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Wallace Eannace Associates Presents: **Innovative Boiler & Heat Exchanger Concepts for Plumbing Applications**

Bob Barrett, CEM, LEED AP
Sales Engineer
Wallace Eannace Associates, Inc.
www.WEA-INC.com
Email: rbarrett@wea-inc.com
Mobile: 610-299-8007

Wallace Eannace Associates Presents: **Innovative Boiler & HXR Concepts**

- **Piping for Higher Efficiency**
- **BPHXR for DHW**
- **BPHXR for High Rise DHW Re-heat**
- **150% Redundancy with 25% Less Capacity**

Innovative Concepts
Piping for Higher Efficiency

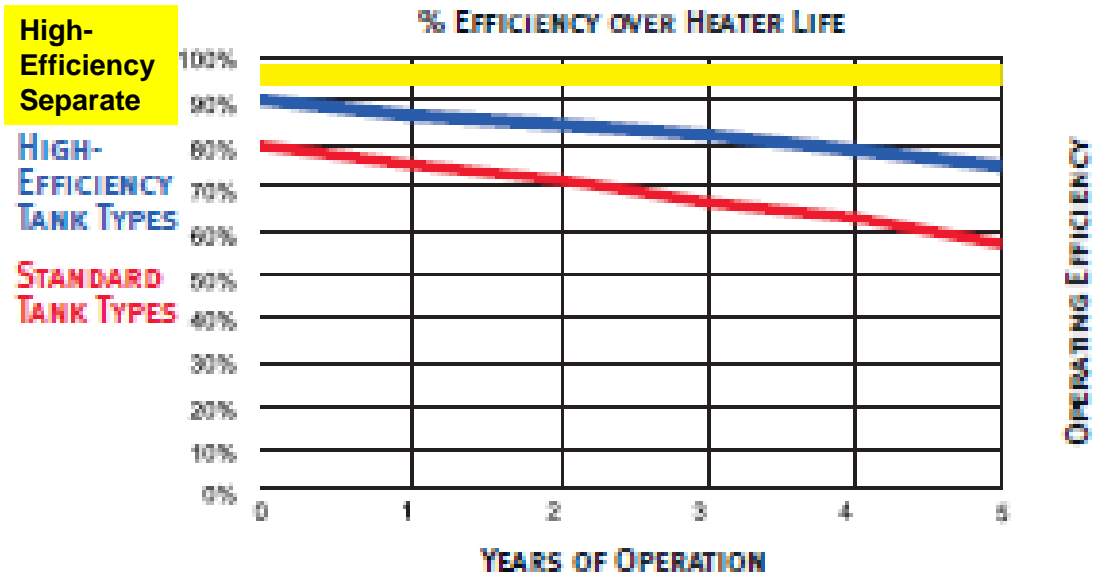
Conventional DHW Heater



Innovative Concepts Piping for Higher Efficiency

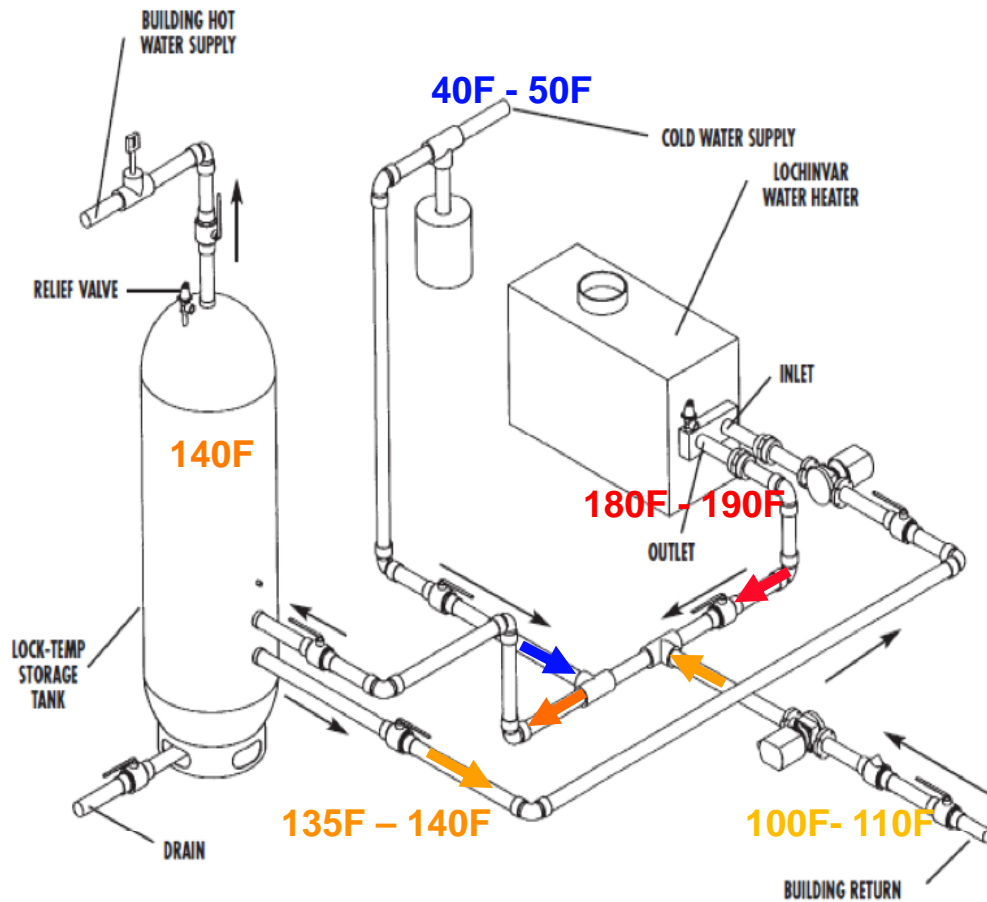


EFFICIENCY LOSS DUE TO LIME SCALE BUILDUP

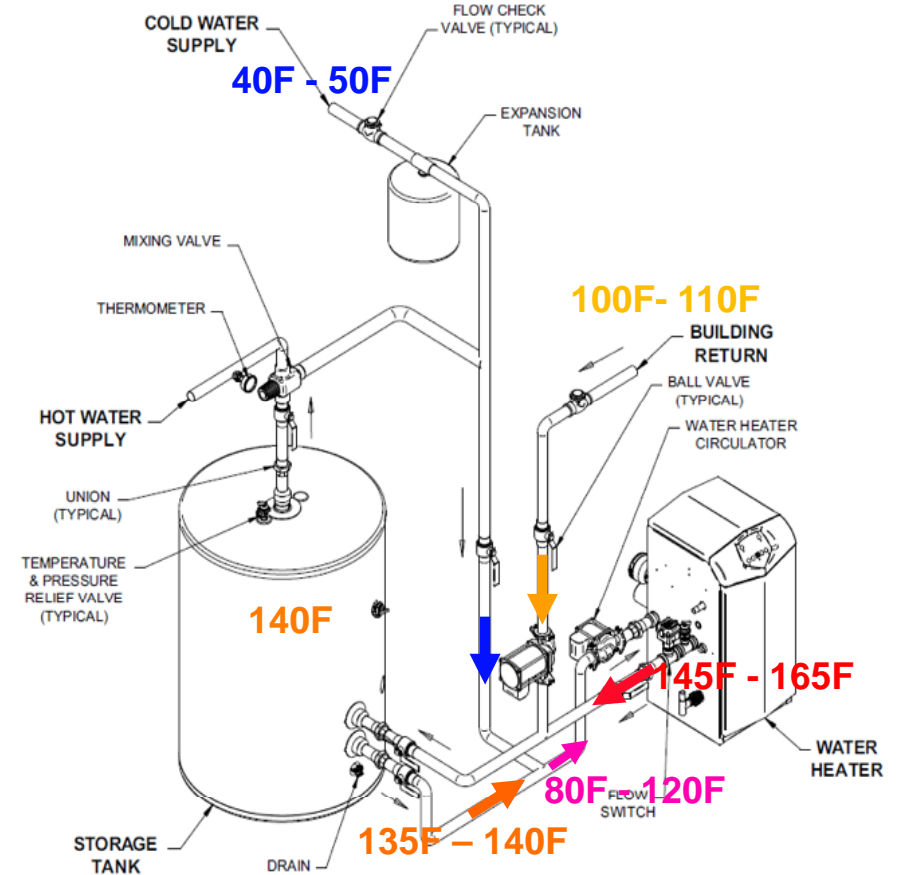


Innovative Concepts Piping for Higher Efficiency

Non-Condensing



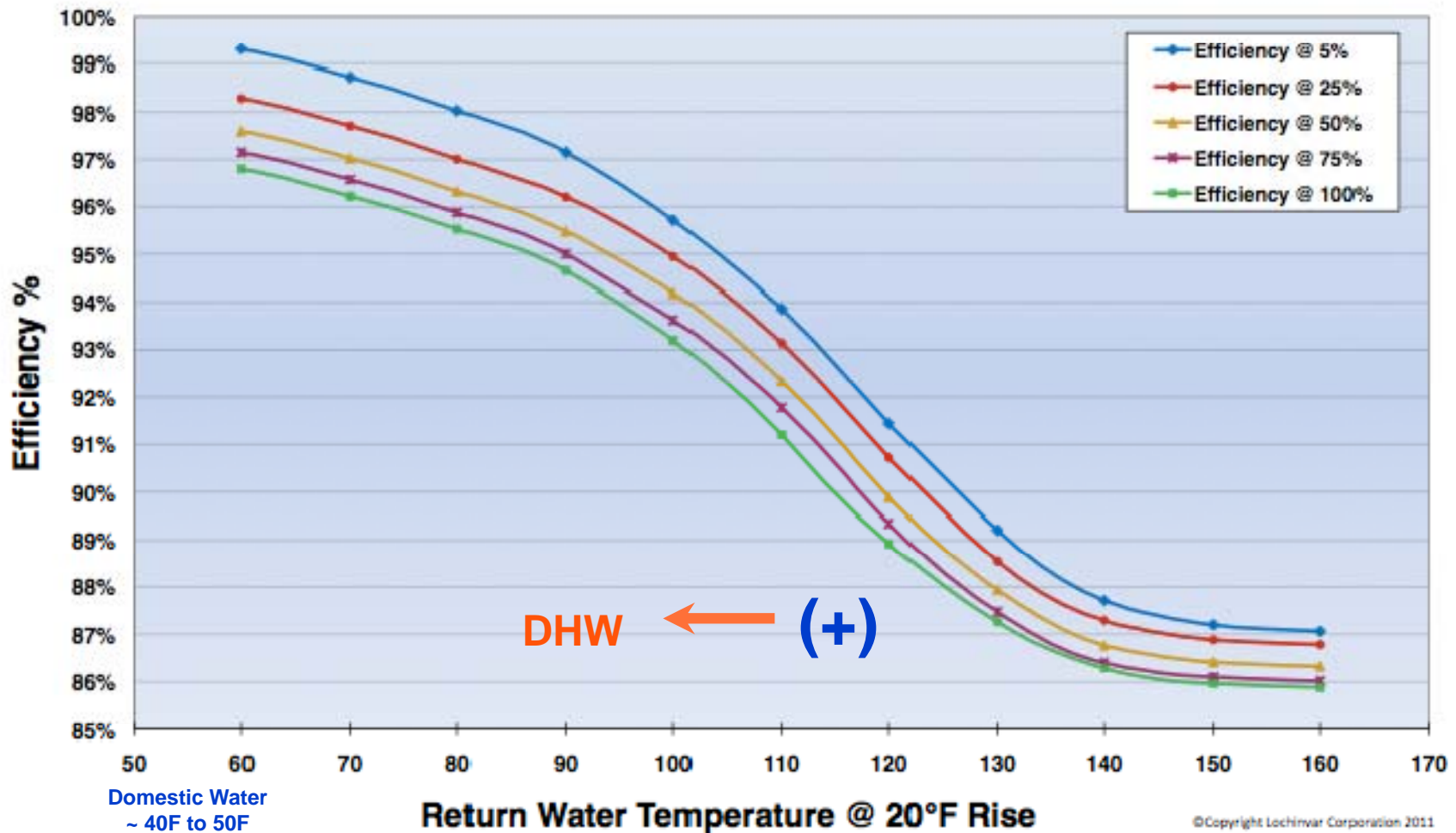
Condensing



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Piping for Higher Efficiency

Boiler Efficiency Curve

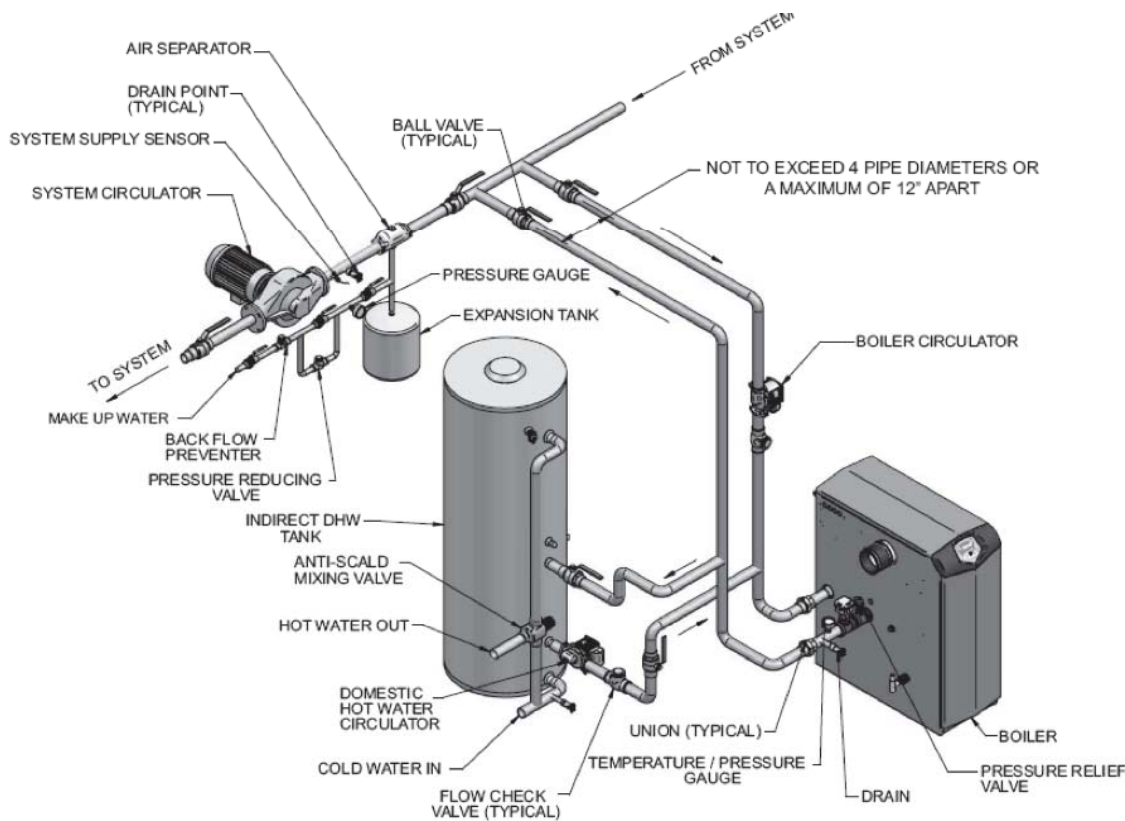


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Brazed Plate Heat Exchangers for
Domestic Hot Water
(BPX for DHW)

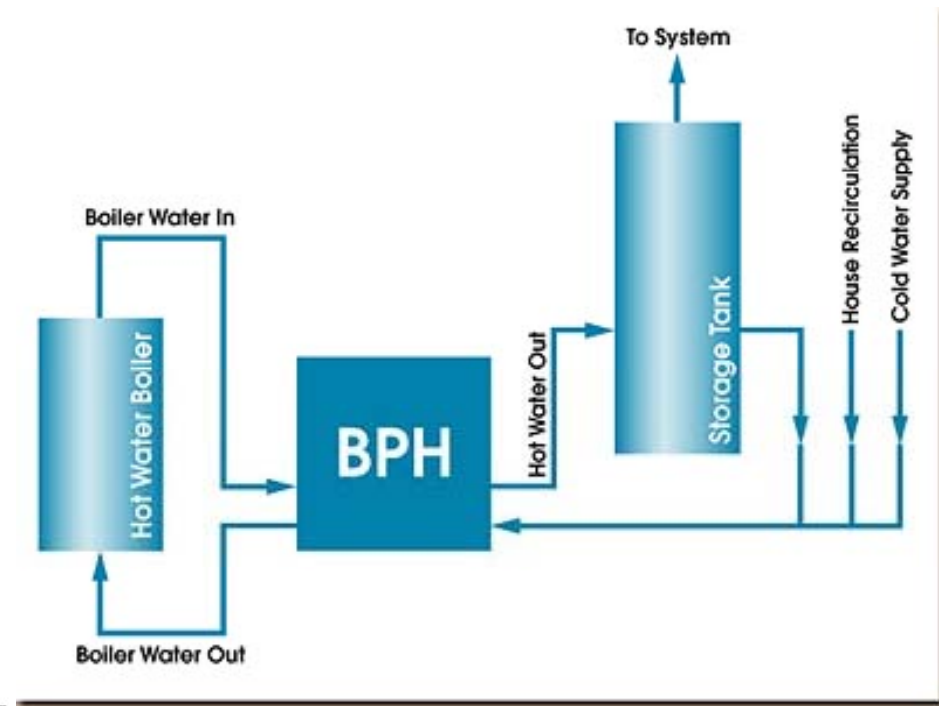
Innovative Concepts **BPX** for **DHW**

If you are used to this..

Why consider this...

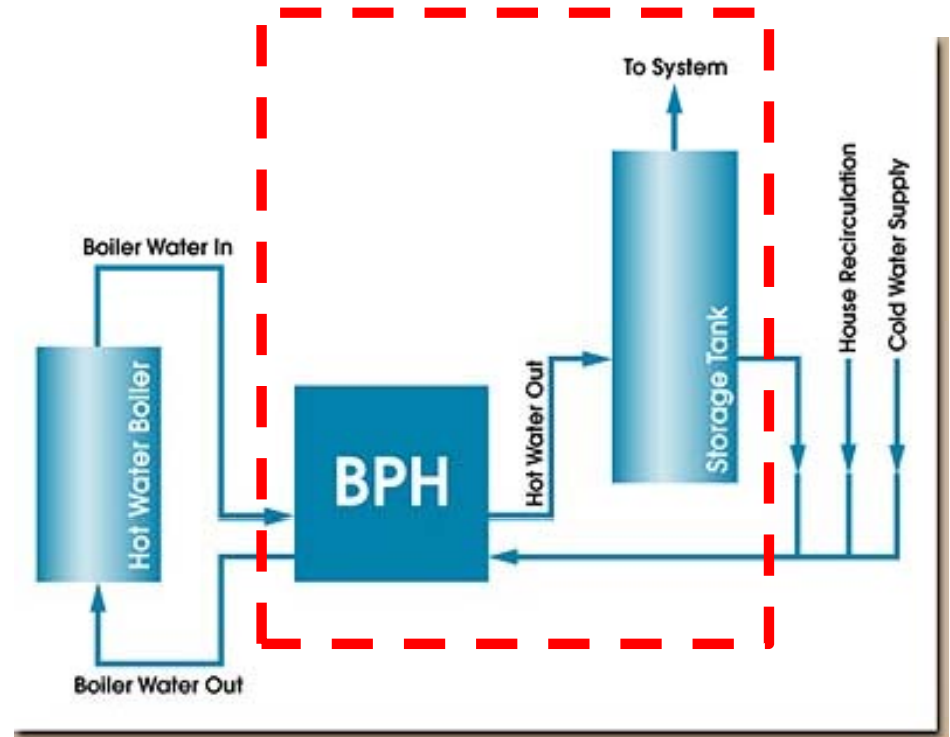
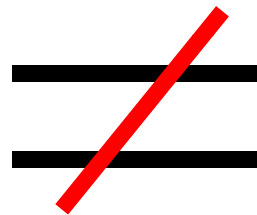
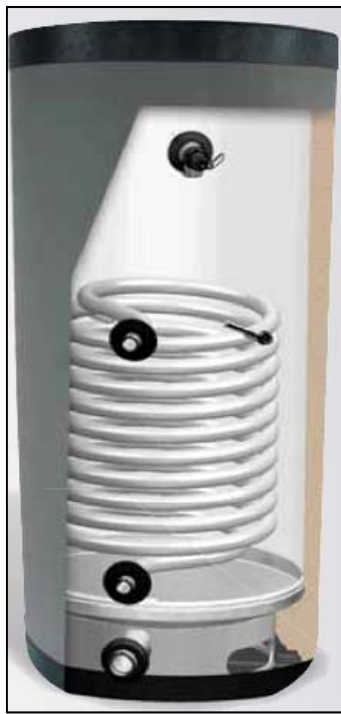


Boiler with Indirect DHW Tank



Boiler with Indirect (BPH + Tank)

Innovative Concepts **BPX** for DHW

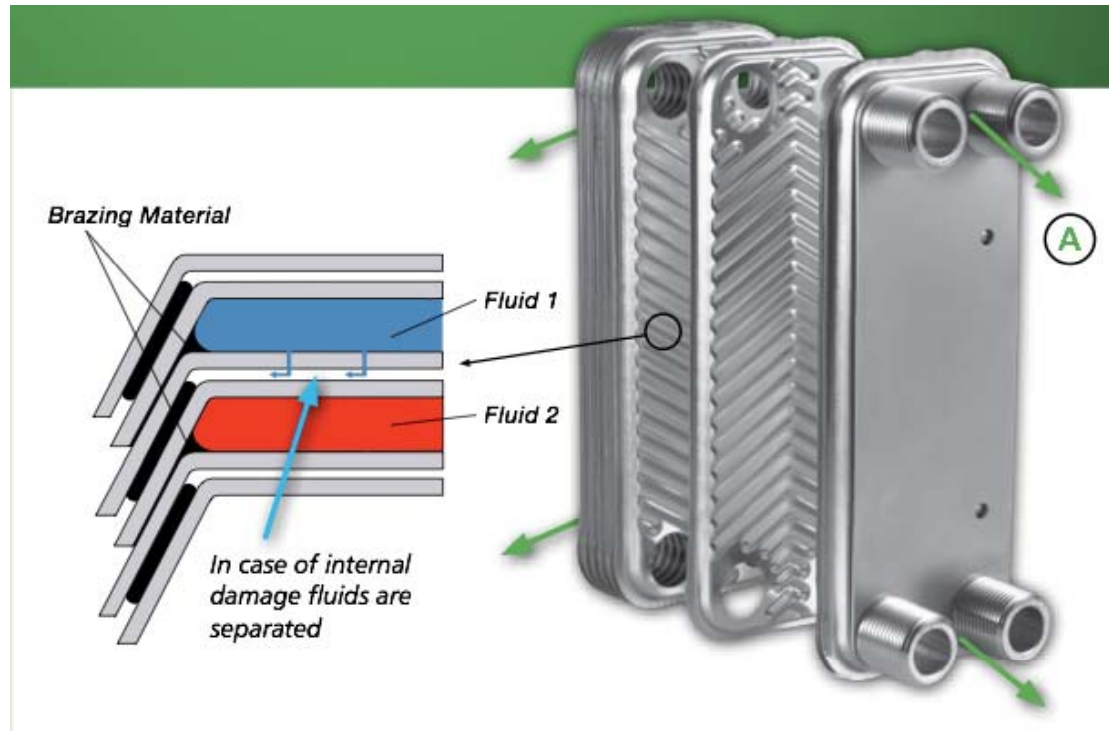


- Stainless Steel Tank
- Stainless Steel HXR
- 2" Foam Insulation (R=13.4)

There are good Indirect DHW on the market, but is there a better way?

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BPX for DHW - Safety



BPX™ BPDW Double-Wall Provides

- True double-wall construction, including port regions
- Double-wall plate design with air vent leak paths
- Complete peripheral braze for additional strength
- Four dedicated leak ports for quick and easy leak detection (A)
- Excellent performance for domestic water applications
- Dependable protection of fresh water streams from polluted fluid steams

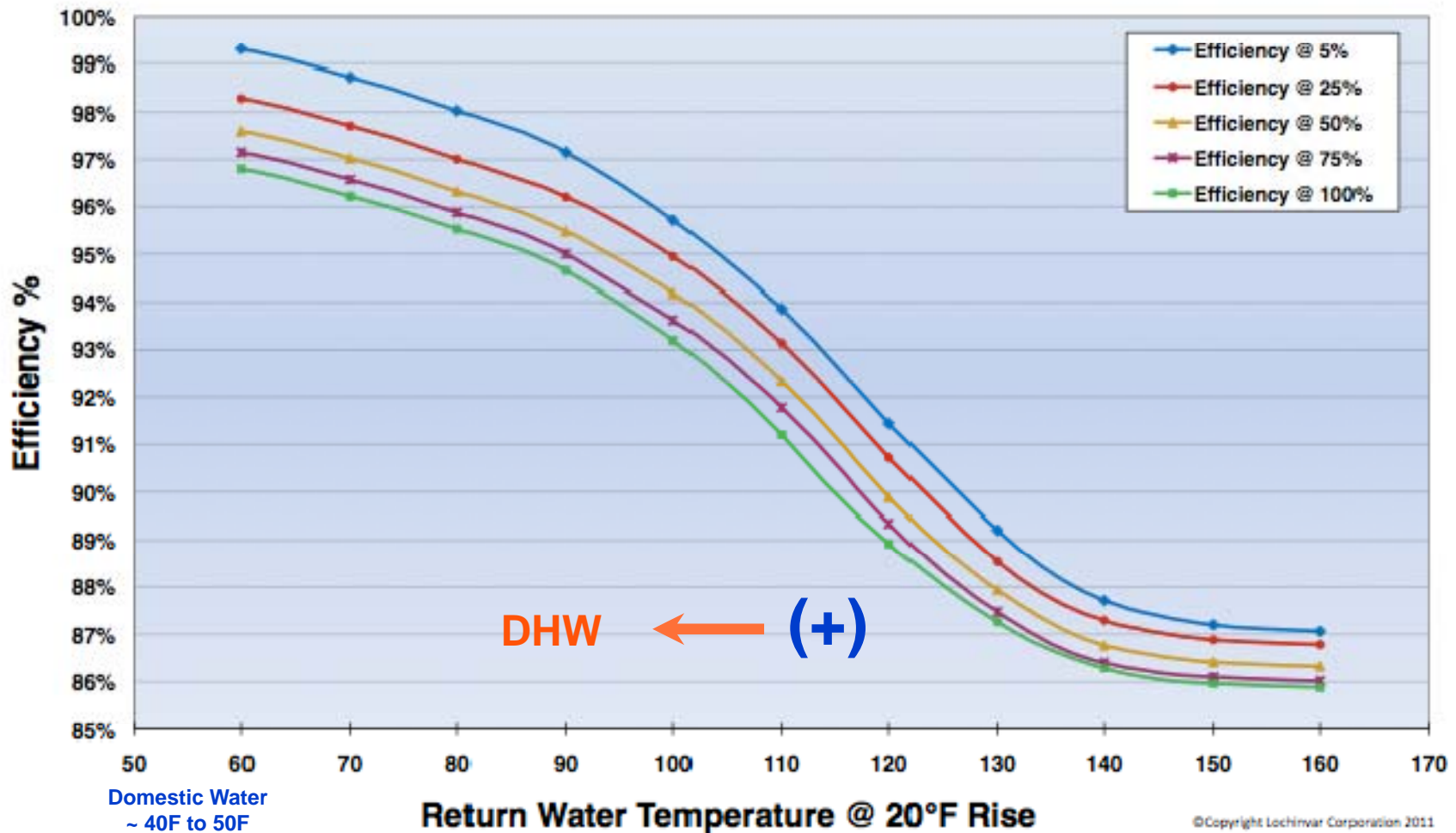
Notes:

- 1) Most Indirect DHW heaters (tubes-in-tank type) are single wall with multiple points for failure.
If compromised, contamination of domestic water with boiler water occurs.
Double walled BPX eliminate the possibility of cross contamination providing **greater safety**.
- 2) Most Indirect DHW heaters are sized for 180F to 160F (Delta-T=20F).
BPX can be sized for lower inlet water temperatures and larger delta-T's (160F to **100F**),
providing condensing boilers with lower return temps -> **Greater efficiency**.

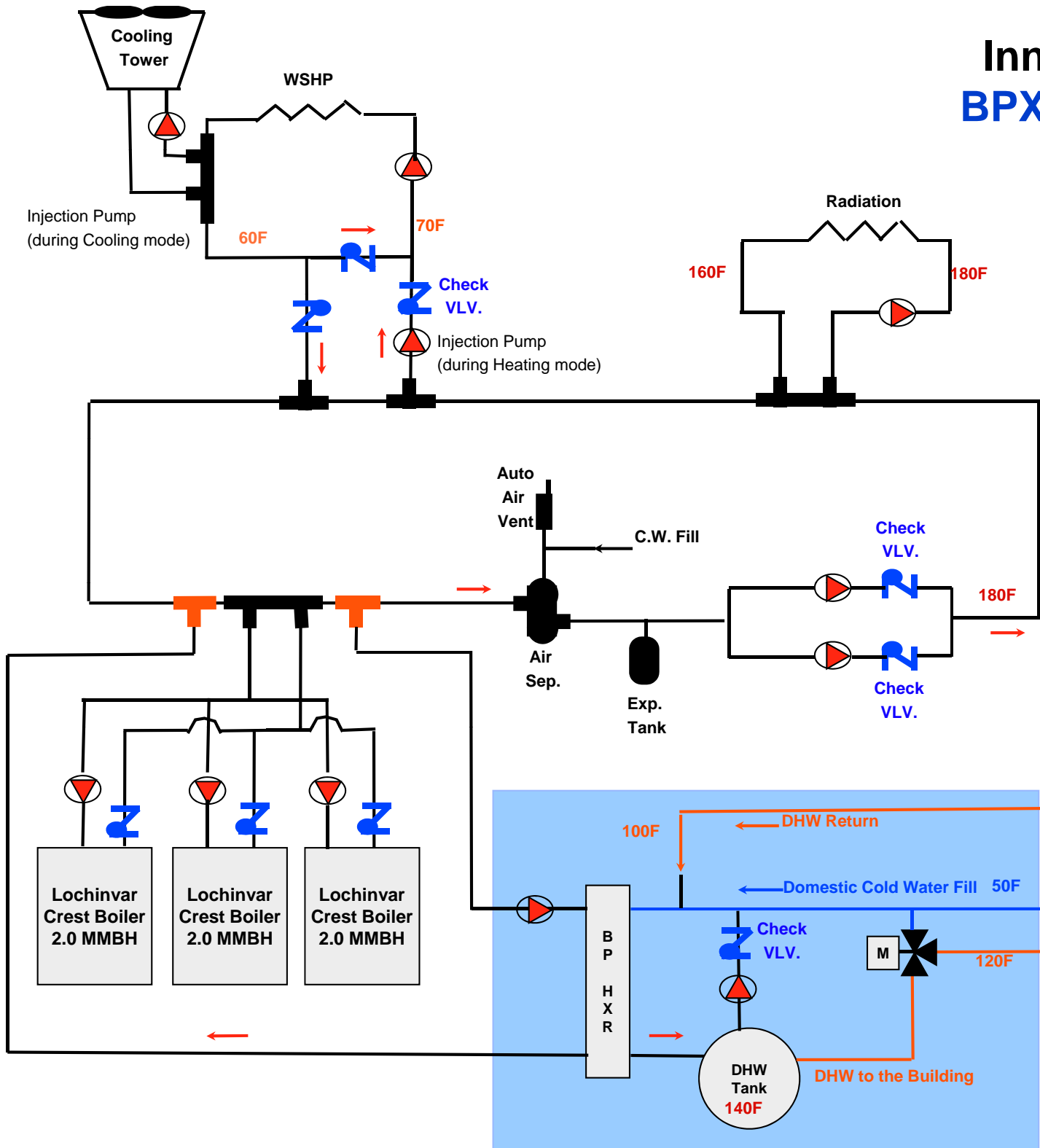
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Piping for Higher Efficiency

Boiler Efficiency Curve



Innovative Concepts BPX for DHW - Applied



Indirect DHW heater via BPX

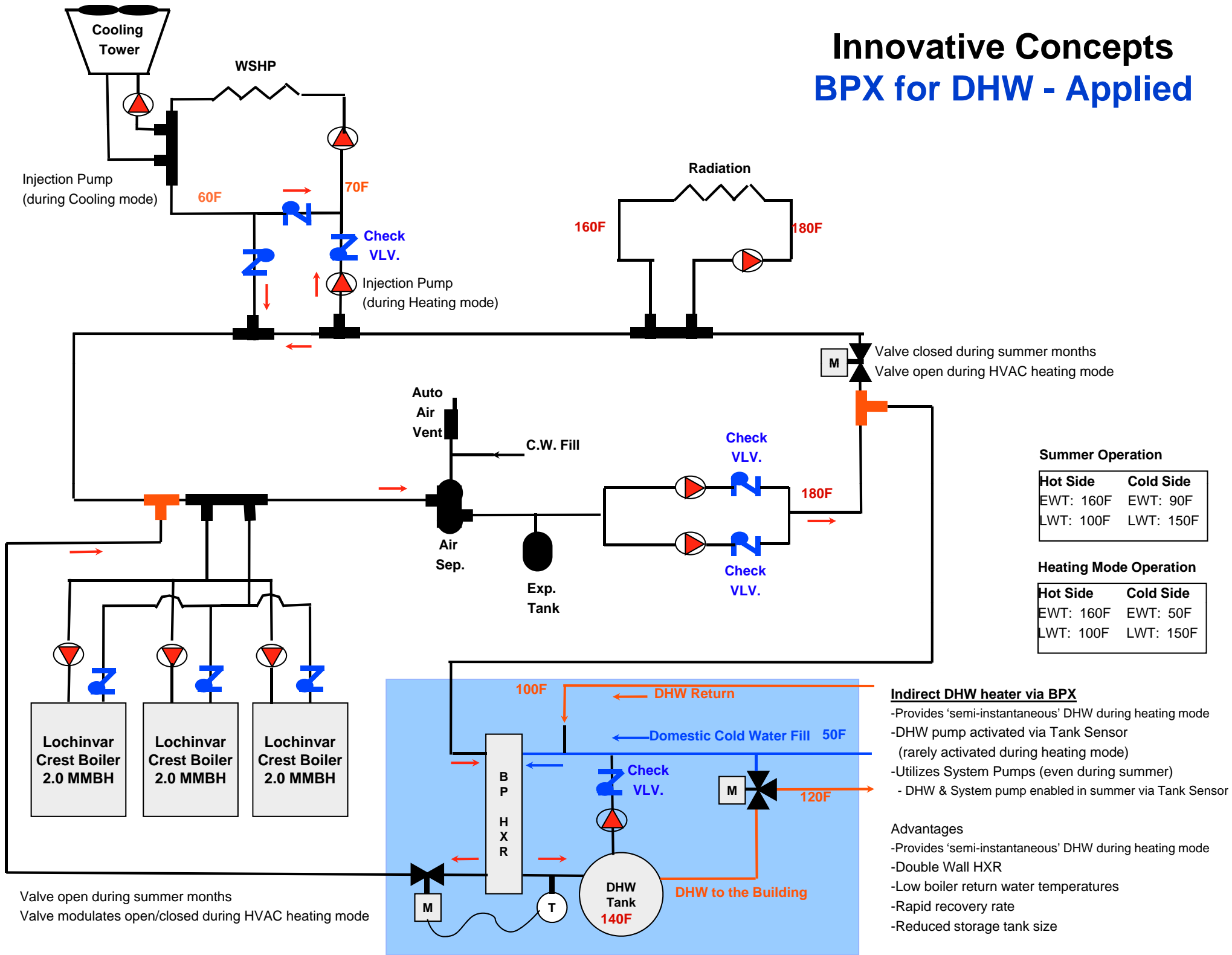
-DHW pumps activated via Tank Sensor

Advantages

- Double Wall HXR
- Low boiler return water temperatures
- Rapid recovery rate
- Reduced storage tank size

Hot Side	Cold Side
EWT: 160F	EWT: 90F
LWT: 100F	LWT: 150F

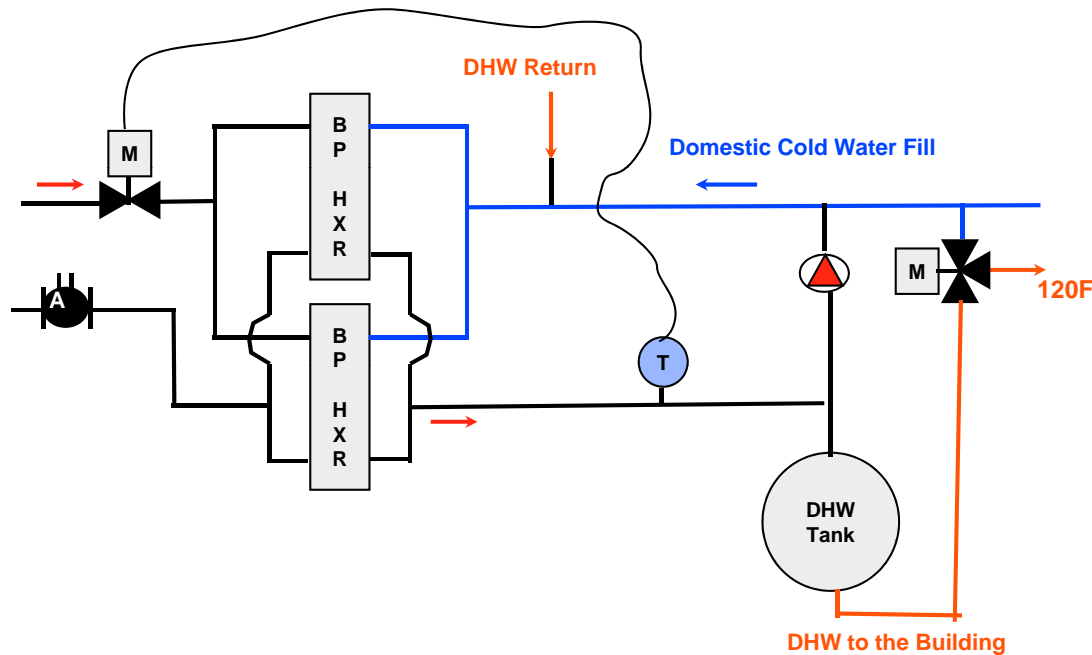
Innovative Concepts BPX for DHW - Applied



Innovative Concepts

BPX for DHW - Applied

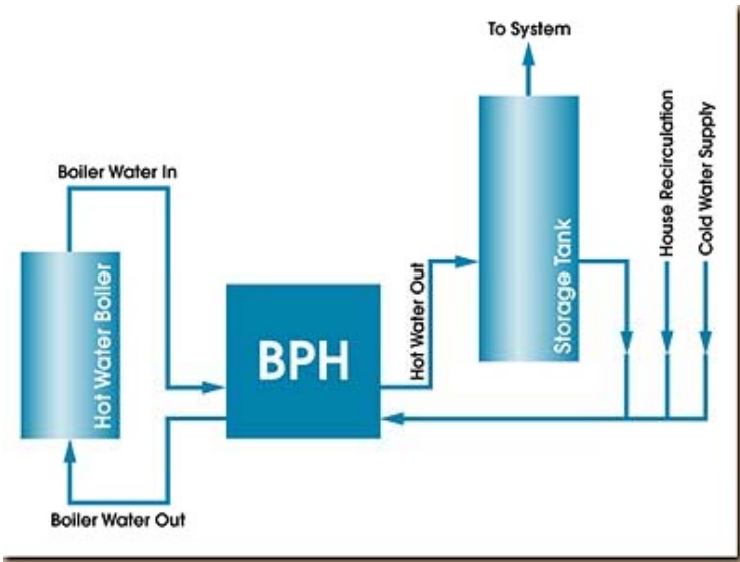
“Semi-Instantaneous” Indirect DHW Heater



- BPX or P/F HXR can be sized for boiler side EWT=160F, LWT=100F
- Tempered DHW (ex: max temp: 150F)
- Dual BPHXR's (for flows in excess of single max cap.)
- Double wall BPHXR to prevent cross contamination
- DHW storage tanks can be downsized (sized to prevent short cycling)

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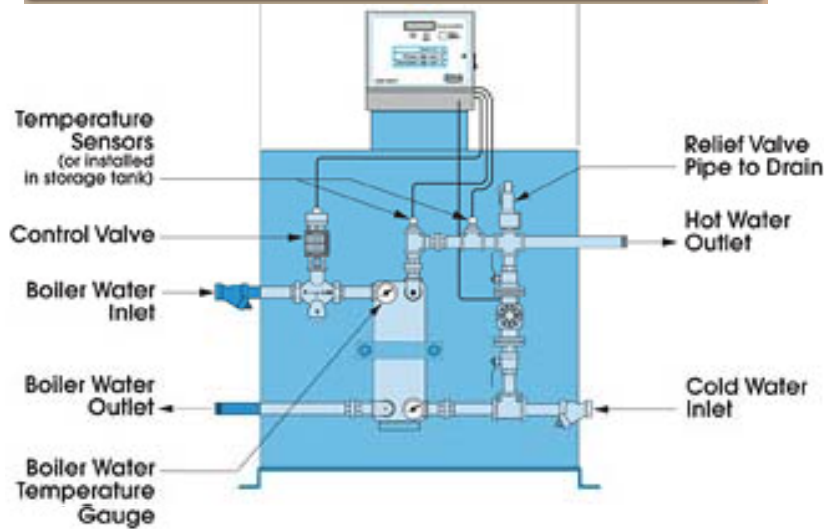
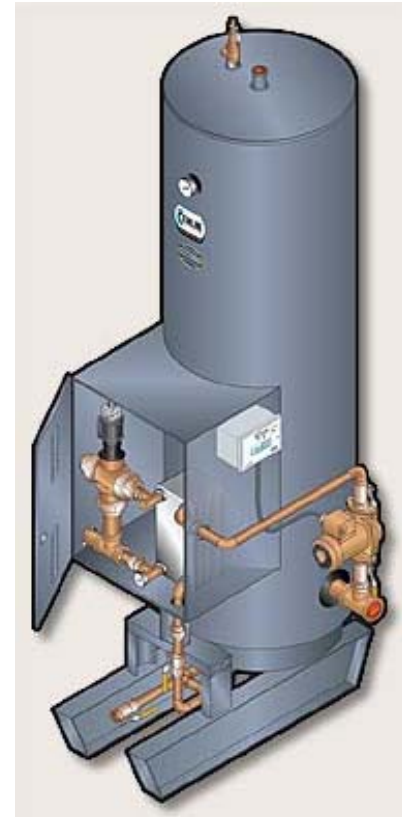
BPX for DHW - Product Offering



*Packaged Plate Water Heaters
Boiler Water*



*Vertical Packaged Storage
Plate Water Heaters
Boiler Water*



“Packaged” Solutions

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BPHXR for DHW - Product Offerings



High Capacity Condensing boilers with:

- Amazing Turndown- 25:1 (4% of full load capacity) *(DHW)
- High Efficiency: 92% AHRI thermal efficiency
- up to 99% efficient with low temp. return water
- Minimum gas pressure required is only 4-in.w.g.
- Easy to read and understand 8" wide color graphic interface
- "Smart System" controller capable of:
 - * Sequencing up to (8) boilers running in parallel
 - * Boiler reset based off outside air temperature
 - * Set point prioritization based off domestic hot water
 - * Software for computer interface including real-time display, set point manipulation, data logging, etc.
 - * Controls three pumps
 - Boiler pump
 - System pump
 - Domestic hot water pump

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BPX for DHW - Summary

... So why use double wall brazed plate heat exchangers as a means for indirect domestic hot water generation?

Stated another way - **Why use DWBPX for DHW?**

- 1) **Safety** - Eliminate cross contamination concerns (< liability)
- **Increased Efficiency** - Drive condensing boilers into condensing mode more hours of the year (\$)
- **Save** first cost, floor space, while adding system redundancy...

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BPX for High Rise DHW Reheat

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BPX for High Rise DHW Reheat

High rise building with multiple pressure zones

Options:

A) Create separate systems per pressure zone

Pros - Pressure issues eliminated

Cons - Multiple systems

- More Equipment & less redundancy

- More maintenance

B) Provide common systems shared between the pressure zones

Pros - Less Equipment & more redundancy

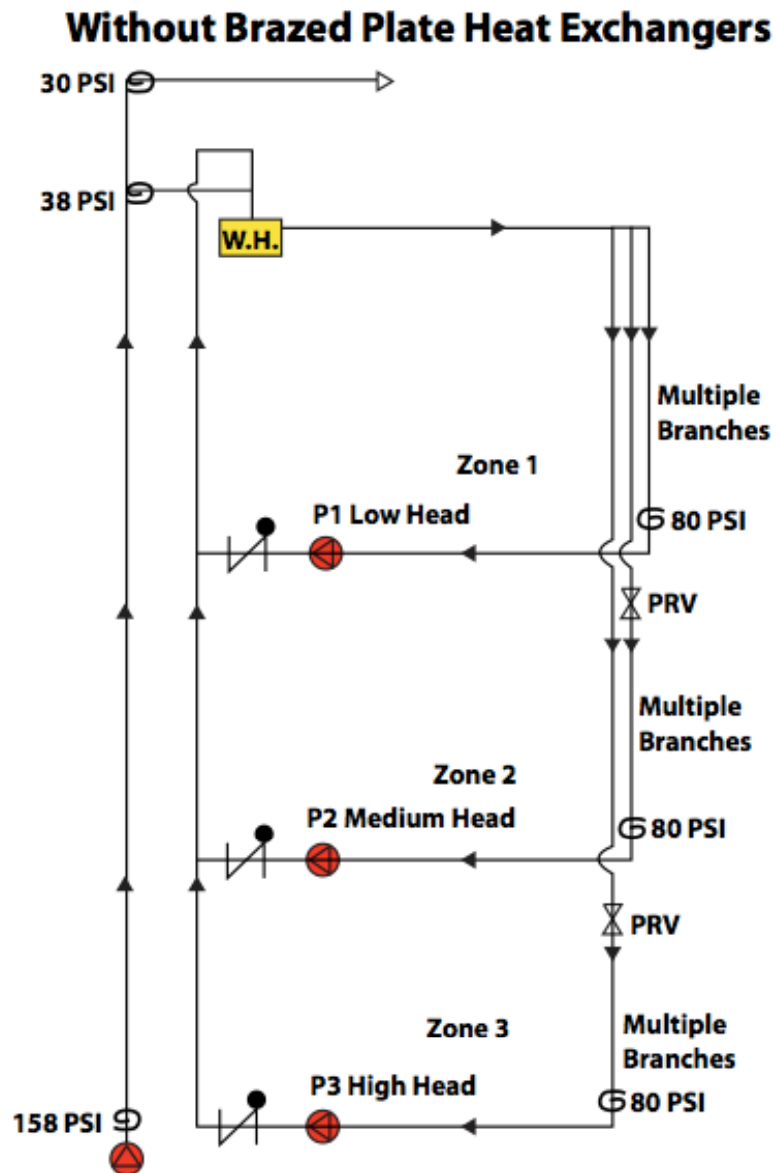
Cons - Possible balancing issues

- Possible additional energy demand

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BPX for High Rise DHW Reheat

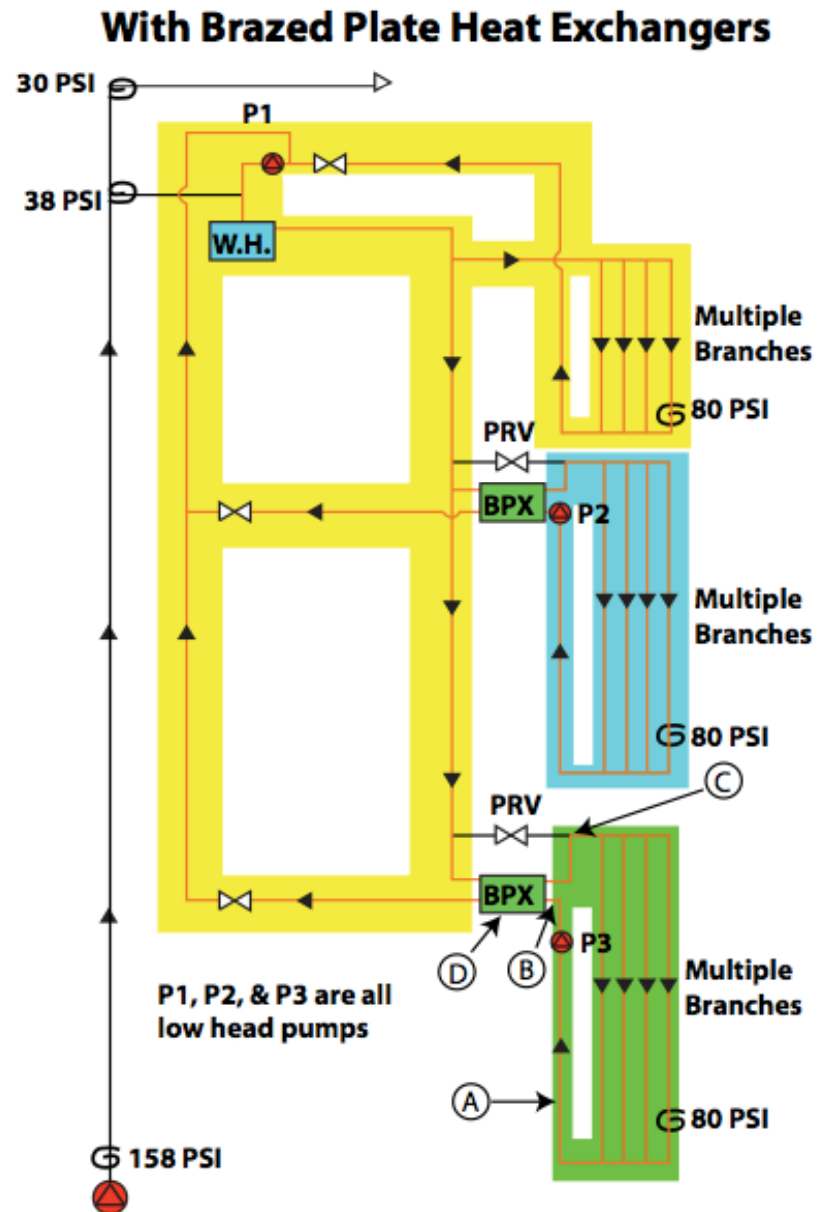
“Traditional” High Rise
DHW Recirculation Loop
with common mechanical room



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BPX for High Rise DHW Reheat

“Decoupled” High Rise
DHW Recirculation Loop
with common mechanical room



Innovative Concepts

BPX for High Rise DHW Reheat

Summary

“Decoupled” High Rise DHW Recirculation Loop
with common mechanical room

- Pros** - Less Equipment \$
- Greater redundancy (< pain)
 - Easier to design & install (< pain)
 - **Less energy consumed** \$
 - Lower first costs \$
 - Lower operating costs \$
 - Lower maintenance \$ + (< pain)

Eliminates Cons

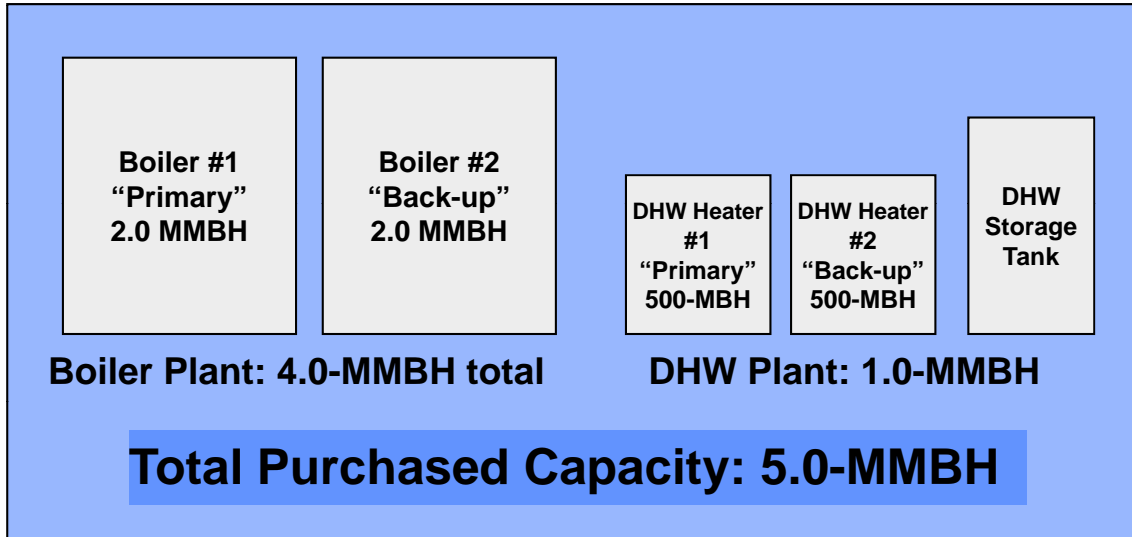
- Eliminates balancing issues (< pain)
- Eliminates additional energy demand \$

Innovative Concepts
150% Redundancy for 25% Less

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100% Redundancy - Conventional Redundancy

Conventional 100% Redundancy



Conventional 100% Redundancy

To achieve 100% redundancy in a conventional system, the designer isolates the system, then doubles the capacity and components so that if one element fails, the exact replacement comes online.

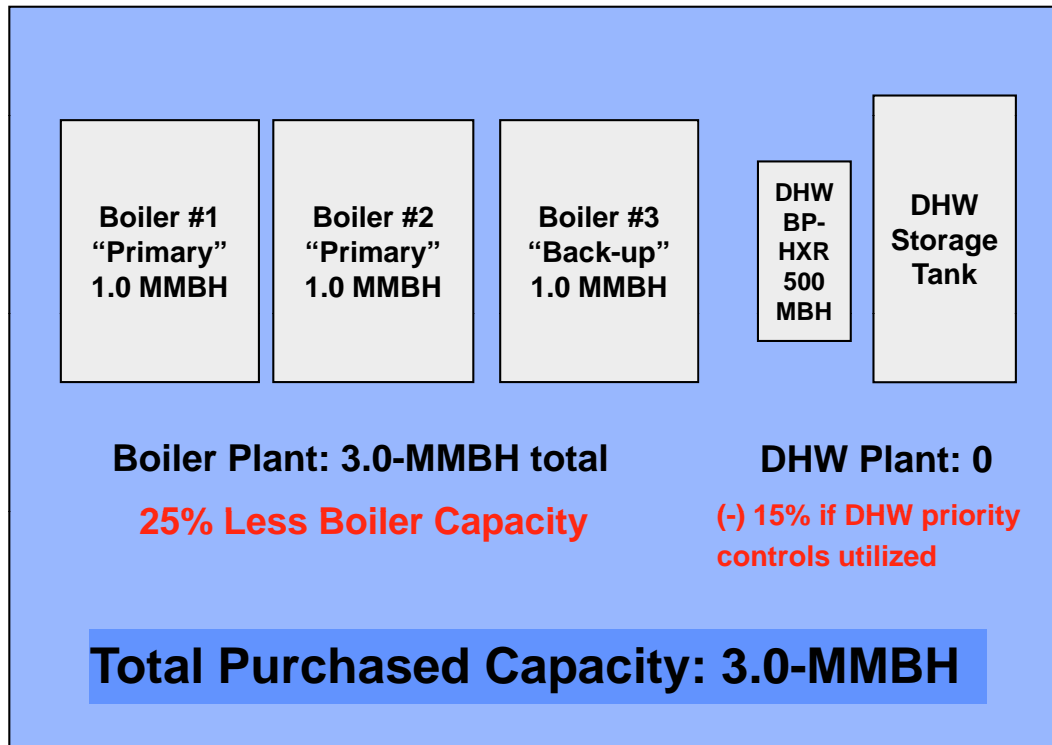
There is nothing wrong with this concept but is there a better way?

Can you achieve more redundancy with a lower first cost?

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150% Redundancy - Less is More

150% Redundancy



150% Redundancy

To achieve 150% redundancy take the calculated capacity requirement, divide it in half, then provide (3) units at that capacity. This will provide 150% redundancy with 25% less purchased capacity.

The DHW can be served without adding capacity to the system by integrating the boiler plant & the domestic hot water, using a double wall heat exchanger (a passive device), and utilizing DHW priority boiler controls.

This will reduce the total plant purchased capacity by 40% to 50% (assuming a DHW load equal to 25% to 50% of the boiler load).

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150% Redundancy - Summary

Use 150% Redundancy to:

- Lower first cost \$
- Save floor space \$
- Potential venting savings \$
- Add additional system redundancy \$
- Take advantage of product integrated controls \$\$ -> \$

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