



Control Measures to Mitigate Risk



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Control Measures to mitigate risk

WATER SAFETY (RISK) MANAGEMENT STEPS



ROLES & RESPONSIBILITIES



WRITING THE SUMMARY



DESCRIBE THE BUILDING



IDENTIFY RISK



CORRECTIVE ACTIONS



DOCUMENTATION



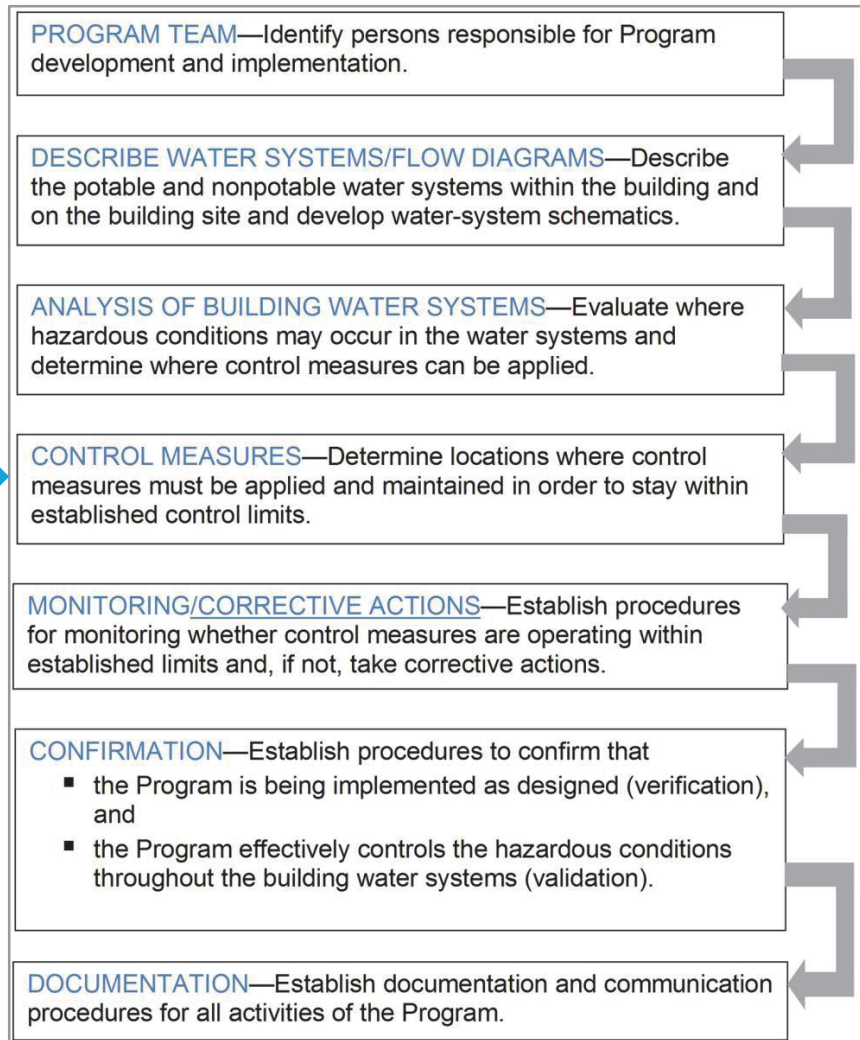
RESOURCES & TOOLS

Control measures to mitigate risk ...



ASHRAE 188 WMP Core Elements:

4. ID Controls



Control measures to mitigate risk ...



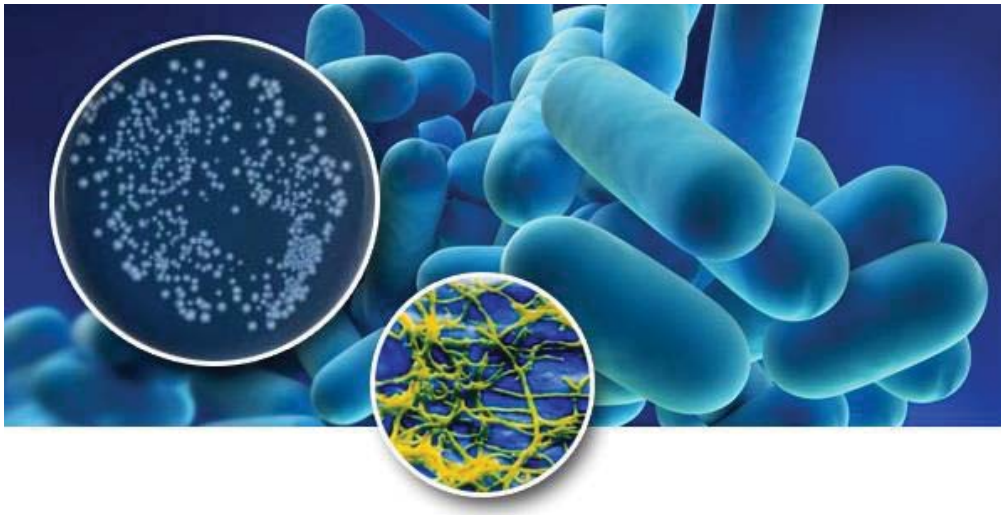
General Principles of effective water management:

- Maintaining water temperatures outside the ideal range for *Legionella* growth – **Hot/Hot!** & **Cold/Cold!**
 - Preventing water stagnation
 - Ensuring adequate disinfection
 - Maintaining devices to prevent scale, corrosion, and microbial growth (biofilm), all of which provide a habitat and nutrients for *Legionella*
- ▶ Once established, water management programs require **regular monitoring** of key areas for potentially hazardous conditions and the use of **predetermined** action responses to remediate such conditions if the team detects them.

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Legionella Bacteria are ...



Very, very, very, very ...
***small* bacteria**

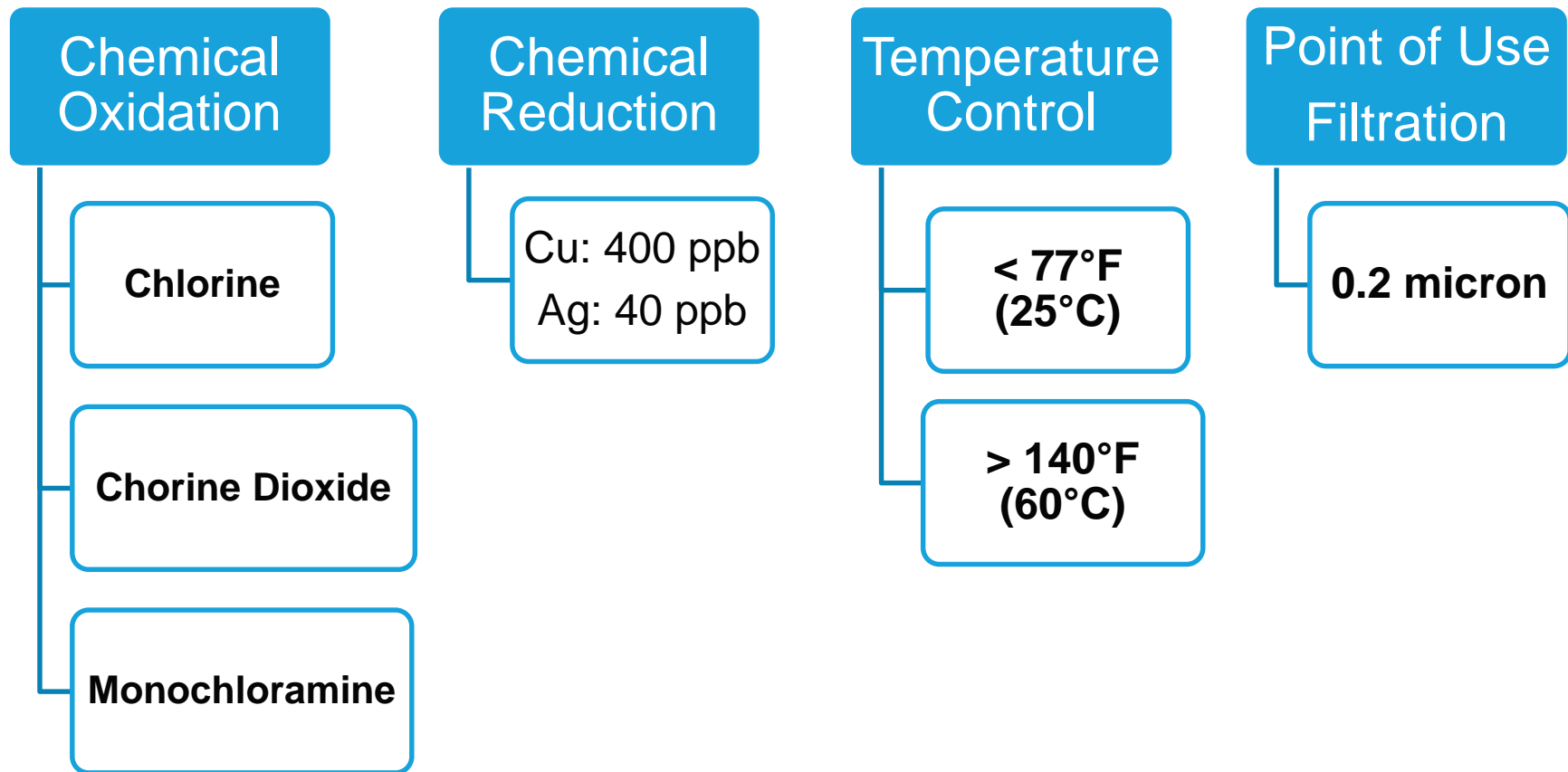
0.3–0.9 μm (by)
2–20 μm

**What filter size would you use for a
Legionella control strategy?**

Control measures to mitigate risk ...



Risk Mitigation: Secondary Disinfection



Control measures to mitigate risk ...



Secondary Disinfection Methods

- Thermal shock treatment (Heat & Flush)
- Shock Chlorination: >10 ppm free residual, may require water tanks to be 25-50 ppm
- Continuous Supplemental Chlorination (1-4 ppm)
- Copper-Silver ionization (continuous) (400/40 ppb)
- Chlorine Dioxide (ClO_2)
- Monochloramine (continuous)
- Point-of-use Filtration

Control measures to mitigate risk ...



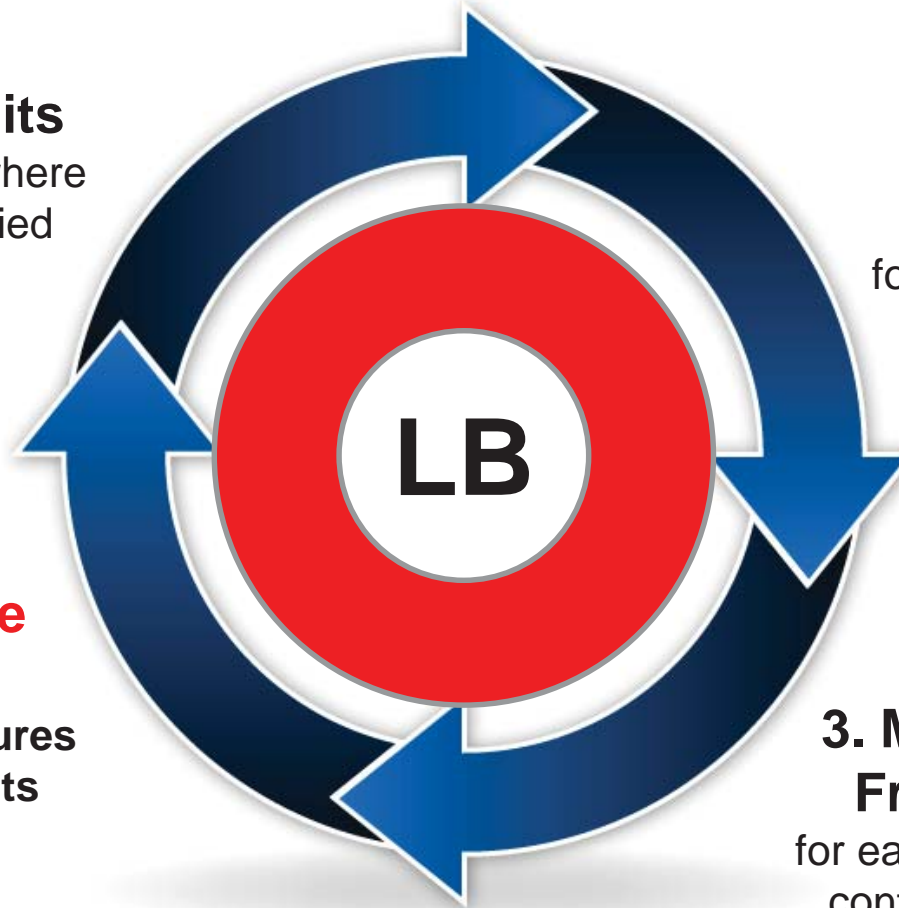
Establish for Every Control Measure

1. Control Limits
for each point where
control is applied

**2. Monitoring
Method**
for each point where
control is applied

**4. Corrective
Actions**
for control measures
Outside of Limits

**3. Monitoring
Frequency**
for each point where
control is applied



Control measures to mitigate risk ...



Summary:

- Control measures to mitigate risk is the heart of a WSM plan and the key to preventing Legionellosis
- The Team shall determine the control measures to be maintained, including: preplanning of physical design & equipment siting, treatment methods, and all aspects of monitoring to maintain the proper (safe) chemical and physical conditions of the water.
- Establish for every control measure: location, limits, monitoring methods & frequency as well as corrective actions for control measures outside of control limits.
- Document, Document and Document everything!