

# Thermostatic Mixing Valves

Reliable, ASSE Listed valves from  
a recognized leader in flow control products





# The Trusted Choice for Thermostatic Mixing Valves

Watts provides a complete thermostatic mixing valve (TMV) line.

- Reliable products for safe, accurate control of water temperature from point-of-source to point-of-use
- Products tested and listed to relevant ASSE standards (1017, 1069, 1070)
- One-of-a-kind products, including Under Sink Guardian® mixing valves, that reduce installation time by up to 50 percent
- Extensive distribution network to ensure product availability
- Provided by a stable, industry leader with more than 150 years in the business

## Common Applications for Thermostatic Mixing Valves

### Residential

Homes, apartments, and dormitories



### Commercial

Businesses, hotels, and office buildings



### Institutional

Healthcare facilities, military facilities, universities, schools, and correctional institutions



# Mixing Valve Overview

## Guarding Against the Dangers of Hot Water

Every year, thousands of people suffer injury or become ill as the result of water stored or used at inappropriate temperatures. The consequences can be severe.

- Serious thermal shock and scalding injuries suffered in bathtubs, sinks, and showers.
- Illness caused by waterborne bacteria such as Legionella.

### Thermal Shock

- One source of injuries in the shower is slips and falls in reaction to a sudden increase or decrease in water temperature, known as thermal shock.
- If the supply of cold or hot water is lost, the water flow should be shut down immediately.
- Termination of the flow reduces the risk of instinctive reaction to quickly move away from a too-hot or too-cold water stream.

### Scalding

- Scalding incidents can occur in the home and in commercial or institutional facilities.
- The tender skin of very young children and the slow reaction time of the elderly and the handicapped make them particularly vulnerable to serious hot water burns.<sup>1</sup>
- Other causes include faulty water heater thermostats and water temperatures set too high.
- Also, temperature valves at the domestic hot water source can malfunction or be missing altogether.
- Water heaters are typically set to temperatures above 131°F (55°C) to prevent development of harmful bacteria in the water supply, however, at that temperature scalding can occur.

### Legionella Bacteria

- Legionella bacteria are responsible for Legionnaires' disease and Pontiac fever, a less severe, non-pneumonia, flu-like disease associated with and likely caused by Legionella.
- In a domestic water system Legionella can find an ideal host environment of warm water temperatures (95°F to 115°F) and rapidly colonize, forming dangerous concentrations.
- A widely accepted and preferred method of maintaining Legionella is to maintain the hot water system storage temperature continually at or above 140°F.<sup>2</sup>



**131°F**

The temperature that is required to kill Legionella bacteria in a water heater



<sup>1</sup> "Understanding Potential Water Heater Scald Hazards," A White Paper. Developed by the ASSE International Scald Awareness Task Group. Revised May 2013. ([https://asse-plumbing.org/media/1utf2c1c/asse\\_water\\_heater\\_scald\\_hazards.pdf](https://asse-plumbing.org/media/1utf2c1c/asse_water_heater_scald_hazards.pdf))

<sup>2</sup> David Kahane, "Legionnaires' Disease in Hospitality, A New Face on a Familiar Problem," Forensic Analytical Consulting Services, 2013.

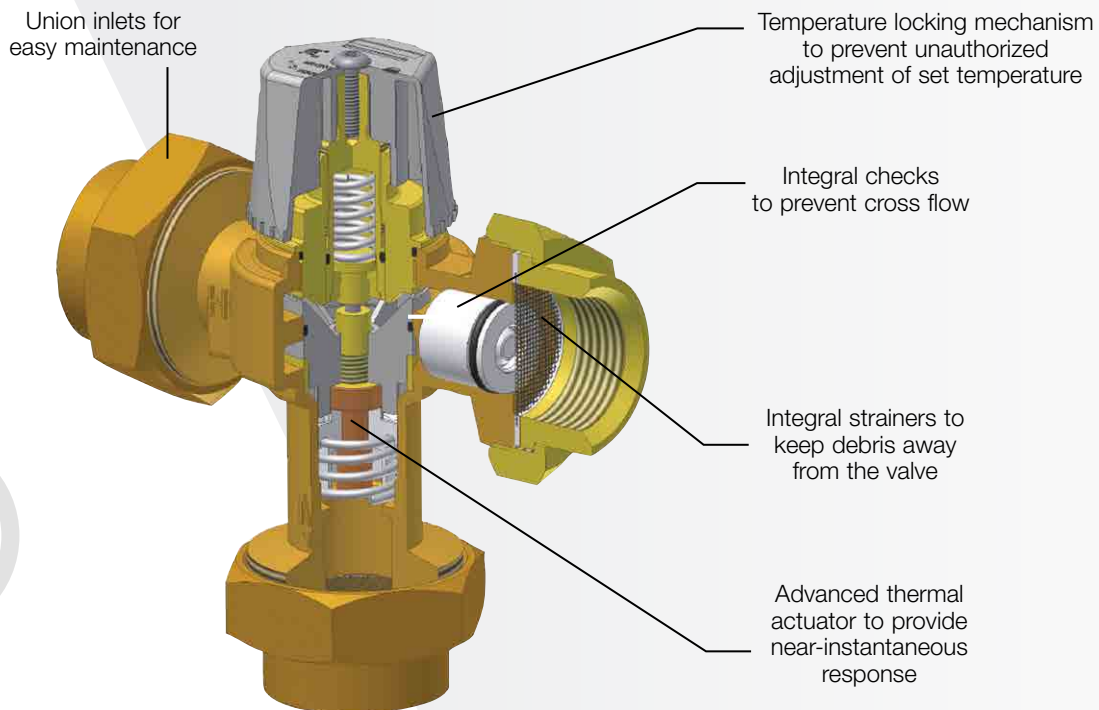
# Mixing Valve Overview



## Advantages of Watts Thermostatic Mixing Valves

Since 1874, Watts has set the standard for valve technology. The design of our thermostatic mixing valves stands out by supporting applications in these specific ways:

- Maintain and regulate mixed hot water to a user-selected, consistent temperature.
- Safeguard against the hazards of untempered or fluctuating water by controlling outlet temperatures.
- Deliver accurate and reliable hot water control from source to point of use, particularly under changing supply pressures or temperatures.
- Outperform pressure balancing mixing valves by automatically adjusting and limiting outlet temperatures, even during sudden supply shifts.



## American Society of Sanitary Engineering (ASSE) Standards 1016, 1017, 1069, and 1070

**ASSE 1016** covers the delivery of water at the individual fixtures that are adjusted and controlled by the user, observing precise and immediate temperature regulation requirements. The standard pertains to three types of valves: pressure balancing, thermostatic, and combined pressure balancing/thermostatic.

**ASSE 1017** is concerned with valves used at the source of hot water for distribution to the supply system. ASSE 1017 Listed devices should never be used to deliver water directly to the user. Rather, these valves should be used in combination with an ASSE 1016, ASSE 1069, and/or ASSE 1070 Listed device.

**ASSE 1069** was developed for applications, such as gang showers and sitz baths, that supply water at a preset temperature through a single pipe supply. Mixing water downstream of an ASSE 1069 Listed device is not allowed.

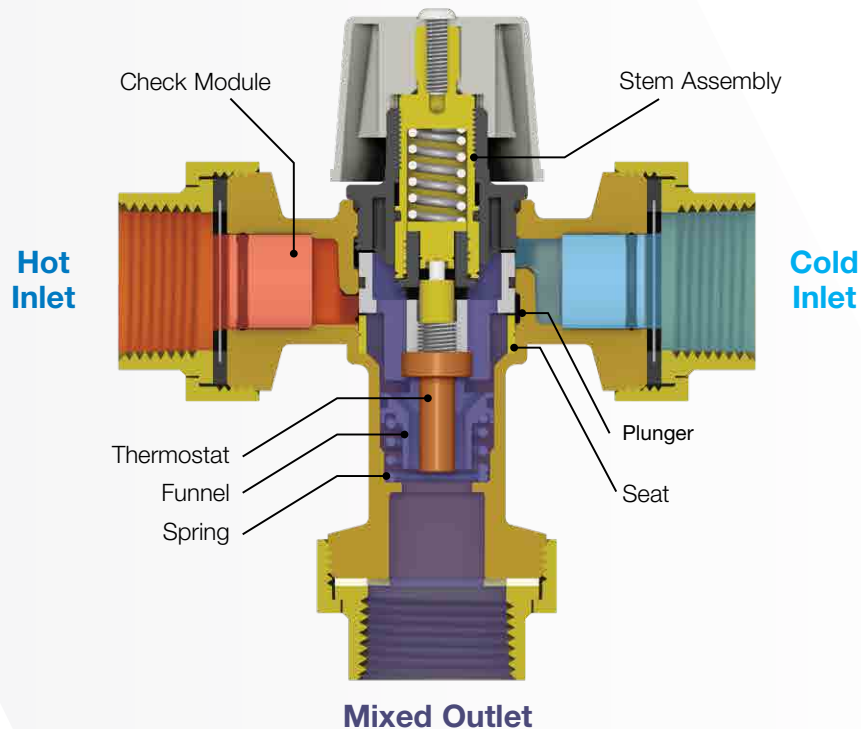
**ASSE 1070** focuses on control of maximum water temperature delivered to a fixture or group of fixtures, such as sinks, lavatories, or bathtubs. An ASSE 1070 device may perform the final temperature regulation or water may be further tempered downstream with the addition of cold water.

For more information, visit [ASSE-plumbing.org](http://ASSE-plumbing.org).



## How Watts Mixing Valves Work

- Once tempered water is in use, a thermostat in the mixing chamber of the valve senses the outlet temperature and automatically positions a seat assembly, which controls the flow of hot and cold water supplied to the mixing chamber.
- If the mixed outlet temperature increases, the thermostat expands, moving the seat assembly to allow the cold water inlet port to open more fully and at the same time restrict the hot water inlet port.
- Conversely, if the mixed outlet temperature decreases, the thermostat contracts, moving the seat assembly to allow the hot water inlet port to open more fully and at the same time restrict the cold water inlet port.
- In both cases the mixed outlet water temperature is automatically and continually maintained at the preset temperature within the tolerances of the valve.
- In the event of a cold or hot water supply failure, the seat assembly moves to an extreme position, shutting off the hot or cold inlet water port.
- A mechanical adjustment permits selection of the desired outlet water temperature within range of the valve.



## End Connections

To facilitate installation and servicing of a thermostatic mixing valve, Watts offers a variety of end fitting configurations, including union fittings (female threaded, solder, CPVC, PEX, CEF PEX, Quick-Connect, or with press end connections). Refer to valve models for specific availability of end connection options.





## At the Fixture

Heat loss in the system piping can result in varying temperatures of the hot and cold water supplied to fixtures. The use of thermostatic mixing valves helps ensure the selected mixed-water temperature at the point of delivery to the fixture.

## In Supply Systems

- The water temperature discharged directly from a water heater can vary by  $\pm 10^{\circ}\text{F}$  or more. This can be attributed to tolerance of control devices, inlet water temperature changes, and/or stacking (higher water temperatures at the top of the water heater).
- Using a thermostatic mixing valve helps ensure constant outlet water temperature even with variations in hot or cold water supply temperature.<sup>3</sup>
- If a water heater is used at lower temperatures, high-flow demand situations can cause the hot water temperature to drop if the recovery time of the water heater is not sufficient for the flow demand. Using a hot water extender or mixing valve allows the water heater to operate at higher temperatures, extending the effective system flow rate and helping prevent the growth of Legionella bacteria.
- Supplying peak demands for domestic hot water often requires high capacity water heaters with high recovery rates. Using a hot water extender can reduce the size/BTU requirements needed to provide capacity for peak system demands.



<sup>3</sup> Refer to specification for the selected model to determine the allowable inlet temperature range to maintain a desired outlet temperature.

# Solutions

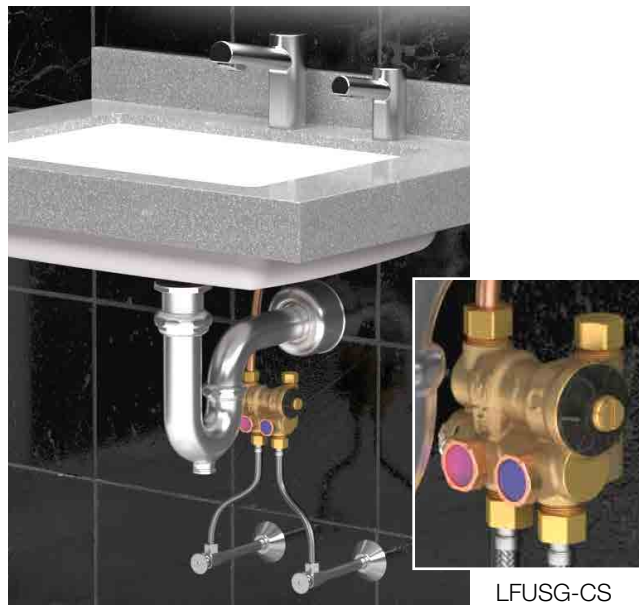
## Point-of-Source Solutions

For use at the source of hot water in commercial and institutional settings, Watts mixing valves provide reliable temperature control of domestic and hydronic hot water distribution systems. In this way, the valves extend the capacity of water heater storage tanks and tankless water heaters.



## Point-of-Use Solutions

Watts mixing valves are used to provide tempered water in sinks, showers, and lavatories in commercial, educational, and institutional environments such as restaurants, schools and universities, hospitals, nursing homes, and public restrooms.



Color-changing indicators on the valve inlets help verify normal hot and cold water flow and identify cross-flow conditions

# Point-of-Use

## Series LFUSG

Under Sink Guardian®

Thermostatic Mixing Valve with Cross Sense™ Technology

- Size: 3/8" (10 mm)
- Lead Free<sup>4</sup> DZR Brass body construction
- Straightforward installation between the stop valves and the faucet
- Replaceable cartridge housing built-in dual check valves and strainers (40 mesh stainless steel) to improve serviceability and sustainability
- Cross-flow detection at the hot and cold inlets
- Included cold water outlet cap for three-port application
- ASSE Standard 1070 Listed, IAPMO cUPC Approved
- Buy American Act (BAA) compliant



LFUSG-CS

## Series LFMMV

Thermostatic Mixing Valves

- Sizes: 1/2" – 1" (15 mm – 25 mm)
- Solid wax hydraulic principle thermostat ensures dependable mixing of hot and cold water
- Thermostat controls both hot and cold water
- Models available with solder, female threaded, PEX, CEF PEX, CPVC, Quick-Connect, or with press end connections
- Adjustment cap with locking feature
- ASSE 1017, 1069, 1070 Listed
- IAPMO cUPC Listed
- Integral filter washers and check valves

LFMMVM1-US



LFMMVM1-CEF

<sup>4</sup> The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.

# Point-of-Source

## Series LF1170 and LFL1170

### Thermostatic Mixing Valves

- Sizes: 1/2" – 1" (15 mm – 25 mm)
- Solid wax hydraulic principle thermostat ensures dependable mixing of hot and cold water
- Thermostat controls both hot and cold water
- Models available with solder, female threaded, PEX, CEF PEX, CPVC, Quick-Connect, or with press end connections
- Integral filter washers and check valves
- Adjustment cap with locking feature
- ASSE 1017 Listed<sup>5</sup>
- IAPMO cUPC Listed



LF1170M2-US

## Series LFN170

### Hot Water Master Mixing Valves

- Sizes: 3/4" – 2" (20 mm – 50 mm)
- Lead Free<sup>6</sup> cast copper silicon alloy
- Paraffin-based thermostat to sense and adjust outlet temperature
- Dirt and lime resistant poppet and seat design
- Virtual shutoff if supply pressure fails
- Vandal-resistant locking mechanism to secure temperature setting
- Available with or without checkstops
- ASSE 1017 Listed<sup>5</sup>, cUPC Approved



LFN170-M3-CSUT

## Series LF70A and LFL70A

### Hot Water Extender Mixing Valves

- Sizes: 1/2" – 3/4" (15 mm – 25 mm)
- Hydraulically operated thermostat that opens a spring-loaded check in cold water inlet
- Simple maintenance thermostat assembly is easily removed and replaceable as a unit
- "Finger Tip" Dial adjustment cap
- Sweat or threaded connections
- Stainless steel springs






LF70A

<sup>5</sup> ASSE 1017 listing is for valves used in hot water source applications.

<sup>6</sup> The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.



## A Comparison of ASSE 1069, 1070 and 1071 with revised 1016 and 1017 standards

Standard	ASSE 1017	ASSE 1069	ASSE 1070
<b>Watts Applicable Products</b>	LFL1170, LF1170, LFMMV, LFN170 	LFMMV 	LFMMV, LFUSG-CS 
<b>Title</b>	Temperature Activated Mixing Valves for hot water distribution systems	Automatic Temperature Control Mixing Valves	Water Temperature Limiting Devices
<b>Category</b>	Tempered water distribution	Point-of-use distribution adjustment by installer	Point-of-use or distribution
<b>Application</b>	Hot water source/boiler	Gang showers, sitz baths, spas, gang lavatories	Sinks, lavatories, baths
<b>Types</b>	Thermostatic only	Thermostatic only	Thermostatic only
<b>Valve Temp Range - Outlet</b>	Minimum adjustable range 105°F – 120°F	100°F – 115°F	105°F – 110°F
<b>Temperature Tolerance</b>	±3°F to ±7°F (depending on valve size/capacity)	+ 5°F lasting more than 1.5 seconds within first 5 seconds - 9°F lasting more than 1 second within first five seconds	Maximum actuation temperature 120°F or less
<b>Pressure Change Test (Hot and Cold)</b>	No pressure change test	20% up and down for cold and hot supply	20% up and down for cold and hot supply
<b>Temperature Change Test (Hot)</b>	25°F hot water increase	25°F hot water increase	25°F hot water increase
<b>Flow Test</b>	Not applicable	Must be 90% of manufacturer's published flow	Must be 90% of manufacturer's published flow
<b>Minimum Tested Flow to Provide Control</b>	50% of flow @ 10 psid	2.5 gpm or less	Manufacturer's minimum stated flow
<b>Cold Water Failure Allowance</b>	Not applicable	0.5 gpm for 1/2" and 3/4" devices 1.0 gpm for 1" and larger devices	0.2 gpm or 20% of minimum flow, whichever is greater before 120°F
<b>Life Cycle</b>	Not applicable	100,000 cycles	100,000 cycles

ASSE 1016	ASSE 1062	ASSE 1071
<i>For applicable products, see Powers, A Watts Water Technologies Company at PowersControls.com</i>		
Automatic Compensating valves for individual showers and tub-shower combinations	Temperature Actuated, Flow Reduction valves for individual fixture fittings (TAFR)	Temperature Activated Mixing valves for plumbed emergency equipment
Point-of use, bather or bather attendant interface	In-line high temperature limit devices	Point-of-use or distribution
Shower or tub/shower combination only	Faucets, shower heads, tub spouts dramatically reduce flow when temperature exceeds actuation point	Eye washers, eye/face washes, drench showers and combination units
Type P - Pressure Balancing Type T - Thermostatic Type T/P - Combination	Thermostatic only	Thermostatic only
Full cold to 105°F minimum, 120°F maximum	Not applicable	65°F – 95°F
T/P and P = ±3.6°F T = +5.4°F, -9.0°F	Maximum actuation temperature 120°F or less	Varies depending on capacity. Also, hot water control has a tighter tolerance than cold water control.
P = 50% up/down T = 20% up/down T/P = 50% up/down	Not applicable	Not applicable
P = Does not test for temperature change T = 25°F hot water increase T/P = 25°F hot water increase	Not applicable	25°F hot water increase
Minimum 2.25 gpm	0.25 gpm within five seconds when temperature exceeds 120°F and one second once actuation temperature exceeds 129°F	HW Failure, CW flow = manufacturer's rated by-pass flow @ 30 psid
2.5 gpm	Not applicable	3.0 gpm or manufacturer's stated minimum
P, T, T/P < 0.5 gpm within 5 seconds before 120°F	Not applicable	CW failure, HW flow gpm not to exceed 0.5
100,000 cycles – all	125,000 cycles	Not applicable

## Watts Family of Brands

Watts designs, manufactures, and sells an extensive line of flow control, water safety, water filtration and treatment, drainage, and PEX plumbing products.

The Watts family of companies provides a single source for solutions used to safely convey, conserve, and manage water.

Making Watts your single source for plumbing-related solutions will streamline your operations, save you money, and reduce the variety of repair parts needed for maintenance.

