

High-performance anti-scald thermostatic mixing valve for point of use application



5213 series



01092/11 GB
Replaces 01092/04 GB



Function

In some domestic hot water distribution systems there is a need to protect more vulnerable individuals against scalding caused by hot water, such as, for example, in hospitals, nursing homes or schools.

This particular series of thermostatic mixing valves has been specifically designed for this type of applications, for user outlets and installation at the point of use.

These thermostatic mixing valves ensure high thermal performance. They are able to control the temperature of the mixed water supplied to the user accurately in case of variations in the inlet supply pressure or temperature, or in the flow rate. They also feature a special anti-scald function which immediately shuts off the hot water flow in the event of cold water supply failure at the inlet.

(The 5213 series mixing valves are certified in accordance with the established specification in the UK, NHS D08, standard BS 7942:2000 and standards EN 1111 and EN 1287).



Product range

Code 521303 Anti-scald thermostatic mixing valve, complete with strainers and check valves at the inlet _____ size 3/4"
Code 521315/322 Anti-scald thermostatic mixing valve, complete with strainers and check valves at the inlet _____ sizes Ø 15 and Ø 22 mm for copper pipe

Technical specifications

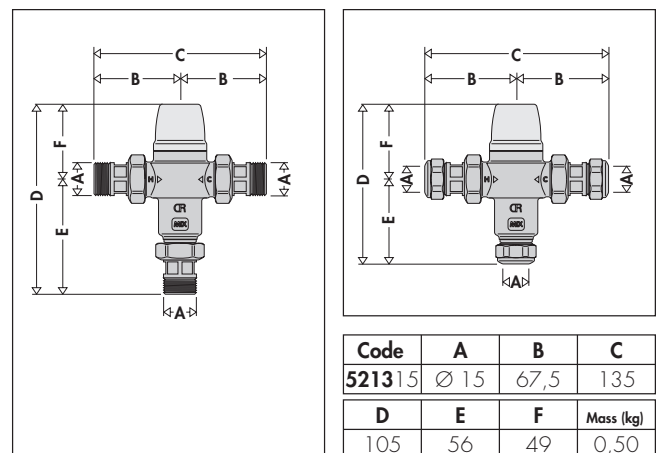
Materials

Body: dezincification resistant alloy **CR**
EN 12165 CW602N, chrome plated
Obturator: PPO
Springs: stainless steel
Seals: EPDM
Cover: ABS

Performance

Adjustment temperature range: 30–50°C
Accuracy: ±2°C
Max. working pressure (static): 10 bar
Max. working pressure (dynamic): 5 bar
Max. inlet temperature: 85°C
Max. inlet pressure ratio (H/C or C/H): 6:1
Min. temperature difference between inlet hot water and outlet mixed water to ensure anti-scald performance: 10°C
Minimum flow rate to ensure optimal performance: 4 l/min
Connections: - 3/4" M with union
- Ø 15 and Ø 22 mm with for copper pipe

Dimensions



| Code | A | B | C |
|--------|------|------|-----------|
| 521303 | 3/4" | 66,5 | 133 |
| D | E | F | Mass (kg) |
| 130 | 81,5 | 48,5 | 0,75 |

| Code | A | B | C |
|--------|------|----|-----------|
| 521322 | Ø 22 | 75 | 150 |
| D | E | F | Mass (kg) |
| 106 | 57 | 49 | 0,60 |

Legionella - scalding risk

In systems producing domestic hot water with storage, in order to prevent the dangerous infection known as *Legionnaire's disease*, the hot water must be stored at a temperature of at least 60°C. At this temperature it is certain that the growth of the bacteria causing this infection will be completely prevented; however, the water cannot be used directly.

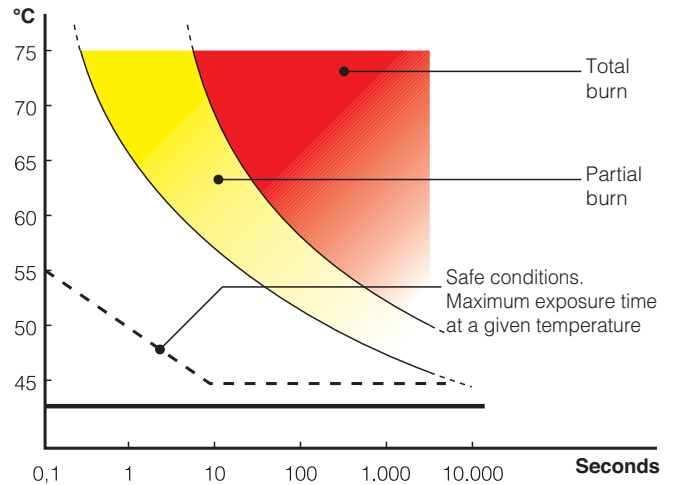
As shown in the diagram and table provided, temperatures over 50°C can cause burns very quickly.

For example, at 55°C, partial burning will occur in approximately 30 seconds, while at 60°C partial burning will occur in approximately 5 seconds. On average, these times can be halved for children and elderly people.

It is therefore necessary to use a thermostatic mixing valve able to:

- reduce the temperature at the point of use to a value lower than that of the storage and make it suitable for domestic use.
- keep the temperature constant in spite of variations in pressure and temperature at the inlet.
- offer an anti-scald safety function in the event of cold water supply failure at the inlet.

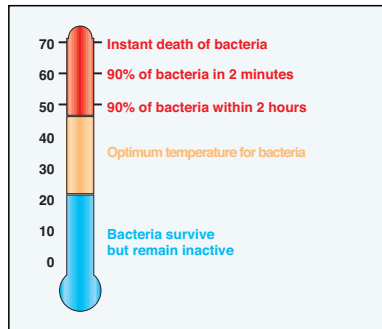
Temperature - Exposure time



Thermal disinfection

The adjacent diagram shows the behaviour of *Legionella Pneumophila* bacteria as the temperature conditions of the water vary.

To ensure correct thermal disinfection, it is necessary to go up to values of no less than 60°C.



Exposure time to cause partial burns

| Temperature | Adults | Children 0-5 years |
|-------------|--------|--------------------|
| 70°C | 1 s | -- |
| 65°C | 2 s | 0,5 s |
| 60°C | 5 s | 1 s |
| 55°C | 30 s | 10 s |
| 50°C | 5 min | 2,5 min |

Operating principle

The thermostatic mixing valve mixes the hot and cold water at the inlet so as to maintain the mixed water at a constant set temperature at the outlet. A thermostatic element is fully immersed in the mixed water flow. It contracts or expands, moving an obturator which controls the passage of hot or cold water at the inlet. If the inlet temperature or pressure changes, the internal element automatically reacts to restore the set temperature at the outlet.

Construction details

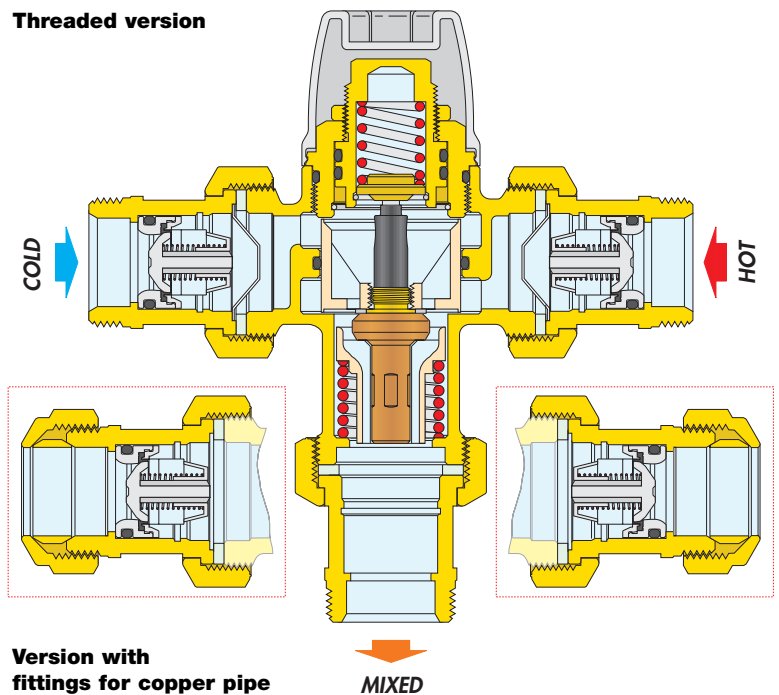
Anti-scale materials

The materials used in constructing the mixing valve were selected to eliminate seizing due to limescale deposits. All functional parts are made using a special anti-scale material with low friction coefficient, which ensures that performance is maintained over time.

Anti-scald safety function

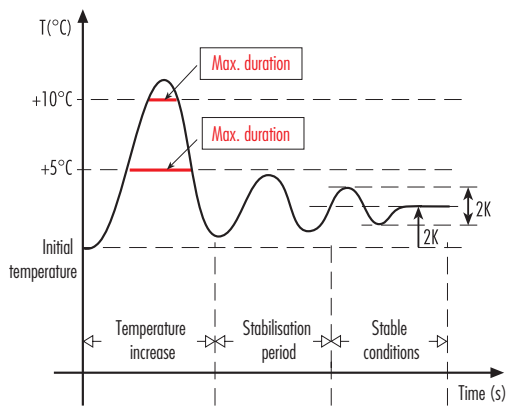
As a safety device, in the event of sudden cold water supply failure at the inlet, the valve immediately shuts off the hot set water flow. This prevents dangerous burns. This performance is guaranteed if there is a minimum temperature difference of 10°C between the inlet hot water and the outlet mixed water. Also in the event of hot water supply failure at the inlet, the valve shuts off the mixed water outlet in order to prevent dangerous thermal shocks (performance in compliance with UK specification, NHS D08, and standard BS 7942:2000).

Threaded version



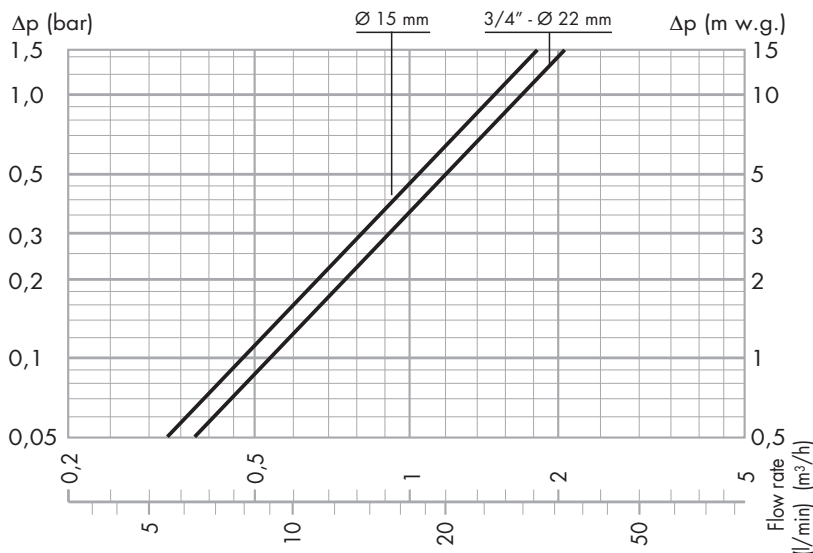
Thermal transient

During the transient, as a consequence of rapid changes in pressure, temperature or flow rate, the temperature increases with respect to the initial set point and this increase must be of limited duration to guarantee safety.



| Maximum temperature increase duration NHS D08 and BS 7942 | |
|--|--|
| Temperature increase | Max. duration Shower - Bidet Washbasin set 38-41°C |
| °C | s |
| +4 | 4 |
| +5 | 2,5 |
| +6 | 1,9 |
| +7 | 1,2 |
| +8 | 0,75 |
| +9 | 0,5 |
| +10 | 0,25 |

Hydraulic characteristics



| Code | Ø | Kv (m³/h) |
|--------|-------|-----------|
| 521303 | 3/4" | 1,7 |
| 521315 | 15 mm | 1,5 |
| 521322 | 22 mm | 1,7 |

Application

In view of its flow characteristics, the Caleffi 5213 series thermostatic mixing valve can be used for application at the point of use or for a limited number of user outlets. For this reason, the flow rate passing through the mixing valve is generally the same passing through the end user outlet, for example the washbasin tap, shower, bidet, etc. To ensure optimal performance, a minimum flow rate of 4 l/min must be guaranteed to the mixing valve.

The system must always be sized in accordance with current legislation relating to the nominal flow rate for each user outlet.

Public buildings, hospitals, kindergartens

In this type of application, the risk of scalding is extremely high because of the type of people using the hot water, like children, old people and invalids.

In these installations, the two supply networks providing hot water from the boiler and cold water may have different origins and operate at different pressures.

In the event of cold water supply failure, the mixing valve is able to shut off immediately the water outlet in order to prevent the risk of scalding.

Selecting the mixing valve size

Given the design flow rate, taking into account simultaneous use of the domestic appliances, the mixing valve size should be selected by checking the head loss on the provided graph. In this case, it is necessary to check the available pressure, the head loss in the system downstream of the mixing valve and the residual pressure to be guaranteed for user appliances.

Sizing software is available on www.caleffi.it.

Installation

Before installing the mixing valve, the connecting pipes should be flushed to remove any impurities that could impair performance.

It is recommended to always install strainers of adequate performance at the inlet from the water supply network.

The 5213 series thermostatic mixing valves are equipped with strainers at the hot and cold water inlets.

The 5213 series thermostatic mixing valves must be installed as shown in the installation diagrams on the instruction sheet or in this leaflet.

The 5213 series thermostatic mixing valves can be installed in any position, horizontally or vertically.

The following marks are indicated on the valve body:

- hot water inlet, indicated by the letter "H" (Hot)
- cold water inlet, indicated by the letter "C" (Cold)
- mixed water outlet, indicated by the word "MIX".

Check valves

In systems with thermostatic mixing valves, check valves must be installed to prevent undesired backflow.

The 5213 series mixing valves are equipped with check valves at the hot and cold water inlets.

Commissioning

In view of the special applications of the thermostatic mixing valve, it must be commissioned in accordance with current regulations by qualified technicians, using appropriate temperature measurement equipment. We recommend using a digital temperature gauge for measuring the mixed water temperature.

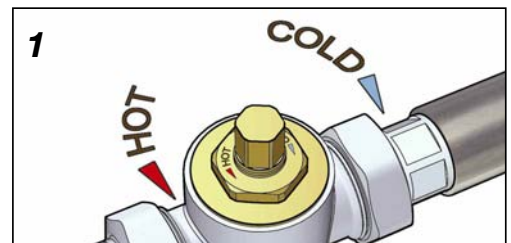
Temperature adjustment and locking

The temperature is set at the desired value using the upper hexagonal screw through the slot on the protection cover.

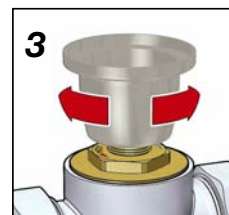
Given the specific use of this type of mixing valve, the following table lists the maximum tap water temperatures to prevent scalding.

| Appliance | Tmax |
|-----------|------|
| Bidet | 38°C |
| Shower | 41°C |
| Washbasin | 41°C |
| Bathtub | 44°C |

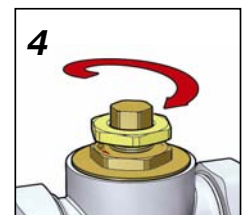
The temperature setting can then be locked at the desired value by means of the tamper-proof locking nut.



View of temperature adjustment

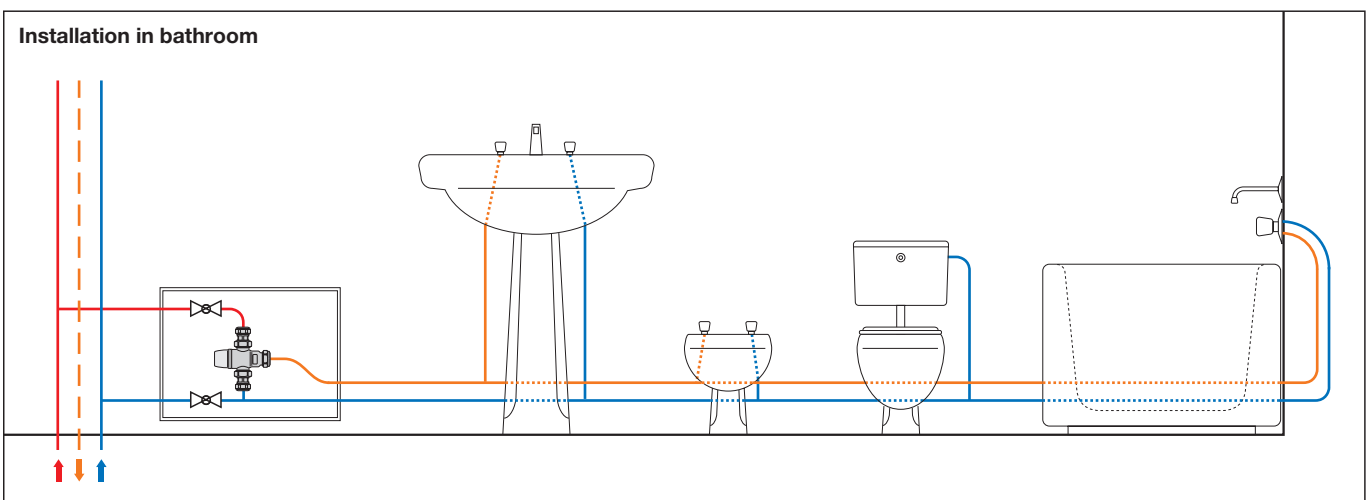
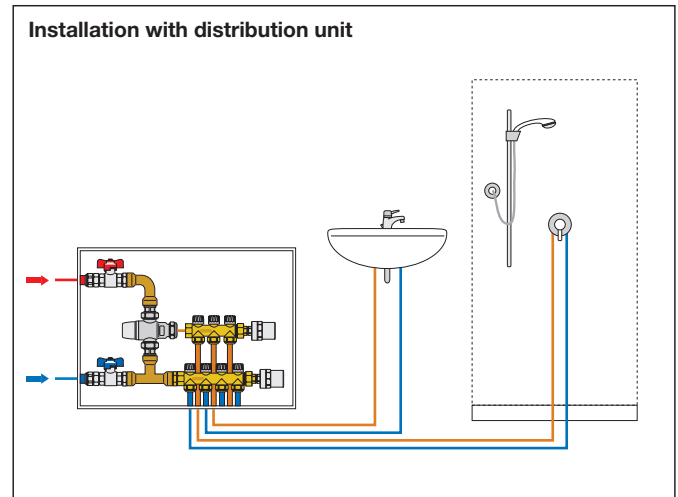
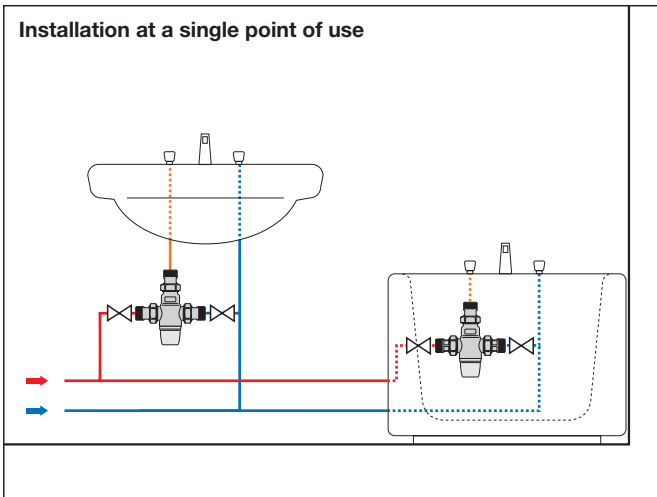


Using the cover for temperature adjustment



Locking the setting using the locking nut

Application diagrams



SPECIFICATION SUMMARY

Code 521303

Anti-scald thermostatic mixing valve. Certified in accordance with specifications NHS D08, BS 7942, EN 1111 and EN 1287. Connections 3/4" M. Dezincification resistant alloy body. Chrome plated. PPO obturator. Stainless steel springs. EPDM seal elements. ABS cover. Maximum working temperature 85°C. Adjustment temperature range 30–50°C. Accuracy $\pm 2^\circ\text{C}$. Maximum working pressure (static) 10 bar. Maximum working pressure (dynamic) 5 bar. Maximum inlet pressure ratio (H/C or C/H) 6:1. Equipped with anti-scald safety function and complete with strainers and check valves at the inlet.

5213.. series

Anti-scald thermostatic mixing valve. Certified in accordance with specifications NHS D08, BS 7942, EN 1111 and EN 1287. Connections $\varnothing 15$ ($\varnothing 22$) for copper pipe. Dezincification resistant alloy body. Chrome plated. PPO obturator. Stainless steel springs. EPDM seal elements. ABS cover. Maximum working temperature 85°C. Adjustment temperature range 30–50°C. Accuracy $\pm 2^\circ\text{C}$. Maximum working pressure (static) 10 bar. Maximum working pressure (dynamic) 5 bar. Maximum inlet pressure ratio (H/C or C/H) 6:1. Equipped with anti-scald safety function and complete with strainers and check valves at the inlet.

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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