

# WHITEPAPER

TECHNICAL DEEP-DIVE REQUIREMENT

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## CALEFFI Series 6000 LEGIOMIX®

Electronic Mixing Valve - Market Issues  
in Design/Installation



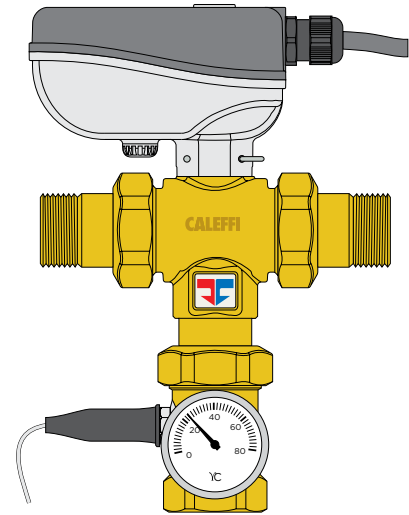
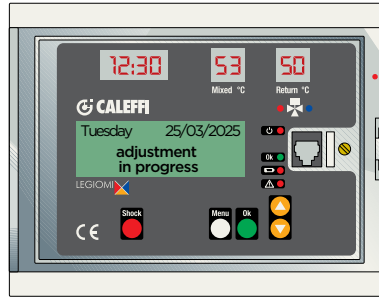
**NEW EVO**  
6003 SERIES

IoT controller



## Introduction

The **LEGIOMIX**® Electronic Tempering Valve is a state-of-the-art solution designed for high-demand centralized hot water systems. This valve ensures precise temperature control and energy efficiency, making it an essential component in modern plumbing and heating systems.



## Key Features

- **Electronic Control:** Provides accurate temperature regulation.
- **Thermostatic Function:** Ensures consistent water temperature.
- **High Flow Rates:** Suitable for systems with high flow rates, saving on space and cost.
- **Durable Construction:** Made from high-quality brass, ensuring longevity and reliability.

## Importance of Sizing the Valve to Flow Rate

Proper sizing of the LEGIOMIX® valve is crucial for optimal performance. Sizing the valve based on flow rate rather than pipe size ensures precise control and efficiency. **Here's why:**

- 1. Flow Control Precision:** Correctly sized valves provide accurate temperature control of the flow control, preventing issues such as turbulence, noise, and wear on valve components.
- 2. Energy Efficiency:** Properly sized valves minimize avoid unnecessary (high) pressure drops and energy losses, leading to more efficient system operation.
- 3. System Reliability:** Valves that are too large or too small can lead to operational inefficiencies and increased maintenance costs.

Legiomix - FLOW RATE Design					
Size mm	Min.		Kv (m <sup>3</sup> /h)*	Max.	
Mm	m <sup>3</sup> /h	l/m	(m <sup>3</sup> /h)	m <sup>3</sup> /h	l/m
DN20	0.5	8	8.4	10.3	172
DN25	0.7	12	10.6	13.2	220
DN32	1	17	21.2	28.1	468
DN40	1.5	25	32.5	39	650
DN50	2	33	41	48.3	805
DN65	4	66	90	110	1833
DN80	5	83	105	150	2500

\*kV (flow coefficient) represents the volume of water (in cubic meters per hour) that flows through a valve at a pressure drop of 1 bar.

**RECOMMENDED** flow rates to ensure stable operation and an accuracy of ± 2 °C

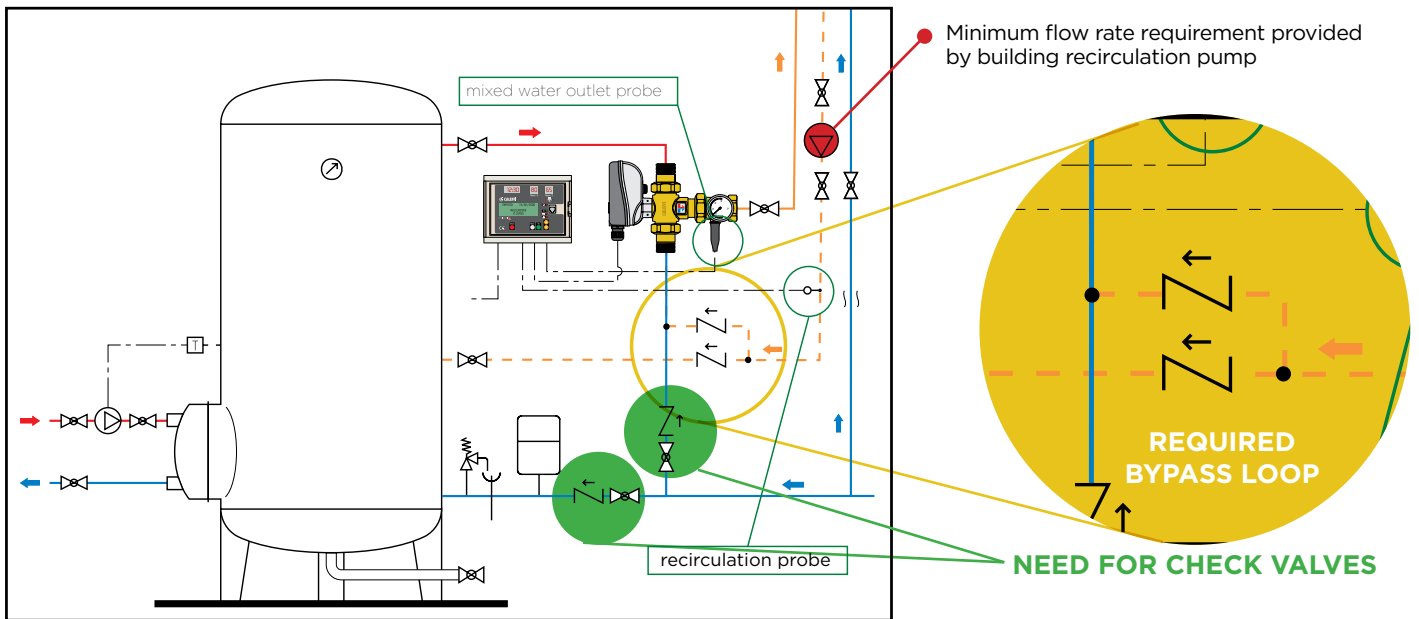
## Need for a Return By-Pass Loop in Recirculation System

A return by-pass loop is essential in maintaining the energy within the system. This loop allows for continuous circulation of water, preventing the system from deadheading and ensuring consistent temperature control. Key benefits include:

**1. Energy Retention:** The by-pass loop helps retain energy within the system, reducing the need for reheating and improving overall efficiency.

**2. System Balance:** It ensures hydraulic balance, preventing pressure imbalances that can lead to system inefficiencies.

**3. Prevention of Over-Exercising the Actuator:** Without a by-pass loop, the actuator may be over-exercised, leading to premature failure due to operation outside its design parameters.



## Consequences of Over-Sizing the LEGIOMIX Valve

Over-sizing the valve can significantly impact the accuracy of the sensors and the overall system performance:

**1. Reduced Sensor Accuracy:** When the valve is oversized, the sensors may not accurately detect the flow rate, leading to incorrect temperature readings and adjustments.

**2. Actuator Over-Exercising:** Inaccurate sensor readings cause the actuator to make frequent adjustments to maintain the desired temperature, resulting in over-exercising.

**3. Fluctuating Supply Temperature:** The constant adjustments by the actuator can lead to fluctuations in the supply temperature, reducing the system's stability and efficiency.

### Consequences of operation outside of design without control

Optimizing actuator movement is essential for maintaining long-term performance:

**1. Component Longevity:** Excessive movement may accelerate natural wear over time, so balanced operation helps ensure durability.

**2. System Reliability:** Optimized actuator management minimizes the risk of unplanned downtime, supporting continuous efficiency.

**3. Maintenance Efficiency:** A well-maintained actuator reduces the frequency of service needs, helping to manage operational costs effectively.

## Conclusion

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The **LEGIOMIX® 6000** Electronic Thermostatic Tempering Valve is a critical component for efficient and reliable hot water systems. Proper sizing to the system design flow rate and the inclusion of a return by-pass loop are essential for maintaining system performance and longevity. By adhering to these guidelines, users can ensure optimal operation and avoid common pitfalls such as actuator over-exercising and system inefficiencies.

For further details and technical specifications, please contact **Waterware Services** 0800 WATERWARE

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