

WHITE PAPER



# Safe, Consistent, Connected:

## The Case for Digital Mixing in Healthcare & Hospitality



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# TABLE OF CONTENTS

<b>Executive Summary</b> .....	1
<b>Introduction</b> .....	1-2
<b>Inherent Challenges of Facility Water Management</b> .....	2-3
<b>Water Tempering with Traditional Mixing</b> .....	3
<b>Challenges Associated with Traditional Mixing Solutions</b> .....	4
<b>An Alternate Approach: Connected Digital Mixing Solutions</b> .....	5
<b>Advantages of Digital Mixing</b> .....	5-6
<b>ROI and Impact on Reputation</b> .....	7
<b>Conclusion</b> .....	7



# EXECUTIVE SUMMARY

In healthcare and hospitality environments, water tempering plays a critical role in meeting the primary goals of these industries: **ensuring occupant safety in healthcare, and occupant comfort in hospitality**. Both industries also share overlapping objectives: healthcare facilities prioritize patient comfort as part of the overall care experience, and hospitality properties must mitigate risks of waterborne pathogens like Legionella to protect guest safety and property reputation.

The paper will explore how the integration of smart, connected digital mixing technology is integral to achieving both safety and comfort in hospitality and healthcare environments. These cutting-edge solutions empower facilities to deliver safe, consistent water while optimizing operational efficiency and resource allocation. By addressing risks associated with pathogens, temperature inconsistencies, and operational inefficiencies, a digital approach to mixing ensures healthcare and hospitality facilities meet their safety and comfort goals while mitigating water-related risks.

## INTRODUCTION

### The Critical Role of Water Tempering

Water tempering is the process of mixing hot and cold water to achieve a desired temperature to ensure safety or comfort for various water-using activities. It is essential for achieving the unique goals of healthcare and hospitality facilities. In healthcare, the primary focus is occupant safety, as patients—especially immunocompromised individuals—are at heightened risk for infections caused by waterborne pathogens like Legionella. These pathogens thrive in water systems where temperatures are not properly regulated, potentially causing severe complications. Complications from Legionnaires' disease can include lung failure and death, with mortality rates as high as 10% in most cases, and 25% for those who contract it in a healthcare setting.<sup>1</sup>

In hospitality, the emphasis is on occupant comfort, where guests expect consistent water temperatures and pressure, and properties commit to an exceptional guest experience. However, guest safety is also a key concern, as hospitality properties must mitigate the risk of pathogens to protect their guests and reputation while avoiding liability. A single negative experience with water, whether due to scalding, or pressure or temperature inconsistency, can lead to negative reviews, room compensations, and reputational damage.

## Legionnaires' Disease

The first identified outbreak of Legionnaires' disease occurred from July 21 to July 24, 1976, during an annual state convention of the American Legion at the Bellevue Stratford Hotel in Philadelphia. Over 2,000 attendees gathered, but shortly after the event, many began experiencing severe pneumonia-like symptoms. By August 15, 200 people had fallen ill, and 34 had died.<sup>2</sup>

The CDC's investigation identified the previously unknown bacterium; *Legionella pneumophila*. The outbreak was traced to the hotel's cooling towers, which had aerosolized *Legionella*-contaminated water, exposing guests. This landmark case emphasized the dangers of poorly maintained water systems in large buildings and established *Legionella* as a significant public health risk.

## INHERENT CHALLENGES OF FACILITY WATER MANAGEMENT

### Legionella Growth and Spread

*Legionella pneumophila* thrives in man-made water systems with stagnate conditions. According to the CDC, it is commonly found in<sup>3</sup>:

- Hot and cold-water storage tanks
- Pipes, valves, and fittings
- Ice machines
- Medical devices like CPAP machines and hydrotherapy equipment
- Water heaters
- Showerheads and hoses
- Cooling towers
- Decorative fountains

In both healthcare and hospitality settings, these devices and systems create ideal conditions for *Legionella* to grow and spread if water is not maintained above the ideal temperature range for bacterial mitigation (122°F and above).<sup>5</sup> However, point-of-use water must be delivered at lower temperatures to reduce the risk of scalding (112°F and below).<sup>6</sup> Water tempering is how facility managers ensure pathogens are killed at high temperatures and water is cooled to temperatures safe for occupants.



The dangers of poorly maintained water systems in large buildings can lead to  
**Legionnaires' Disease**



Legionella grows rapidly at temperatures between  
**68°F**  
to  
**113°F**  
and can spread through water droplets.<sup>4</sup>



## Temperature Inconsistency

Large healthcare and hospitality facilities often face fluctuating water demands, making consistent temperature control challenging. In healthcare, even slight variations can create conditions conducive to Legionella growth, jeopardizing patient safety and regulatory compliance. Moreover, patient comfort—a critical component of quality care—may be compromised by inconsistent water temperatures, further impacting recovery and satisfaction scores.

For hospitality properties, temperature inconsistencies are equally problematic. Guests expect uninterrupted access to hot water, and deviations can lead to dissatisfaction.



*“If you turn on hot water and there’s no hot water, or the pressure’s low, that’s a problem.”*

- Executive VP of a hotel group

## Scalding Prevention

Water in building systems must be heated to high temperatures, to kill harmful pathogens like Legionella, which can cause serious and sometimes fatal illnesses.<sup>5</sup> However, water at these temperatures poses a significant risk of scalding, especially for vulnerable populations like young children and the elderly, whose skin is thinner and more susceptible to burns. Compounding the danger is our conditioning to assume water from a tap or shower will be safe; we often don’t test it before making contact. This makes precise water tempering essential to delivering water that is both safe to use and safe to touch.

## WATER TEMPERING WITH TRADITIONAL MIXING

Water tempering is the process of blending hot and cold water to achieve a specific, safe temperature for use in building water systems. This is essential for preventing scalding at high temperatures while ensuring water is hot enough to inhibit the growth of harmful bacteria like Legionella. Thermostatic mixing valves (TMVs) accomplish this by using a temperature-sensitive element that automatically adjusts the mix of hot and cold water to maintain a consistent output temperature, even when water pressure or demand fluctuates. TMVs provide an essential layer of safety and comfort by ensuring water temperatures remain within a safe range for occupants.



**Scalding**  
can occur  
in just seconds when  
water temperatures reach  
**140°F**  
or higher<sup>6</sup>

# CHALLENGES ASSOCIATED WITH TRADITIONAL MIXING SOLUTIONS

## Downtime During Installation and Commissioning

Traditional mixing systems require significant downtime during installation, disrupting operations in both industries. In hospitals, this can delay patient care, compromising both safety and comfort. In hotels, downtime can prevent guests from accessing water, resulting in negative reviews and revenue loss.

Traditional mechanical systems also require ongoing recalibration, particularly in high-use environments where changes in demand cause temperature fluctuations. In multi-valve installations, each valve must be commissioned individually, repeating the manual process of running water, measuring temperature, and adjusting the valve until the desired setting is reached. This time-consuming process increases labor costs and the risk of inconsistent performance.

## Drift and Loss of Precision Over Time

Traditional systems often experience drift, where consistent use and wear compromise temperature regulation. If the temperatures required for reliable bacterial mitigation aren't maintained, this can create ideal stagnant conditions for the growth and proliferation of legionella in your water system.

## Complicated, Time-Consuming Maintenance

Frequent manual adjustments or full valve replacements are common with traditional mixing systems. This can lead to extended downtime and higher costs.



*“At the beginning of the week, we’d walk into the mechanical room, check the systems and temps that had [assuredly] drifted.”<sup>8</sup>*

- Master Plumber



*“The strainers get gummed up occasionally, and you have to regularly maintain these valves.”<sup>9</sup>*

- Head estimator  
of a plumbing company





# AN ALTERNATE APPROACH: CONNECTED DIGITAL MIXING SOLUTIONS

Digital mixing systems use advanced technology to precisely control and blend hot and cold water to achieve a desired, safe temperature. Unlike traditional mixing valves, digital mixing solutions use electronic sensors and controls to continuously monitor water temperature and flow in real time. These systems can automatically adjust the mix of hot and cold water to maintain consistent output, even during fluctuations in water pressure or demand. Many digital mixing systems also integrate with building automation systems or intelligent water management software, enabling remote monitoring, real-time alerts, and adjustments through web apps or mobile interfaces, ensuring water safety and efficiency while reducing manual maintenance.

## ADVANTAGES OF DIGITAL MIXING

### Improved Safety and Compliance

The smartest digital mixing solutions allow for real-time monitoring and even offer remote control capabilities. This ensures compliance with safety standards while prioritizing occupant safety. For healthcare, this capability is critical for maintaining stringent safety protocols and avoiding regulatory penalties. For hospitality, it adds an extra layer of assurance that systems are running optimally.

### Enhanced Comfort

For hospitality properties, smart systems ensure consistent water temperatures and pressure, even during peak demand periods. This enhances guest comfort while safeguarding against liability from scalding incidents or pathogen exposure. After installing a cutting-edge IntelliStation 2 Digital Mixing Valve, one hospitality leader in North Carolina shared “It can keep up with my instant hot water heaters like nothing I’ve ever seen. This thing just regulates. I can tell you; it’s been in here for almost three months, and I haven’t had one issue with hot water on my upper floors,” said the Director of Engineering, explaining how the solution solved his previous temperature and pressure issues on the property.<sup>7</sup>



Smart digital mixing solutions enable engineering teams to **adjust** water temperatures and initiate/pause sanitization cycles from **anywhere**

## Simplified Serviceability

The best intelligent digital mixing solutions are engineered with serviceability at their core, featuring modular, easily accessible components that are easy to repair or replace with minimal downtime. Unlike traditional systems, they eliminate the need for rebalancing after maintenance, streamlining the repair process and ensuring a quick return to optimal performance. This is particularly critical in healthcare and hospitality environments, where uninterrupted access to safe, tempered water is essential for both patient safety and guest comfort, and where downtime can lead to significant disruptions or financial losses.

## Proactive vs. Reactive Approach

Smart and connected digital mixing solutions like IntelliStation 2 provide advanced capabilities to track equipment performance over time, allowing facilities to identify patterns, optimize operations, and anticipate maintenance needs or potential equipment issues before they can cause disruptions. This type of predictive approach minimizes downtime and ensures consistent water delivery, critical for both patient safety in healthcare and guest satisfaction in hospitality.

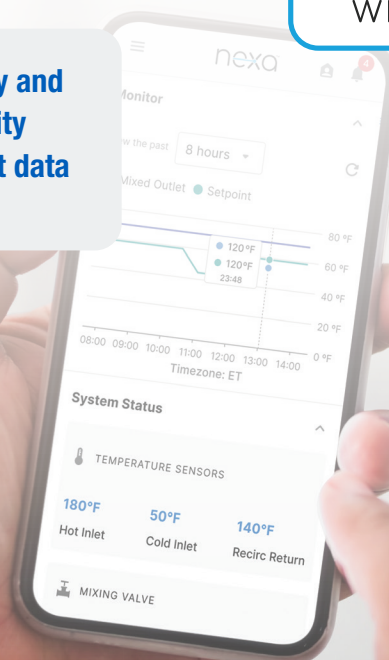
IntelliStation 2 is also able to integrate seamlessly into a building's management system (BMS) enabling centralized monitoring and control, streamlining facility operations. Facility managers and engineering teams can remotely adjust temperatures, pause sanitization cycles, and receive proactive alerts for potential issues, ensuring safety, efficiency, and operational continuity.



Some advanced **intelligent** digital mixing solutions, like **IntelliStation 2**, are enhanced by **water management software**, like **Nexa**, which provides **real-time data** and insights, accessible through user-friendly apps and dashboards.

works with | **nexa**

**For high-demand environments, this connectivity and predictive intelligence offer unparalleled reliability and the sense of security that comes with robust data and analytics.<sup>10</sup>**





# ROI AND IMPACT ON REPUTATION

Investing in intelligent digital mixing systems aligns with the critical goals of healthcare and hospitality while providing measurable returns:



## **Enhanced Safety and Comfort:**

Delivering safe water that meets guest and patient expectations.



## **Operational Efficiency:**

Reduced maintenance demands and increased system insights improve overall facility performance, allowing teams to focus on their core priorities.



## **Proactive Risk Mitigation:**

Preventing outbreaks and temperature-related incidents protects both occupants and the facility's reputation, minimizing financial liability in the event of a water-related lawsuit.




## **Customer Satisfaction and Revenue Protection:**

Negative reviews or complaints are avoided, preserving trust and financial stability.

## CONCLUSION

The critical goals of healthcare and hospitality—ensuring occupant safety and comfort—require precise, consistent water management. Intelligent digital mixing solutions represent the future of water tempering, offering unmatched precision, reliability, and operational efficiency. When it comes to protecting comfort and safety, an intelligent digital water mixing solution is a facility's best bet.

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Our patents on technologies serve as the backbone for many products in commercial and industrial water temperature control markets. From pressure balance to digital mixing valves we strive to bring safety and comfort to modern plumbing.

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