~~ANNUAL MIDWEST WORKSHOP IN ENVIRONMENTAL HEALTH~~

CANCELLED
Webinar 10/05

~~March 23-26, 2020~~

Legionella Risk Assessment

Residual risk or just Boilerplate

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Brief summary of presentation content:

- Before commencing the site assessment
  - Gathering and understand published guidance/Reference material
  - Building survey tools to measure compliance with good practice
  - Establishing water system inclusions and exclusions
- Legionella risk assessments,
  - Assessing the management structure & water safety plans (record system)
  - Conducting site surveys & inspections
  - Prioritising corrective actions
  - Suggesting site specific control measures
- Sampling
  - Sampling, what are we trying to achieve?
  - Analysis, changing world

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Selection of a Legionella Risk Assessor?

Some factors you may want to consider (based on CDC suggestions):

- Appropriate training – Nobody ever defines what is appropriate training.
- Knowledge of codes, standards, and regulations?
- Legionella specific experience – For what water systems and facility types/size.
- Experience of effective solutions - Practicable remediation, and control implementation.
- Laboratory expertise – Selection of an accredited laboratory (proficiency testing program for Legionella).
- Sampling for Legionella – Selection of sample points.
- Potential conflicts of interest - Promoting specific services or products.

VS

ASHRAE Guideline 12 does not require previous training or certification in hazard analysis, risk assessment, or risk management methodologies

While it is perfectly possible for business operators to perform risk assessments themselves, if they intend to perform anything other than a tick box exercise the amount of effort skilling up the risk assessor is clearly significant and may well prove to be commercially impractical if done properly.

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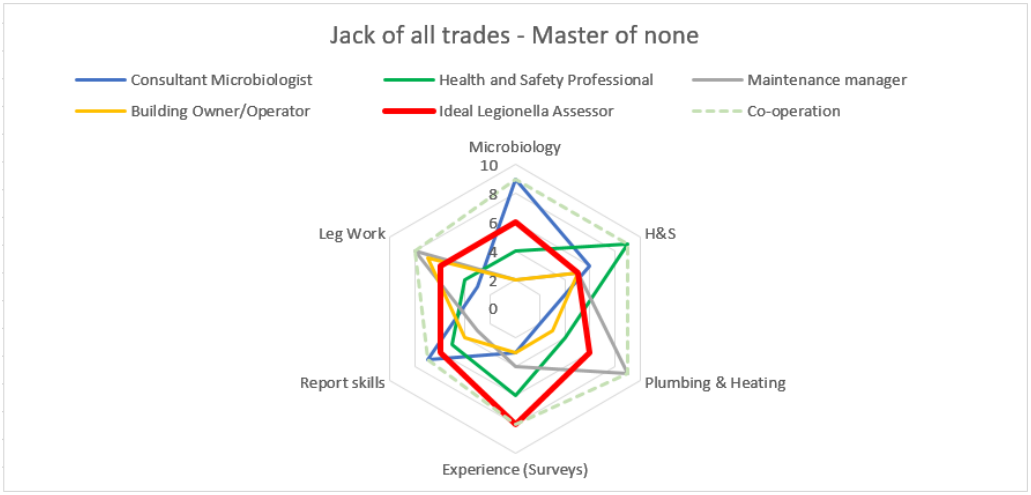
Jack of all trades - Master of none
Consultant Microbiologist
Health and Safety Professional
Maintenance manager
Building Owner/Operator
Ideal Legionella Assessor
Co-operation
Microbiology
10
8
6
4
2
0
H&S
Plumbing & Heating
Experience (Surveys)
Report skills
Leg Work

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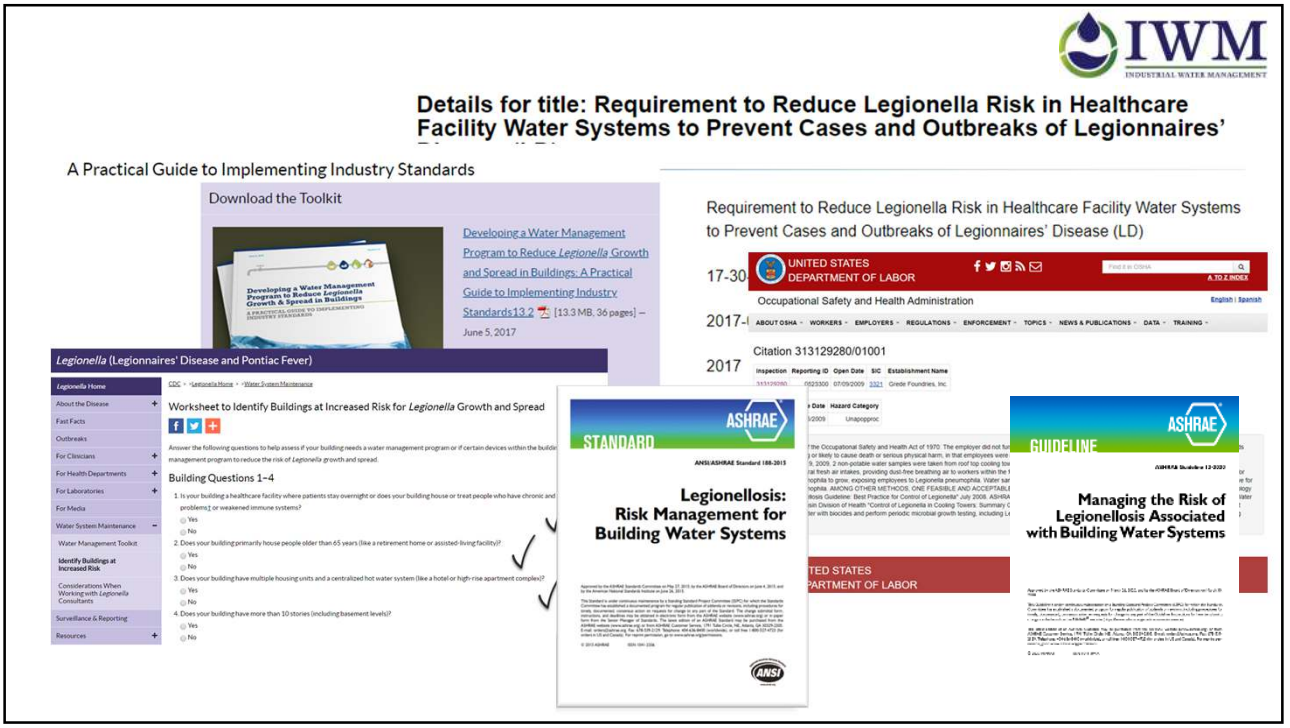
Details for title: Requirement to Reduce Legionella Risk in Healthcare Facility Water Systems to Prevent Cases and Outbreaks of Legionnaires'
A Practical Guide to Implementing Industry Standards
Download the Toolkit
Developing a Water Management Program to Reduce Legionella Growth & Spread in Buildings
Developing a Water Management Program to Reduce Legionella Growth and Spread in Buildings: A Practical Guide to Implementing Industry Standards13.2 [13.3 MB, 36 pages] – June 5, 2017
Requirement to Reduce Legionella Risk in Healthcare Facility Water Systems to Prevent Cases and Outbreaks of Legionnaires' Disease (LD)
17-30
UNITED STATES DEPARTMENT OF LABOR
Occupational Safety and Health Administration
2017-
2017
Citation 313129280/01001
Legionella (Legionnaires' Disease and Pontiac Fever)
Worksheet to Identify Buildings at Increased Risk for Legionella Growth and Spread
Building Questions 1–4
ASHRAE
STANDARD
Legionellosis: Risk Management for Building Water Systems
ASHRAE
GUIDELINE
Managing the Risk of Legionellosis Associated with Building Water Systems

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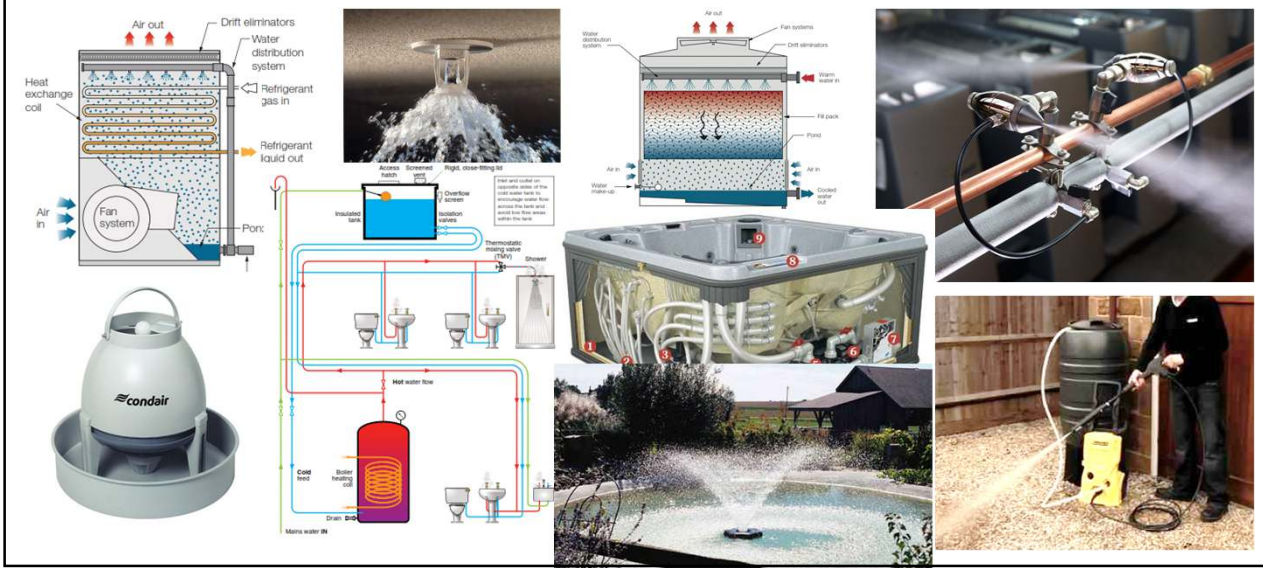
RA systems Included/Excluded



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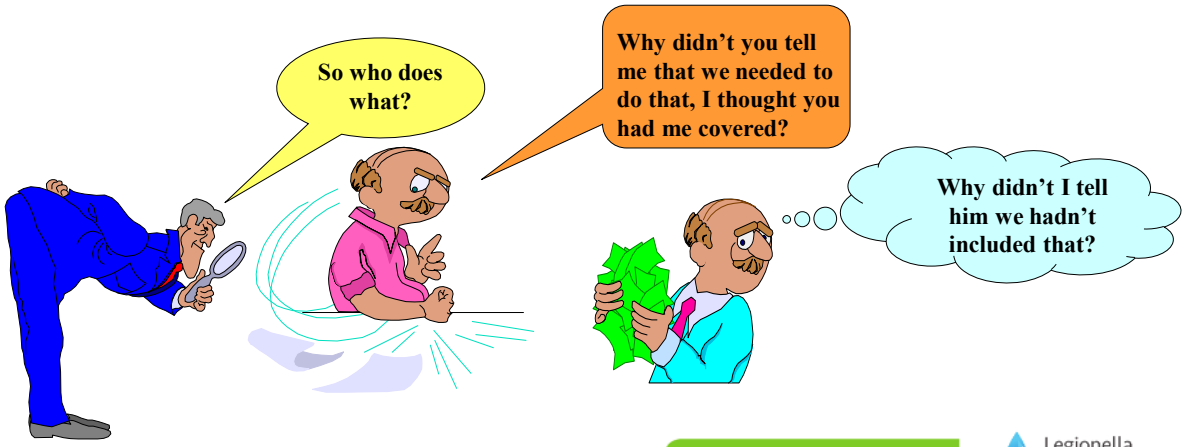
Define the water systems covered and indicate any systems knowingly not assessed.



The Control of Legionella
A Recommended Code of Conduct
for Service Providers

Legionella Control Association

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Inherent risk, yes – But we need residual risk

- "It's pretty dangerous"

- "My child went to see one today"

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Risk Assessment – Priorities

- Provide guidance that can be used to produce and implement the water hygiene program.

Risk Assessment Ratings

LR - Legionella Risk Ratings

LR - Legionella Risk Rating has been used to prioritise corrective actions relating directly to legionella control. Our assessment is based on the residual risk with the current design & control systems in place. Failure of the current control system could easily result in the water system reverting to a far higher risk rating - the water systems inherent risk.

Level 0	• HAZARD (Legionellosis) x LIKELIHOOD (Very Low) = RISK (Minimal) • No additional action required.
Level 1	• HAZARD (Legionellosis) x LIKELIHOOD (Low) = RISK (Slight risk under abnormal operating conditions) • Take actions when other more significant risks have been completed.
Level 2	• HAZARD (Legionellosis) x LIKELIHOOD (Possible) = RISK (Possible risk with existing operating conditions) • Take actions when operationally practicable, time periods often programmed to fit with shutdowns or planned maintenance.
Level 3	• HAZARD (Legionellosis) x LIKELIHOOD (Present) = RISK (Probable risk with existing operating conditions) • Take actions as soon as possible, time periods are typically a few months maximum.
Level 4	• HAZARD (Legionellosis) x LIKELIHOOD (High) = RISK (Imminent risk of harm or loss) • Take immediate action to reduce the risk, this may include taking systems off line.

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Risk Assessment – Survey work

- Site visit/survey
  - Escorted by plumber / someone with site knowledge
  - Access to all areas & parts of the system for inspection
  - Access to individuals with responsibilities for conducting control tasks
  - Information on planned changes to system use, operation or fabric

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Service voids

Boilerplate
- Remove any dead ends

Site specific prioritized corrective actions & remedial works.
- The Dead ends in service void (M5-104) need to be cut back to flowing pipework.
- Insulation?
- Plumber training issues to be solved?

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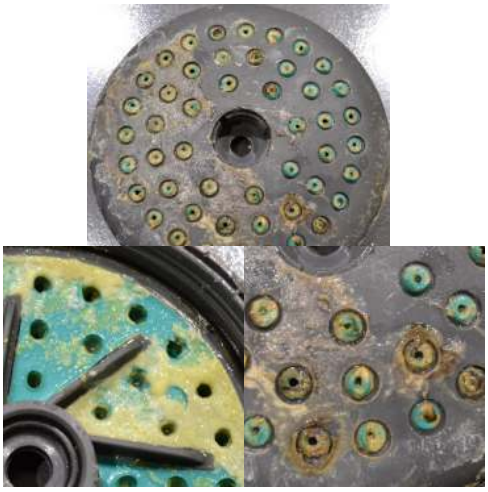
Shower – Cleaning, replacement, selection



Boilerplate control measures

- Quarterly - Dismantle, clean, descale and disinfect removable parts, heads, inserts and hoses where fitted.

Site specific control measures

Quarterly - Dismantle, clean, descale and disinfect removable parts, heads, inserts and hoses: -

- 1 x Mixer Shower - Located Ground Floor Reception building kitchen
- 19 x Mixer Shower - Located Ground Floor Tents 1-19

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Open it, look in it…..

- An ultrasonic humidifier

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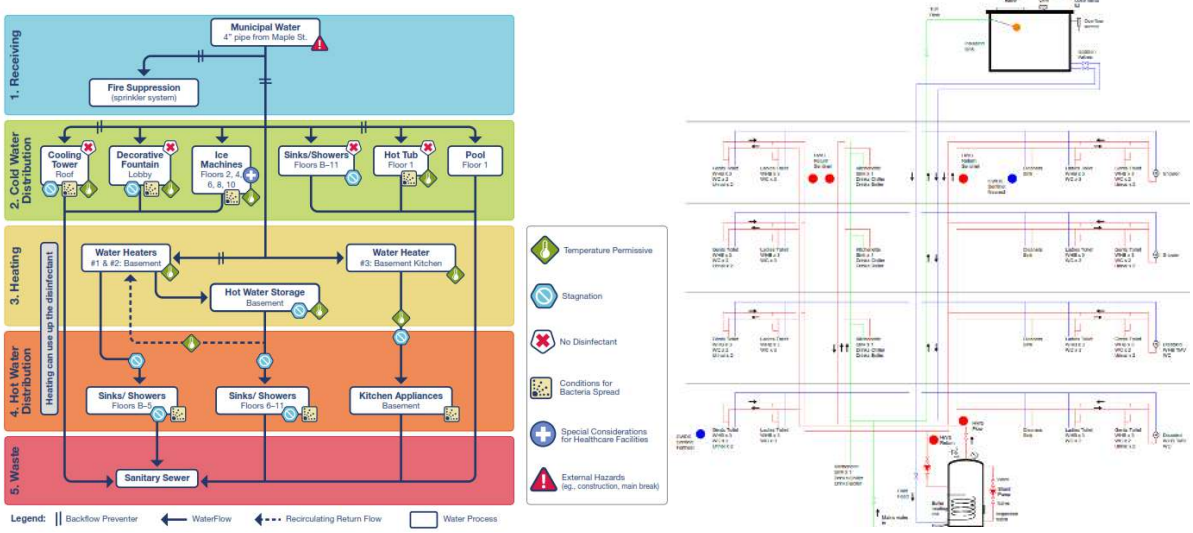
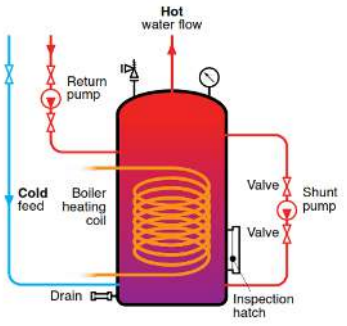
ASHRAE Flow Diagram / UK – Schematic Diagram



Water Heaters (Calorifiers)



- UK
  - Hot water should be stored at 60°C (140°F) and distributed so that it reaches a temperature of 50°C (122°F) within one minute at outlets. Hot water calorifiers must be capable of reaching a temperature of at least 60°C (140°F) throughout the vessel at least once per day. This may be achieved by using a destratification (shunt) pump, fitting a heat source at low level or returning a pumped HWS to the bottom of the vessel.
  - In the main US guidance also states this but…..

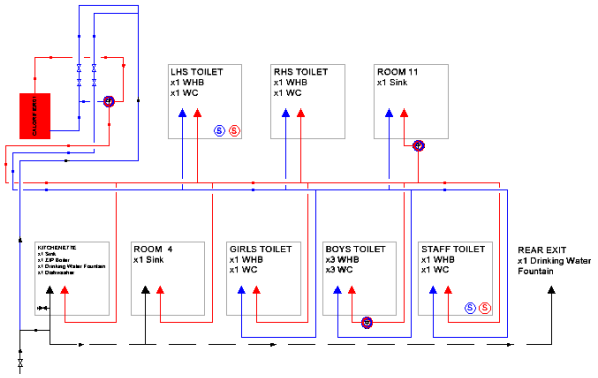
Anti-Scalding, centralised TMVs.

STRATEGIES FOR LEGIONELLA CONTROL AND THEIR APPLICATION 175

TABLE 4-3 Water Temperature, Risk of Scalding/Burning, and *Legionella* Growth Potential

°F	°C	Time to First-degree Burn	Time to Second-degree Burn	*Legionella* Growth Potential
<77	<25			No
80	27			Low
90	32			Moderate
100	38			Very high
110	43			Very high
116	47	35 min	45 min	Moderate
122	50	1 min	5 min	Very low
131	55	5 sec	25 sec	No
140	60	2 sec	5 sec	No
149	65	1 sec	2 sec	No
154	68	instantaneous	1 sec	No

SOURCE: Adapted from Armstrong (1978) and Klein (2018).



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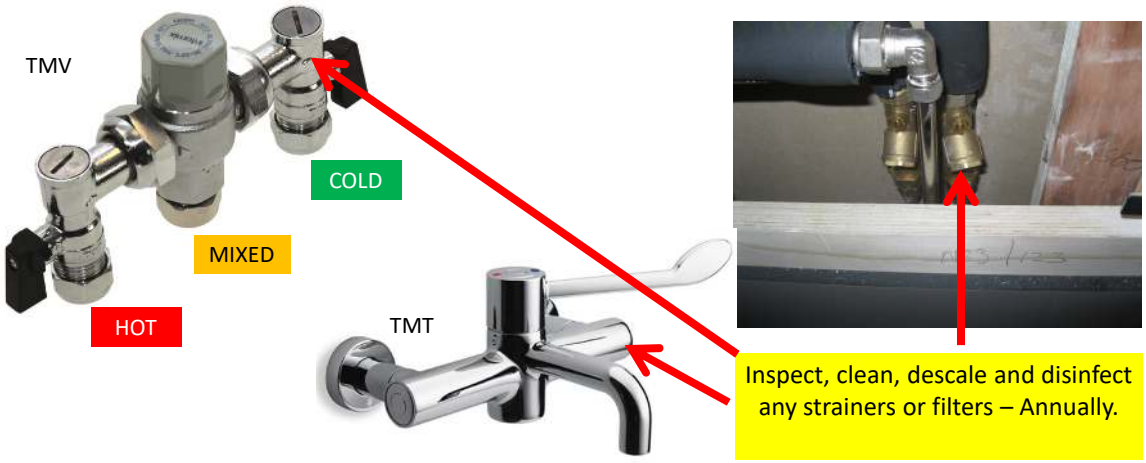
Point of use -Thermostatic Mixing Valves



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Secondary dosing (disinfectants)

- Over dosing causes corrosion, taste, smell and wholesome water issues.
- Under dosing gives little benefit but many of the associated costs.
- To be effective an assessor needs to see regular, on-site testing with control limits at pre-selected, distal outlets.

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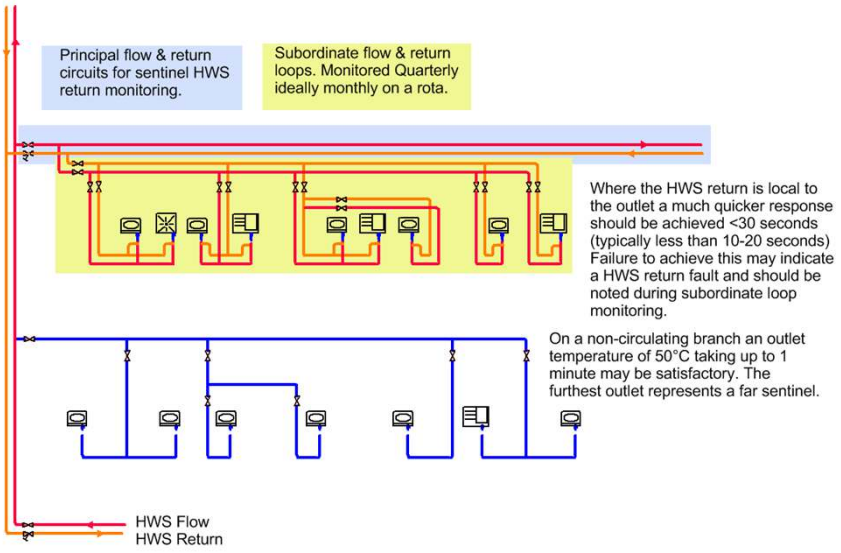
Failure in hot water system return



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Many issues are localised

- Biofilm likes flow straighteners in taps if they are made from some plastics / restrict the flow / catch debris.

- Flexible Hoses - Legionella bacteria have been found in water samples taken from water outlets fed by flexible hoses.

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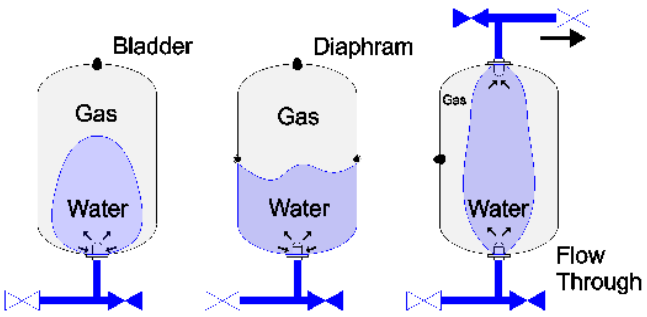
Not so obvious stored water

- Expansion vessels – Dead legs?? Encourage growth??



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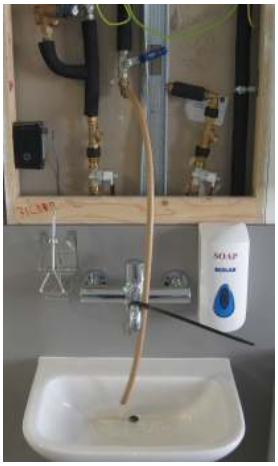
New build/ refurbishment – Stagnation during construction



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Legionella Sampling – Regular not one off

When to sample (UK Guidance HSG274)

- water systems treated with biocides where water is stored or distribution temperatures are reduced.
- water systems where the control levels of the treatment regime, e.g. temperature or disinfectant concentrations, are not being consistently achieved.
- **high-risk areas or where there is a population with increased susceptibility, e.g. in healthcare premises including care homes;**
- water systems suspected or identified in a case or outbreak of legionellosis
- Where the risk assessment identifies the need for testing.

ASHRAE 188 <u>"Program Confirmation"</u>

The Program Team shall include consideration of the following as part of the determination of whether to test for Legionella:

- **Program control limits are not maintained in building including in water systems with supplemental disinfection.**
- **A health care facility provides in-patient services to at risk or immunocompromised populations.**
- A prior history of legionellosis is associated with the building.

VA Policy

- Water samples from at least 10 outlets on the hot water distribution system and at least 10 outlets on the cold water distribution system must be tested from each building for each quarterly testing cycle.

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Management of Legionella in Water Systems

The Committee's analysis of studies on Legionella occurrence that collected concentration data suggests that a Legionella concentration of

5 × 10^4 CFU/L (50,000)

should be considered an "action level," that is, a concentration high enough to warrant serious concern and trigger remediation. This concentration could be used for many purposes, including to set an acceptable risk level for Legionnaires' disease and for regulations and guidelines on Legionella management in building water systems (see Chapter 5).

Management of Legionella in Water Systems (2020)

DETAILS

290 pages | 7 x 10 | HARDBACK
ISBN 978-0-309-49947-7 | DOI 10.17226/25474

- UK Legionella limits
  - Initial action <100 CFU/L
  - Concern >1000 CFU/L
  - (In practice not detected <50 is often quoted).
  - US often report per ml so the UK limit would be 0.05 cfu/ml.

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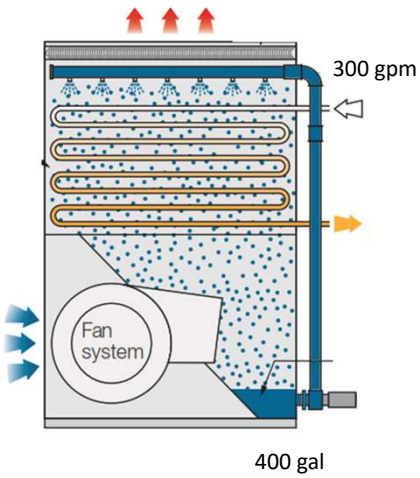
Systemic samples



Easy enough to achieve in: -

Cooling Towers

Evaporative condensers

SPA / Whirlpool baths

Other recirculating water systems.

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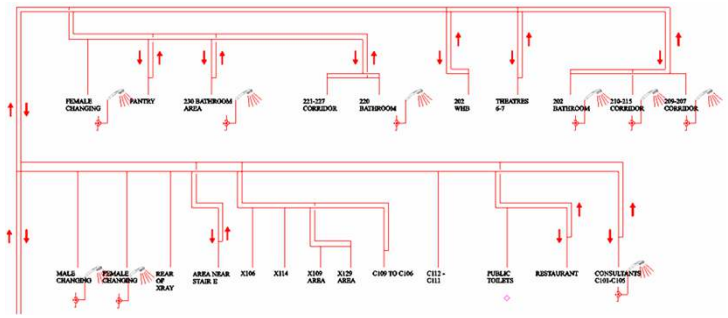
Non-systemic pre-flush Legionella sampling



What are we sampling?
In domestic systems, often worst case pre-flush at outlets is most relevant.