

# Adjustable, anti-scale thermostatic mixing valve

## series 521



cert. n° 0003  
ISO 9001

01050/03 NA



### Function

The thermostatic mixer is used in systems producing domestic hot water or in radiant panels heating systems. Its function is to maintain the temperature of the mixed water supplied to the user constant at the set value when there are variations in the supply conditions of the incoming hot and cold water.

The valve has been specifically certified to ASSE 1017.



ASSE 1017

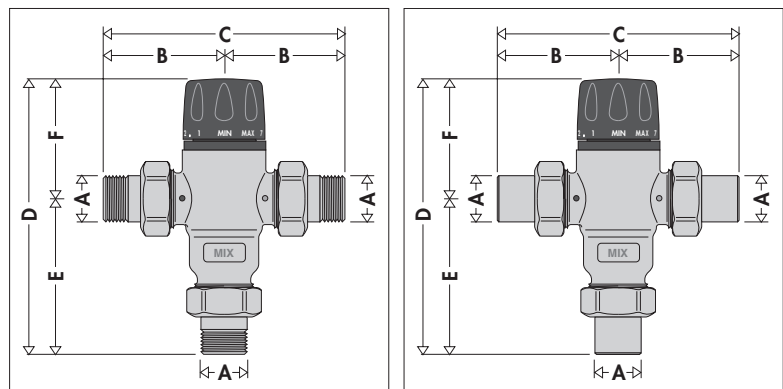
### Product range

Series 521 Thermostatic mixing valve with threaded connections Sizes 1/2", 3/4", 1"  
 Series 521 Thermostatic mixing valve with sweat connections Sizes 1/2", 3/4", 1"

### Technical specification

- Materials: - Body: DZR Brass
- Shutter: PPO
- Springs: Stainless steel
- Seals: EPDM
- Setting range: 85÷150°F (30÷65°C)
- Tolerance: ±3°F (±2°C)
- Max working pressure (static): 200 psi (14 bar)
- Max working pressure (dynamic): 70 psi (5 bar)
- Max hot water inlet temperature: 200°F (93°C)
- Maximum inlet pressure ratio (H/C or C/H): 2:1
- Minimum temperature difference between hot water inlet and mixed water outlet for optimum performance: 27°F (15°C)
- Certified to: ASSE 1017
- Connections: 1/2"÷1" NPT male with union  
1/2"÷1" sweat with union

### Dimensions



Code	A	B	C	D	E	F	Code	A	B	C	D	E	F
521400A	1/2"	2 5/8"	5 1/4"	5 15/16"	3 3/8"	2 9/16"	521409A	1/2"	2 1/4"	4 1/2"	5 5/8"	3 1/16"	2 9/16"
521500A	3/4"	2 5/8"	5 1/4"	5 15/16"	3 3/8"	2 9/16"	521509A	3/4"	2 1/2"	5"	5 7/8"	3 1/4"	2 9/16"
521600A	1"	2 7/8"	5 7/8"	8 5/16"	3 11/16"	2 9/16"	521609A	1"	3 1/16"	6 3/16"	6 7/16"	3 7/8"	2 9/16"

## 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 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 sanitary users. For safety reasons, it is advisable to limit the mixed water temperature to 120°F;
- maintain the temperature constant when the incoming pressure and temperature conditions vary.

## Operating principle

The controlling element of the thermostatic mixing valve is a temperature 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 mixer automatically regulates the water flow to obtain the required temperature.

## Construction details

### Anti-scale materials

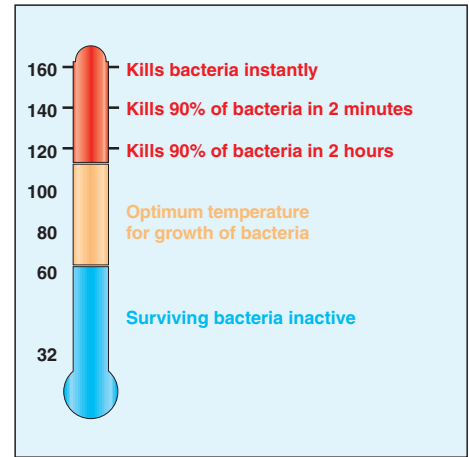
The material used in the construction of the mixer eliminates the problem of jamming caused by lime deposits. All the working parts such as shutter, seats and slide guides are made of a special anti-scale material, with a low friction coefficient, guaranteeing that the performance will be maintained over the long term.

### Temperature setting and locking

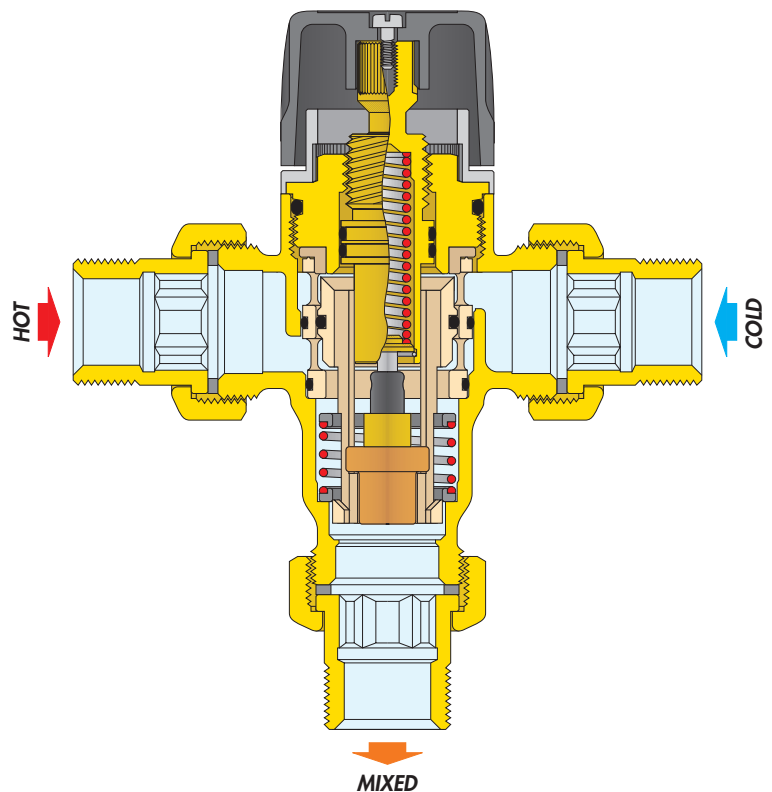
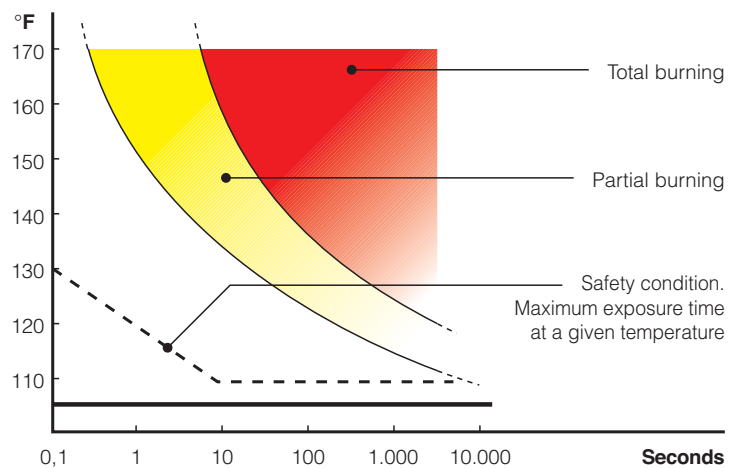
The control knob permits temperature setting between minimum and maximum in one turn (360°). It also has a tamper-proof system to lock the temperature at the set value.

## Thermal disinfection

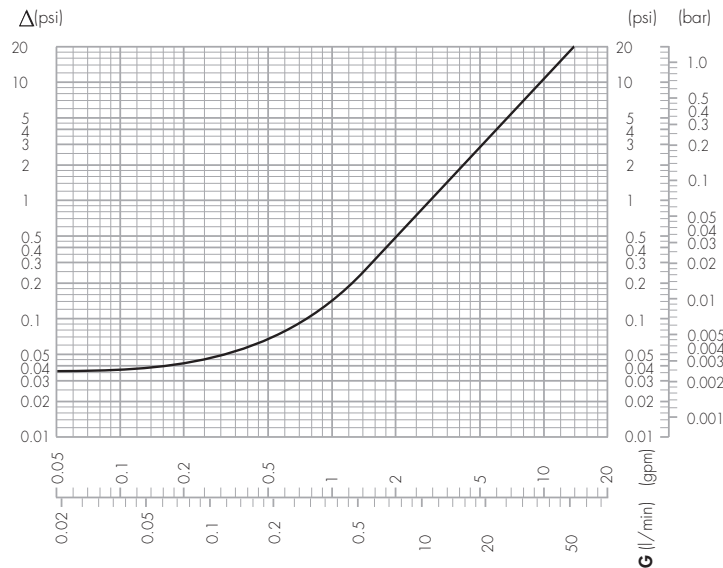
The diagram shows the behaviour of the bacteria *Legionella Pneumophila* when the temperature conditions of the water in which it is contained vary. In order to ensure proper thermal "disinfection", the values must not be below 140°F.



## Temperature - Exposure time



## Flow curves



$C_v = 3.0$  (gpm)  
 $K_v = 2.6$  (m<sup>3</sup>/h)

## Use

Caleffi series 521 thermostatic mixing valves are designed to be installed at the hot water heater. The Caleffi series 521 valve cannot be used for tempering water temperature at fixtures as a point-of-use valve. They are not designed to provide anti-scald or anti-chill service. They should not be used where ASSE 1016 devices are required. Wherever an antiscald feature is required, Caleffi series 5212 high performance mixing valve need to be installed. For safety reasons, it is advisable to limit the maximum mixed water temperature to 120°F

## Instantaneous production of hot water

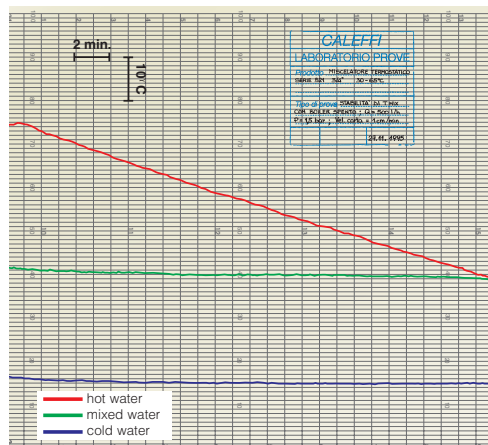
Caleffi Series 521 thermostatic mixers should not be used in conjunction with boilers giving instantaneous production of domestic hot water. Their addition would compromise the correct operation of the boiler itself.

## Radiant panel heating systems

Caleffi Series 521 thermostatic mixing valves can also be used for regulating the flow temperature in radiant panel heating systems, to which it assures a constant and accurate control with ease of installation.

## Temperature stability

The diagram shows the stability of the temperature of the mixed water on variation of the temperature of the stored water.



## Installation

Before installing a Caleffi Series 521 mixer, the system must be inspected to ensure that its operating conditions are within the range of the mixer, checking, for example, the supply temperature, supply pressure, etc.

Systems where the Caleffi Series 521 mixer is to be fitted 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 mains supply is always advisable.

Caleffi Series 521 mixers must be installed by qualified personnel in accordance with the diagrams in this brochure, taking into account all current applicable standards.

Caleffi Series 521 mixers can be installed in any position, either vertical or horizontal.

The following are shown on the mixer body:

- Hot water inlet, color red and marked "HOT".
- Cold water inlet, color blue and marked "COLD".
- Mixed water outlet, marked "MIX".

## Check valves

In order to prevent undesirable backsiphonage, check valves should be installed in systems with thermostatic mixing valves.

## 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 temperature measuring equipment. Use of a digital thermometer is recommended for measurement of the mixed water temperature.

## Temperature adjustment

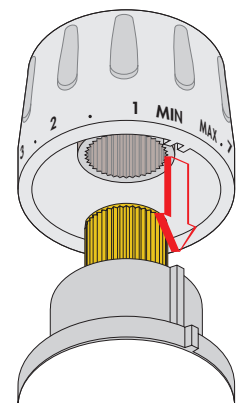
The temperature is set to the required value by means of the knob with the graduated scale, on the top of the valve.

Pos.	Min	1	2	3	4	5	6	7	Max
T (°F)	81	90	100	111	120	127	136	145	152
T (°C)	27	32	38	44	49	53	58	63	67

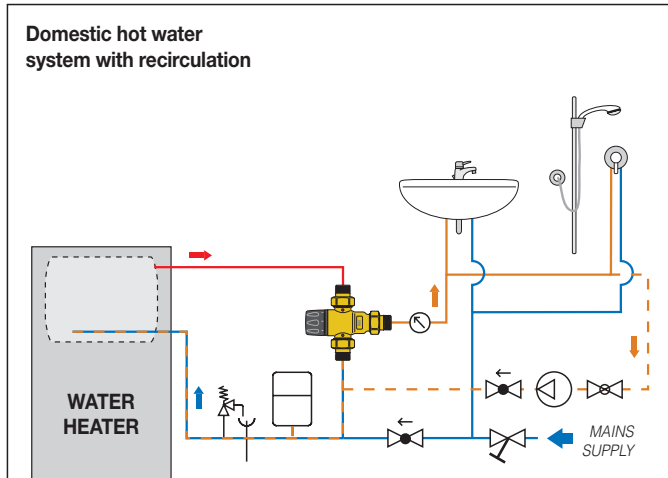
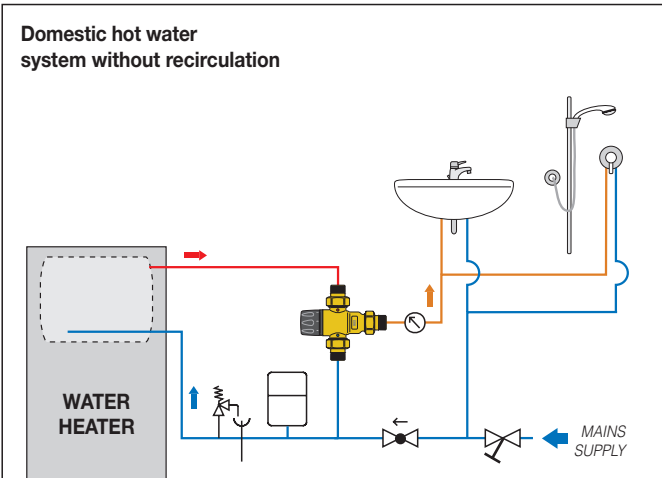
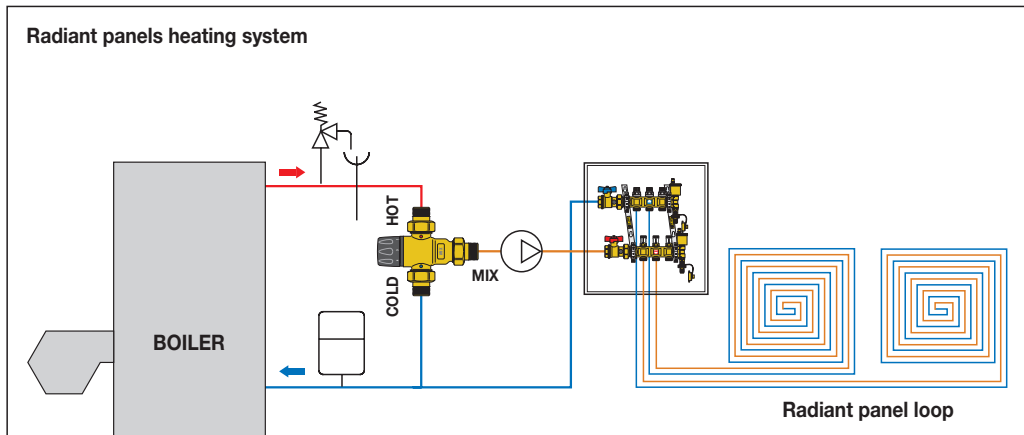
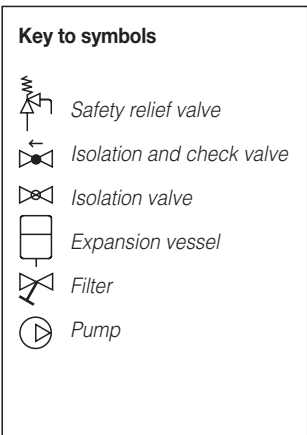
with:  $T_{HOT} = 155^{\circ}F$  ( $68^{\circ}C$ ) ·  $T_{COLD} = 55^{\circ}F$  ( $13^{\circ}C$ ) ·  $P = 43$  psi (3 bar)

## Preset locking

Position the handle to the number required. Unscrew the head screw, pull off the handle and reposition it so that the handle fits into the internal slot of the knob. Tighten the head screw.



**Application diagrams**



**SPECIFICATION SUMMARIES**

**Series 521**

Adjustable thermostatic mixing valve to ASSE 1017. Threaded connections 1/2" (3/4" or 1") NPT M with union tailpieces. DZR alloy body. Shutter, regulating seats and sliding surfaces in anti-scale plastic. Seals EPDM. Stainless steel spring. Maximum working temperature 200°F. Setting range 85°F to 150°F. Maximum working pressure 200 psi. Tolerance ±3°F. Provided with tamper-proof setting lock.

**Series 521**

Adjustable thermostatic mixing valve to ASSE 1017. Sweat connections 1/2" (3/4" or 1") with union tailpieces. DZR alloy body. Shutter, regulating seats and sliding surfaces in anti-scale plastic. Seals EPDM. Stainless steel spring. Maximum working temperature 200°F. Setting range 85°F to 150°F. Maximum working pressure 200 psi. Tolerance ±3°F. Provided with tamper-proof setting lock.

*We reserve the right to change our products and their relevant technical data, contained in this publication, at any time and without prior notice.*



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