RL Stone Company
Domestic Hot Water Systems Advances & Concerns in the Hospitality Sector

Presented by
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1-800-836-3690
What Do Today’s Guests Want In Your Hotel

- Good & Friendly Service
- Connectivity
- Cleanliness
- Safety
- Predictability

- Comfortable Beds
- Plentiful Hot Water
Presentation Position Statement

What is Domestic Hot Water

• Potable hot water which is used for drinking, food preparation, sanitation and personal hygiene.

• System equipment generally consists of:
  – Hot Water Generator
  – Distribution Piping
  – Circulation & Booster Pumps
  – Temperature Control
  – Point of Use Fixtures
Domestic Hot Water System

Master Thermostatic Mixing Valve
ASSE 1017/CSA B125.3

TW 120 F
CW

TAFR VA.
ASSE 1062

SHOWER VA.
ASSE 1016 / CSA B125.1

POINT OF USE MIXING VALVE ASSE 1070

RL Stone Co - Domestic Hot Water
Owners Concerns

- Initial Cost – NSF 61 Energy Cost
- Maintenance Cost
- Water Cost
- Risk Avoidance
  - Scalding
  - Legionella
New York State DOH Adopts ASHRAE Standard 188-2015 for Cooling Tower Management

- No longer voluntary compliance
- By 9/17/15 cooling towers need to be registered, inspected, tested and react to findings
- By 12/31/15, towers cleaned and certified
- By 3/1/16 a plan based on ASHRAE 188-2015 needs to be formalized and implemented
• The bacteria’s natural habitat is WATER
• Drinking Legionella bacteria is something we all do, probably every day
• It’s breathing moist aerosolized air with Legionella in it that can cause problems
• Estimated up to 18,000 hospitalized cases every year. 5-30% are fatal (CDC).
• Legionella outbreaks have increased 323% in the last 10 years over the previous 10 (CDC)
• NY DOH 2006 Guidelines makes 1 case an outbreak
Who Does Legionella Affect

- Smokers
- Elderly people
- Immunocompromised
- People with Respiratory problems
- Pneumonia-like Symptoms
Cooling Towers Get The Attention

• The name Legionnaires disease comes from a cooling tower outbreak in Philadelphia 1976 at an American Legion conference
• Fall River MA 1993
• Pittsburgh VA 2009
• Aria Hotel In Las Vegas 2011
• Springhill Suites Altamonte Fla 2015
• More recently 8/15, in the South Bronx 119 people were infected and 12 died
The Bigger Concern

- Domestic Water Systems
- CDC Estimates that 80% of the LD cases come from domestic water systems
  - 21% Hotels
  - 23% Healthcare
  - 56% from all other facilities
We’ve Created Excellent Homes

- Plumbing systems are a good environment for harboring and growing Legionella
- Legionella will grow between 68F and 122F water temperature
- Stagnant or low movement in the water – Dead legs, aquastat controlled recirculation pumps, hot water storage tanks
- Biofilm on plumbing pipe walls protects Legionella Colony
ASHRAE 188-2015 for Potable Water
Legionella: Risk Management for Building Water Systems

• ASHRAE 188-2015 says that facilities meeting any one of the following requirements must implement a Water Management Plan WMP
  – Multiple Housing units with a central hot water system
  – More than 10 stories
  – Housing designated for people over 65
  – Patients staying more than 24 hours
  – Whirlpool or Spa
  – An area housing or treating people with certain medical risk factors....
ASHRAE 188-2015 for Potable Water Legionella: Risk Management for Building Water Systems

• Provides a Framework: Not Specific Control Measures
• Each Facility must come up with its Own Control Measures
• The ONUS is on you!!!
System Design Best Practices

• If water must be stored, it should be at 140F or higher
• Minimize dead legs in piping
• Avoid stagnant water in system (keep recirculation pumps running)
• System temperature is recommended circulate at 140F, and blend before point of use.
What Does a WMP (Water Management Plan) Consist Of

• Program Team - Assign a team responsible for program development
• Develop water system flow diagrams and schematics
• Evaluate where hazardous conditions may occur
• **Control Measures** - Determine where and what control measures should be implemented
• Monitor control measures and take corrective actions to maintain limits
• Confirmation – Form procedures to confirm the program is being implemented and working
• Documentation – Establish procedures to communicate and document activities
Control Measure Options

- Hyperchlorination
- Ultraviolet Rays
- Chlorine Dioxide
- Copper Silver Ionization
- Superheat and Flush
Legionella - Your Risk and Exposure

- The Law for your Guest: There is no law but if Legionella occurs your are at risk for litigation for personal injury, negligence, medical expenses, lost income, pain, and emotional distress. If your loved one died, your family may have a wrongful death claim.

- The Law for your Employees: The law requires employers to provide their employees with safe and healthful workplaces.

- In any case Approved Codes of Practice exist (which the do now and recently) they must be followed or you must do more!
  - ASHREA
  - CDC
  - OSHA
Legionella - Your Risk and Exposure

• **What you must do:**
  • Under general health and safety law, as an employer or person in control of a premises you have health and safety duties and need to take suitable precautions to prevent or control the risk of exposure to legionella.
  • Details of the specific law that applies can be found in part 1 of Legionnaires’ disease: The control of Legionella bacteria in water systems. Carrying out a risk assessment is your responsibility and will help you to establish any potential risks and implement measures to either eliminate or control risks.
  • ASHRAE 188 Guidelines
How Can We Achieve Our Legionella Prevention & Business Cost Goals With All These Concerns?
Understand our Typical Daily Water Demand
Legionellae and Temperature

• Below 68°F Legionellae can survive but are dormant
• Legionellae growth range (68°F - 122°F)
• Ideal growth range (95°F - 115°F)
• Above 122°F Legionellae can survive but do not multiply
• At 130°F Legionellae die within 5 to 6 hours
• At 140°F Legionellae die within 32 minutes
• At 150°F Legionellae die within 2 minutes
• Disinfection range (158°F - 176°F)
Safety Issue

140°F.
## Temperature/Time Burn Chart

<table>
<thead>
<tr>
<th>Temperature in °F</th>
<th>Time for 1st degree burn</th>
</tr>
</thead>
<tbody>
<tr>
<td>110°F</td>
<td>5 hours</td>
</tr>
<tr>
<td>118°F</td>
<td>10 minutes</td>
</tr>
<tr>
<td>122°F</td>
<td>1 minute</td>
</tr>
<tr>
<td>131°F</td>
<td>5 seconds</td>
</tr>
<tr>
<td>140°F</td>
<td>2 seconds</td>
</tr>
<tr>
<td>149°F</td>
<td>1 second</td>
</tr>
<tr>
<td>158°F</td>
<td>---</td>
</tr>
</tbody>
</table>
What are We Seeing Being Done with Equipment in the DHW Systems in Hospitality Market
Recent Trends in HW Generation

- Reduction / Elimination of Tanks
- Instantaneous Heaters
- High Efficiency Gas Water Heaters
  - 1995 normal eff = 83%
  - 2015 normal eff = 95%+
- Solar Supplement
- Packaged Solutions
- Many of the Above Qualify for Utility Incentives
Feed-Forward Steam Instantaneous Water Heater

Compact
Quick Reaction to Demand Changes
Accurate & Safe
Easy to Maintain
Easy to Install
No External Utilities
“Packaged Solution”

Flo Rite Temp

The Brain

BASIS

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Recent Trends in HW Distribution

- Properly Sized Pipes: Low Noise, Low Friction, Less Erosion
- Insulation
- ECM Pumps – up to 75% Energy Savings
- Utility $$$
- Need to fix crossovers
Trends We See In Our DHW System

• Master Control:
  – Digital Mixing Valves
    • Accurate Control +/- 2F
    • Extremely Safe
    • Connectivity
    • Low Maintenance – Especially with Hard Water
**Digital Mixing Valve**

- Warranty 5 Years all Components
- Digital readout of setpoint and Outlet Temperature
- Commissioning: Plug the valve in
- Internally checks itself every 4 Seconds
- BrainScan® true interface with ability to remote adjust temperature
- BrainScan® saves a snapshot to memory every 15 min.

**Thermostatic Mixing Valve**

- Warranty 1 Year from ship date
- Gauges in mixed outlet
- Set low flow and then high flow with and without pump running
- Dependent on nothing in the system changing from start up
- Single RTD installed to see the mixed outlet
- No interaction with valve
- No information to suggest it saves information
Remote Set Point Adjustment

PC/BAS Interface

Intelligent System Solutions
STEAM • AIR • HOT WATER
Digital Offering

DRV40

DRV40R

DMC40BS

DMC40-40BS

DRV80

DRV80R

DMC80BS

DMC80-80-80BS

RL Stone Co - Domestic Hot Water
**Keeping Water Hot, Safe and Comfortable**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Readings per hour (<strong>BrainScan®</strong>)</td>
<td>4</td>
</tr>
<tr>
<td>Readings per 24 hr. cycle</td>
<td>96</td>
</tr>
<tr>
<td>Readings since commissioning (est.)</td>
<td>119,808</td>
</tr>
<tr>
<td><strong>November 18th 2012</strong></td>
<td></td>
</tr>
<tr>
<td>Internal Checks (<strong>DRV80-The Brain®</strong>)</td>
<td>15</td>
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<tr>
<td>Internal Checks per hour</td>
<td>900</td>
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<tr>
<td>Internal Checks per 24 Hr. cycle</td>
<td>21,600</td>
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<tr>
<td>Internal Checks per Month</td>
<td>648,000</td>
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<tr>
<td>Internal Checks since commissioning</td>
<td>26,956,800</td>
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<tr>
<td>Averaged Hot Water Feed Temperature</td>
<td>149.53</td>
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<tr>
<td>Averaged Cold Water Feed Temperature</td>
<td>108.90</td>
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<tr>
<td>Averaged Mixed Outlet to Guest Loop</td>
<td>122.04</td>
</tr>
<tr>
<td>Temp Difference in degrees cold/mixed to loop</td>
<td>13.14</td>
</tr>
<tr>
<td>Total adjustments made to The Brain®</td>
<td>0</td>
</tr>
<tr>
<td>Total Cost to service The Brain®</td>
<td>$0.00</td>
</tr>
<tr>
<td>Total cost for repair parts</td>
<td>$0.00</td>
</tr>
<tr>
<td>Total Days In Operation</td>
<td>1,248</td>
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<tr>
<td>Remaining Warranty</td>
<td>577</td>
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<tr>
<td>Total operating hours</td>
<td>29,952</td>
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<tr>
<td>Commissioned</td>
<td>2009</td>
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</table>

**Before suspected lowered calorific value change in the gas feeding the water heaters.**
Case Study – Digital Mixing Valve Performance

- Springhill Suites Columbia, MD 04-06-2015.xlsx
RL Stone Company

Offices Across New York and New England

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