



# Automated Monitoring of Domestic Water Systems for Smarter *Legionella* Risk Management

Presented by:  
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## Talking Points

- Compliance
- Water Quality Monitoring Versus *Legionella* Testing
- Importance of Automation
- What and Where to Monitor

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## Monitoring Water Quality is Required for Compliance with...





**New Water Management Requirements**



ANSI/ASHRAE Standard 188-2021





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## Water Quality Monitoring Versus Legionella Testing

	Legionella Testing	Water Quality Monitoring
Direct correlation with Legionella	Yes	No
Frequency	1-4 times a year	Several times a day
Amount of data	Little	Lot
Indicates growth condition	No	Yes
Effective for alerts	No	Yes

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## Monitoring Makes Water Management Programs (WMPs) more...

Protective  
Insightful  
Predictive

*and, if automated, easier*

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## Importance of Automation

*Making WMPs easier...*

Saves money  
Reduces disease risk

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### WMP Performance Study



**Comparison of Control Measure (CM) Compliance with Number of Tests and Domestic Water Legionella Positivity in LAMPS WMPs Active > 12 Months**

CM % OK*	Legionella Tests**	Other Microbial Tests**	Temp Tests**	Disinfectant Tests**	Legionella % Positive in DW***
0	0.81	0.14	1.44	2.98	NA
0.5-49%	5.62	2.21	8.18	12.05	24.03%
50-79%	7.21	1.54	33.99	7.95	21.40%
80-94%*	17.36	7.82	26.77	32.50	16.88%
95-100%*	33.16	23.67	51.53	33.84	14.98%

\* As of the end of the study period, < 20% of sites had CM compliance ≥ 80%, < 10% had CM compliance 95-100%  
 \*\* Avg number of tests in recent 12 months. Only 10% of sites tested 20+ samples. Only 6% tested 40+ samples.  
 \*\*\* For the life of the WMP, excluding sites with fewer than 6 domestic water test results total

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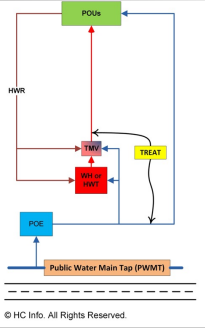


### Factors for What and Where to Monitor

Risk reduction

Cost

Compliance



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### Compliance Requirements

	ASDWA 2020	CDC 2021	VHA 2021	TJC EC.02.05.02
pH	X	X	X	X
Temperature	X	X	X	X
Disinfectant	X	X	X	X
Hardness			X	
Turbidity	X			
Suspended or dissolved solids			X	

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9

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## Sensors Versus Handheld Devices

- Amount of data
- Quality of data
- Labor
- Cost

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## Sensor Location Considerations

- Value of data for risk reduction
- Cost of sensor installation and service
- Building automation system
- Available technology

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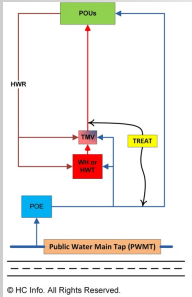
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## Conductivity and Turbidity

- What it tells you
- Why it's important
- Sensors versus handheld devices
- Where to monitor

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12

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ASPE  
Convention & Expo 2022

Temperature, Disinfectants,  
pH

Effect on *Legionella*

Can uncover problems

How to use the data

Sensors versus handhelds

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13

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ASPE  
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Flow

*Legionella's* weird  
relationship with water age  
and flow

Monitor volume? Rate? Time?

Data value versus cost at  
various points in the system

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14

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Minimum Specification

ASPE  
Convention & Expo 2022

At the POE,  
continuously  
monitor...

- Disinfectant residual
- Temperature
- Conductivity
- Turbidity
- pH

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Who...

Designs?  
Specifies?  
Installs?  
Services?

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