recirculation port that can be plugged or used for connecting to a hot water recirculation loop (B).

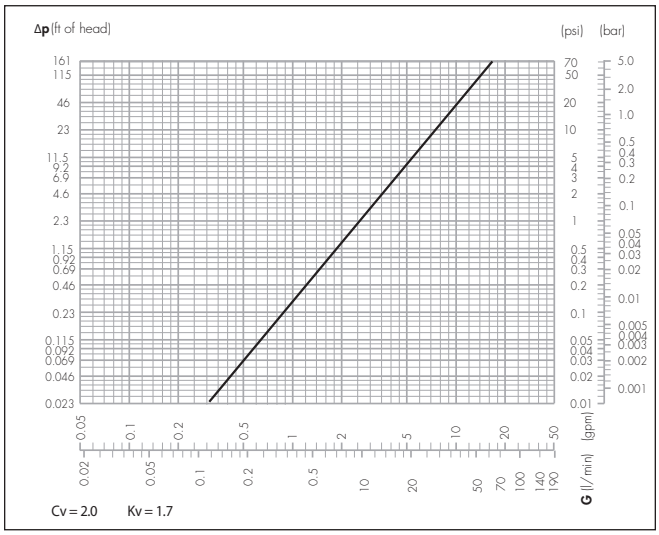


TankMixer Subassembly

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.

Hydraulic Characteristics



Flow should never exceed standards for pipe size and materials.

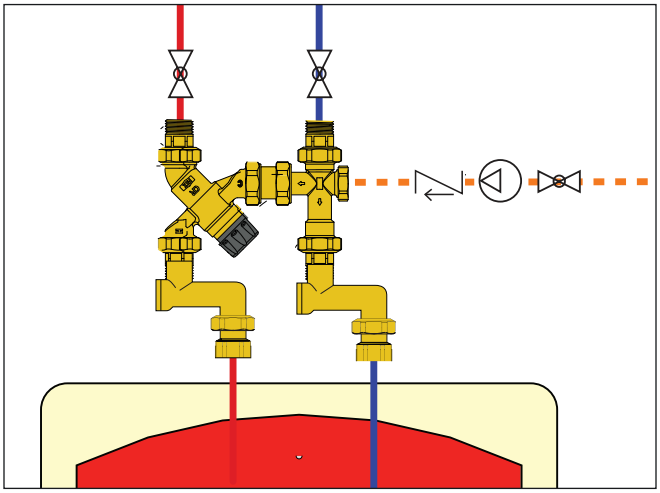
Use

Caleffi PivotMixer thermostatic mixing valve assemblies are designed to be installed at the water heater. The PivotMixer cannot be used for tempering water temperature at fixtures as a point-of-use valve. They are not designed to provide scald protection. For safety reasons, it is advisable to limit the maximum mixed water temperature to 120 °F when anti-scald devices are not used at each fixture.

Water heater

As a result of the NAECA, many water heaters now have more insulation making them physically larger, for the same water capacity, than the older models. Sometimes smaller units with less capacity are installed requiring higher temperature settings to provide the capacity users were previously accustomed to, requiring mixing valves to temper the water to safe levels.

Caleffi PivotMixer thermostatic mixing valves with cold water cross assembly and pivot connectors will conveniently fit a typical electric water heater and heat pump water heater. A recirculation return can be connected at the side port of the cold water cross.



Installation

Before installing a Caleffi PivotMixer thermostatic mixing valve assembly, 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 PivotMixer thermostatic mixing valve assembly 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 PivotMixer thermostatic mixing valve assemblies must be installed by qualified personnel in accordance with the diagrams in this brochure, taking into account all current applicable standards.

Caleffi PivotMixer thermostatic mixing valve assemblies can be installed in any position, either vertical, horizontal or upside down.

The following are shown on the thermostatic mixing valve body:
- Hot water inlet, color red and marked “HOT”.
- Cold water inlet, color blue and marked “COLD”.
- Mixed water outlet, marked “MIX”.

The PivotMixer 52051_AP series comes packaged in a kit with everything needed for fast installation including union fittings and NPT male, sweat or press tailpiece connections.

Commissioning

The Caleffi PivotMixer thermostatic mixing valve assembly must be commissioned in accordance with current standards by qualified personnel using temperature measuring equipment. The mixed outlet temperature gauge reduces commissioning time, saving time to approach the desired temperature efficiently. It’s advisable to utilize a digital thermometer to verify the final setting of the mixed water temperature.

Temperature adjustment

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

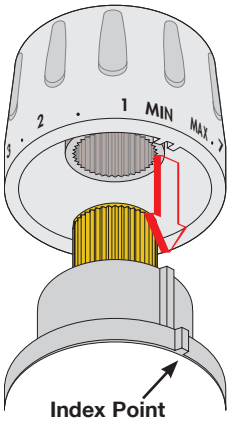
Locking the setting

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

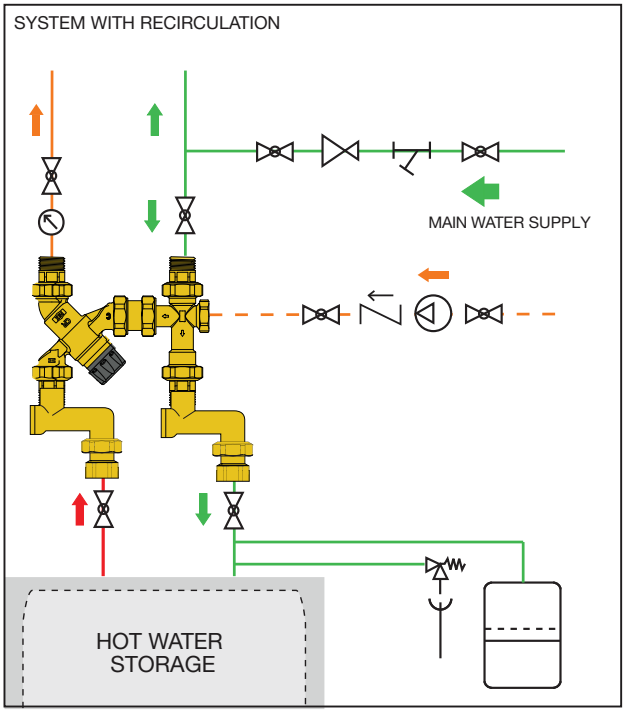
2. Unscrew the head screw and remove the control knob.

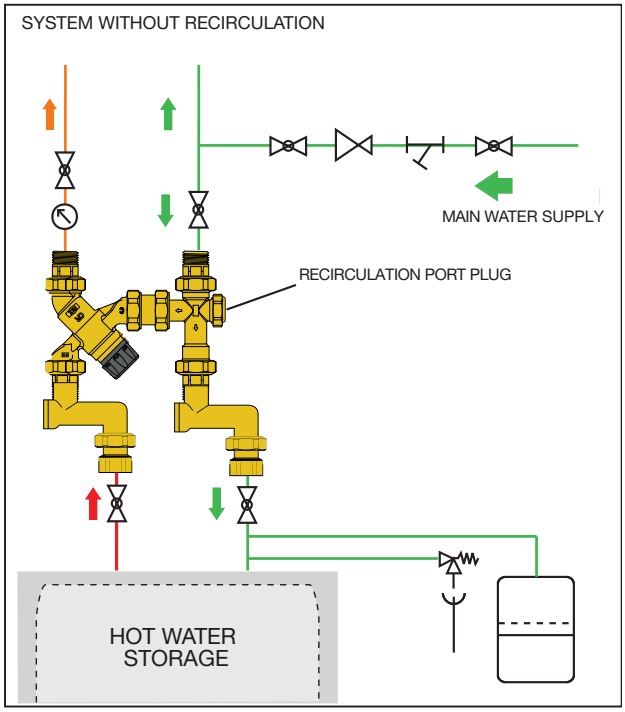
3. Position the knob so that the boss, indicated by red arrow in figure, fits into the internal slot of the control knob.

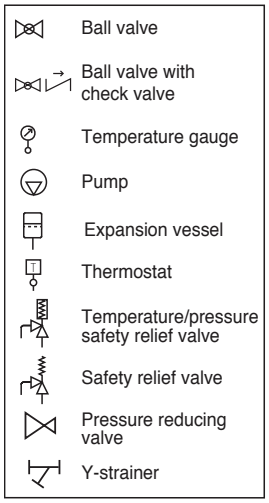
4. Tighten the head screw and the control knob will no longer be able to rotate to adjust the mixing setting.

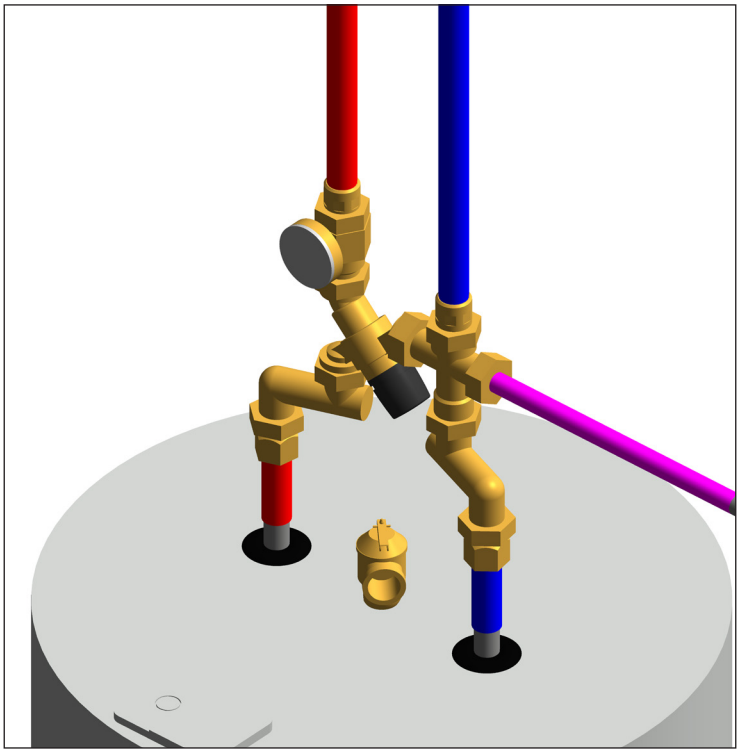


Application diagrams









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SPECIFICATION SUMMARIES

PivotMixer™ 52051_AP series - water heater tank and heat pump mixing valve

Adjustable thermostatic and pressure balanced mixing valve, certified by ICC-ES to ASSE 1017 and CSA B125.3, approved for point of distribution domestic water systems. Connections ¾" NPT male, ¾" sweat or ¾" press with union tailpieces. DZR low-lead brass valve body, pivot connectors and cold water cross (<0.25% Lead content) certified by ICC-ES file 1360. Meets requirements of NSF/ANSI/CAN 372-2022. Shutter, regulating seats and sliding surfaces in anti-scale plastic, PSU. Seals peroxide-cured EPDM. Stainless steel spring. Maximum working temperature 195 degrees F (90 degrees C). Setting range 95 degrees F to 150 degrees F (35 degrees C to 65 degrees C). Maximum working pressure 150 psi (10 bar). Maximum operating differential pressure 75 psi (5 bar). Tolerance ±3 degrees F (±2 degrees C). Flow rating: Cv 2.0 (Kv 1.7). Provided with tamper-proof setting lock. Provided with cold water port check valve in cold water cross outlet. Provided with mixed outlet temperature gauge, 32 to 210 degrees F scale, 2 inch diameter. Provided with recirculation return port, ½" NPT female, low-lead brass plug included.

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