Belimo Energy Valve™
Delta T Manager™

Measures Energy
Controls Power
Manages Delta T
Presentation Agenda

• **Low Delta T at the Coil**
• **Some of Low Delta T Causes**
• **Low Delta T**
  • Cost of Overflowing Coil
  • Cost of Chiller Staging
  • Cost of Over Pumping
  • Occupant Comfort
• **Does it Really Work?**
• **Benefits**
Low Delta T at the Coil

Low Coil Delta T = Inefficient Heat Transfer

Increase GPM >> No Increase in Energy output

More Pump HP >> Reduction in Plant Efficiency
Low Delta T

Some of Low Delta T Causes

• Low Control Set Point

• Fouled Coils

• Low Valve Authority
Low Delta T
Coil Power vs Delta T Behavior
Low Delta T

Cost of Overflowing the Coil...

Energy Valve Delta T Manager
Low Delta T

Cost of Overflowing the Coil...

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<th>1</th>
<th>2</th>
<th>Δ</th>
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<tbody>
<tr>
<td>BTUh</td>
<td>330,000</td>
<td>335,000</td>
<td>1.5%</td>
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<tr>
<td>GPM</td>
<td>55 GPM</td>
<td>65 GPM</td>
<td>18%</td>
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<tr>
<td>Pump hp</td>
<td>Hp increase = (65/55)^3</td>
<td>65%</td>
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\[
\frac{HP_2}{HP_1} \quad \frac{GPM_2}{GPM_1}
\]
Delta T Manager™
Cost of Chiller Staging

Chiller Plant Efficiency

Design Condition

- Design $\Delta T=12^\circ F$ (54°F - 42°F)
- 360 GPM
- 1 Chiller, 90% Load (180 Ton)

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Delta T Manager™
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Chiller Plant Efficiency

Low $\Delta T$

- $\Delta T = 10.4^\circ F$ (52.4$^\circ F$ - 42$^\circ F$)
- 415 GPM
- 2 Chillers, 45% Load (180 Ton)

No change to the load, but a 2nd Pump and 2nd Chiller are started.
Low Delta T
Cost of Over Pumping

- Delta T Manager Signal
- Wasted Pumping
- DDC Signal

Energy Valve Delta T Manager
“How can I let the Delta T Manager limit flow if it doesn’t measure discharge air temperature?

What about occupant comfort?!?”
Delta T Manager™
Occupant Comfort

Delta T Manager adjusts the valve if the $\Delta T$ drops below the set point in order to maintain peak coil efficiency.
Delta T Manager™

Does it really work?
Case Study
Large Tech Company in North Carolina

Delta T vs. Tons - B500 AHU3

- Delta T Management: 96 GPM
- Flow Control: 144 GPM
- Position Control: 240 GPM

Energy Valve Delta T Manager
Case Study
MIT University Hayden Library - Boston, MA

Building and Project Details
• 150,000 sq. ft. on 3 floors
• 6 AHU provide majority of the cooling

Results
• Aug 9 - Oct 9, 2010
  \( \Delta T = 6.15°F \)
• Aug 9 - Oct 9, 2011
  \( \Delta T = 12.14°F \)
Case Study
University of Miami Hospital

Building and Project Details
- Rosenstiel Building
- 11 AHUs
- 2600 Tons of Cooling
- Over 10,000 GPM

Results
- Delta T raised from 5.5°F to 10.5°F
- Flow ~ 5600 GPM
- Estimated $66,000/yr savings
- Estimated 2.9 year payback
Delta T Manager™
Benefits

• **Coil**
  • $\Delta T$ Managing for peak coil efficiency
  • Optimization in retro-fit applications

• **Chiller Plant**
  • Improved chilled water plant efficiency
  • Released chiller capacity

• **Pump**
  • Reduced pump energy

• **Occupant Comfort**
  • No reduction in supplied energy
Energy Valve Delta T Manager