

POTABLE WATER SAMPLES - Overall Building Risk Assessment; Remedial Action Criteria

Overall Building Risk Assessment per ANSI/ASHRAE 188-2021 for Hospitals, Assisted Living Facilities, Hotels, and Buildings greater than Ten Stories	Faucet fixtures are dead-legs off of the building circulating hot water loop. The numbers of <i>Legionella</i> present in the water at each faucet will vary according to how frequently the faucet is used, since frequent flushing will repeatedly reduce <i>Legionella</i> that has accumulated in the water due to growth and release from the surface biofilm. The risk of Legionnaires' Disease is more closely correlated with the <u>percentage of sites that are positive</u> , rather than the numbers of <i>Legionella</i> at any one site. Therefore, EST recommends that a 30% positive for any <i>Legionella</i> be used as an action threshold. (New York Codes, Rules and Regulations, Volume A (Title 10), Part 4, protection Against <i>Legionella</i> , Effective Date 7/6/16)		
Risk for Legionnaires' Disease	High Risk = $\geq 30\%$ Positive for <i>Legionella</i>	Low Risk = $<30\%$ Positive for <i>Legionella</i>	Very Low Risk = ND
Recommendations for Disinfection for the Building's Potable Water System	Immediate Disinfection of Potable Water System (Refer to Dr. Miller's Two-Step Disinfection Procedure)	Disinfect if LD cases are detected, or as indicated by individual site results (below)	No Action
Recommendations for Testing	Immediate post disinfection <i>Legionella</i> retest to determine the effectiveness of disinfection. * Schedule monthly testing for future <i>Legionella</i> monitoring. Consider prevention strategies if colonization is persistent.	Maintain a regular testing schedule in accordance with your Water Management Plan of at least ten (10) potable water sites in the building for <i>Legionella</i> control validation.	

While frequent use of a faucet may lead to a transiently low number of *Legionella*, high numbers of *Legionella* at a site are always relevant, particularly if they are the most virulent *Legionella pneumophila* SG1, and should be acted upon as outlined below:

Individual Sample Site Risk for Legionnaires' Disease	Very High Risk	High Risk	Moderate Risk	Low Risk	Very Low Risk	Very Low Risk
<i>Legionella pneumophila</i> SG1	> 1,000 CFU/ml or swab	100-999 CFU/ml or swab	10-99 CFU/ml or swab	1-9 CFU/ml or swab	0.1-0.9 CFU/ml or swab	None Detected
<i>Legionella pneumophila</i> SG 2-14 or Non- <i>pneumophila</i> species	> 10,000 CFU/ml or swab	1,000 – 9,999 CFU/ml or swab	100-999 CFU/ml or swab	10-99 CFU/ml or swab	0.1-9 CFU/ml or swab	None Detected
Recommendation for Site Flushing (Refer to Dr. Miller's 1-5-5 Site Flushing Procedure)	Yes	Yes	Yes	Yes	Yes	No Action
Recommendation for Disinfection (Refer to Dr. Miller's Two-Step Disinfection Procedure)	Immediate Site Disinfection*	Immediate Site Disinfection*	Consider Site Disinfection	Consider Site Disinfection	No Action	No Action

Abbreviations: ND = None Detected (<0.1 CFU/ml, Limit of Detection); LD = Legionnaires' Disease; CFU = Colony Forming Unit.

*Consider EST's **Viable *Legionella* vPCR** analyses to rapidly validate the disinfection effectiveness.

NON-POTABLE SAMPLES (Cooling Towers and Industrial Water) - Risk Assessment; Remedial Action Criteria

Legionella Risk Level	Very High Risk	High Risk	Moderate Risk	Low Risk	Very Low Risk
<i>Legionella pneumophila</i> SG1	> 5,000 CFU/ml	1,000-5,000 CFU/ml	100–999 CFU/ml	10–99 CFU/ml	ND or <10 CFU/ml
<i>Legionella pneumophila</i> SG 2-14 or Non-pneumophila species	> 10,000 CFU/ml	5,000-10,000 CFU/ml	1,000-4,999 CFU/ml	100–999 CFU/ml	ND or < 100 CFU/ml
Legionnaires' Disease Risk	Significant Potential for causing an outbreak of Legionnaires' Disease	<i>Legionella</i> detected at level associated with outbreaks of Legionnaires' Disease.	<i>Legionella</i> approaching the level associated with outbreaks of Legionnaires' disease	<i>Legionella</i> well below the level associated with outbreaks of Legionnaires' disease	Background levels of <i>Legionella</i>
Recommendation for Disinfection	Immediate Disinfection	Immediate Disinfection	Disinfection is usually indicated as a precaution against any future <i>Legionella</i> amplification	Disinfection is generally not recommended unless located near susceptible populations	Disinfection is generally not recommended unless located near susceptible populations
Recommendations for <i>Legionella</i> Testing	Schedule immediate retest to determine effectiveness of the disinfection*	Schedule immediate retest to determine effectiveness of the disinfection*	Schedule a retest to determine effectiveness of the disinfection*	Maintain regular testing schedule for <i>Legionella</i>	Maintain regular testing schedule for <i>Legionella</i>
Recommendations for Biocide Treatment	Alter the current biocide treatment program	Alter the current biocide treatment program	Review the current biocide treatment program	Review the current biocide treatment program	Review the current biocide treatment program

Abbreviations: ND = None Detected, CFU = Colony Forming Unit.

*Consider EST's **Viable Legionella vPCR** analyses to rapidly validate the disinfection effectiveness.

Whirlpool Spa Legionella & Total Pathogens Test - Overall Site Risk Assessment; Remedial Action Criteria

Legionella Risk Level	Very High Risk	High Risk	Moderate Risk	Low Risk	Very Low Risk
<i>Legionella pneumophila</i> SG1	> 100 CFU/ml	10-99 CFU/ml	1-9 CFU/ml	0.1-0.9 CFU/ml	ND or <0.1 CFU/ml
<i>Legionella pneumophila</i> SG 2-14 or non-pneumophila species	> 1,000 CFU/ml	100-999 CFU/ml	10-99 CFU/ml	1-9 CFU/ml	ND or < 1 CFU/ml
Legionnaires' Disease Risk Assessment	Significant Potential for causing an outbreak of Legionnaires' Disease	Legionella detected at level associated with outbreaks of Legionnaires' Disease.	Moderate potential for Legionnaires' Disease	Low potential for Legionnaires' Disease	No potential risk for Legionnaires' Disease
Recommendation for Disinfection	Immediate shock disinfection of sample site	Immediate shock disinfection of sample site	Review disinfection system, filters, and maintenance program	Review disinfection system, filter, and maintenance program	No Action
Recommended Legionella Testing	Schedule immediate retest to determine effectiveness of the disinfection*. Review/modify the disinfection system, filters, and maintenance program	Schedule immediate retest to determine effectiveness of the disinfection*. Review/modify the disinfection system, filters, and maintenance program	Schedule immediate retest of this site to check for Legionella amplification.*	Schedule a retest of this site to check for Legionella amplification.*	Maintain a regular testing schedule for Legionella

In order to assess the Overall Disinfection Control in a whirlpool spa or hot tub, it is recommended to additionally test these sites for the presence of high total bacteria counts, *E. coli*, *Pseudomonas* and Non-Tuberculosis Mycobacterium during routinely scheduled Legionella testing.

Overall Disinfection Control	Hazardous	Poor	Fair	Good
Total Bacteria	>10,000 CFU/ml	1,000-9,999 CFU/ml	200-999 CFU/ml	<200 CFU/ml
<i>E. coli</i> , <i>Pseudomonas</i> and Non-Tuberculosis Mycobacterium	10-99 CFU/ml	1-9 CFU/ml	0.1-0.9 CFU/ml	ND or < 0.1 CFU/ml
Recommendations for Disinfection	Immediate shock disinfection. Review disinfection system, filters, and maintenance program.	Immediate shock disinfection. Review disinfection system, filters, and maintenance program.	Review disinfection system, filters, and maintenance program.	No immediate action.
Recommendations for Testing	Schedule an immediate retest*	Schedule an immediate retest*	Schedule retest*	Maintain regular testing schedule

Abbreviations: ND = None Detected, CFU = Colony Forming Unit.

*Consider EST's Viable Legionella vPCR analyses to rapidly validate the disinfection effectiveness.

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