LAARS Heating Systems

2026 DOE Regulations

- History
- Effective Date
- Alternatives under new regulations
- Combination Plant Alternative
- Design Guidelines
- Q&A

ASHRAE West Michigan | Jacek Grob, Technical Sales Manager, LAARS | February 2026

Speakers Bio: Jacek Grob

Through his 32+-year career in the Hydronic Heating, Jacek has represented many product lines besides LAARS products, including AERCO, Maxi-Therm, Bryan Steam, CAMUS, DeDietrich, Hamilton Engineering, Hurst, Miura, Precision Boilers, Raypak, RBI, Sussmann, and Unilux, to name a few. Jacek is also a combustion expert who has represented Weishaupt, Siemens, Gordon Piatt, Riello, Power Flame, and Webster burners over the years.

- Technical Sales Manager, Midwest - LAARS
  - 9 and counting years of hydronic and plumbing design market with Engineers & Contractors
- Vice President of Business Development to Sales Engineer – Various companies
- Contributor on ASPE & ASHRAE
- Education: Warsaw University, Poland & Biomedical Engineering at Oakton College

How did this end up a U.S. Department of Energy (DOE) Issue?

- The Energy Policy and Conservation Act (EPCA) was passed in 1975 as a response to the 1973 oil crisis
- EPCA authorized the DOE to set energy efficiency standards for appliances and equipment
  - Including establishing test procedures and minimum energy efficiency requirements for products

History of DOE and its Impact on the Industry

- Formation and Mission in 1977
- Introduction of Efficiency Standards
- Implementation of the National Appliance Energy Conservation Act (NAECA) in 1987
- 2026 Commercial Water Heater Regulations

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Wait, Did Anything Happen Between NAECA's Founding and 2026?

- 1987 – First major federal regulation impacting water heaters
- 1990s – Periodic updates to increase the minimum efficiency levels for storage gas and electric water heaters
- 2015 – DOE Efficiency standard revisions
  - Raised the Energy Factor (EF) requirements significantly
- 2016 – 2024 – Revise and review every six years for energy efficiency products
  - Increasing the technical knowledge required by installers and specifiers

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The New Commercial Water Heater Energy Conservation Standards under the DOE

- New minimum DOE energy conservation standards 10/6/2026:
  - Commercial gas-fired storage water heaters:
    - 🔺 New Thermal Efficiency (TE) Requirement: Minimum 95% Thermal Efficiency (up from 80%)
    - ♨️ Standby Loss: Stricter limits on allowable standby heat loss
  - Commercial gas-fired tankless water heaters:
    - 🔺 New TE Requirement: Minimum 96% Thermal Efficiency (up from 80%)
    - 📦 Hot Water Supply Boilers (Volume Water Heaters): Now included and required to meet the 96% TE standard
  - Residential-duty commercial gas-fired storage water heaters:
    - ⚙️ UEF Increase: Higher Uniform Energy Factor (UEF) requirements
      - 🔁 Will require use of condensing technology to comply

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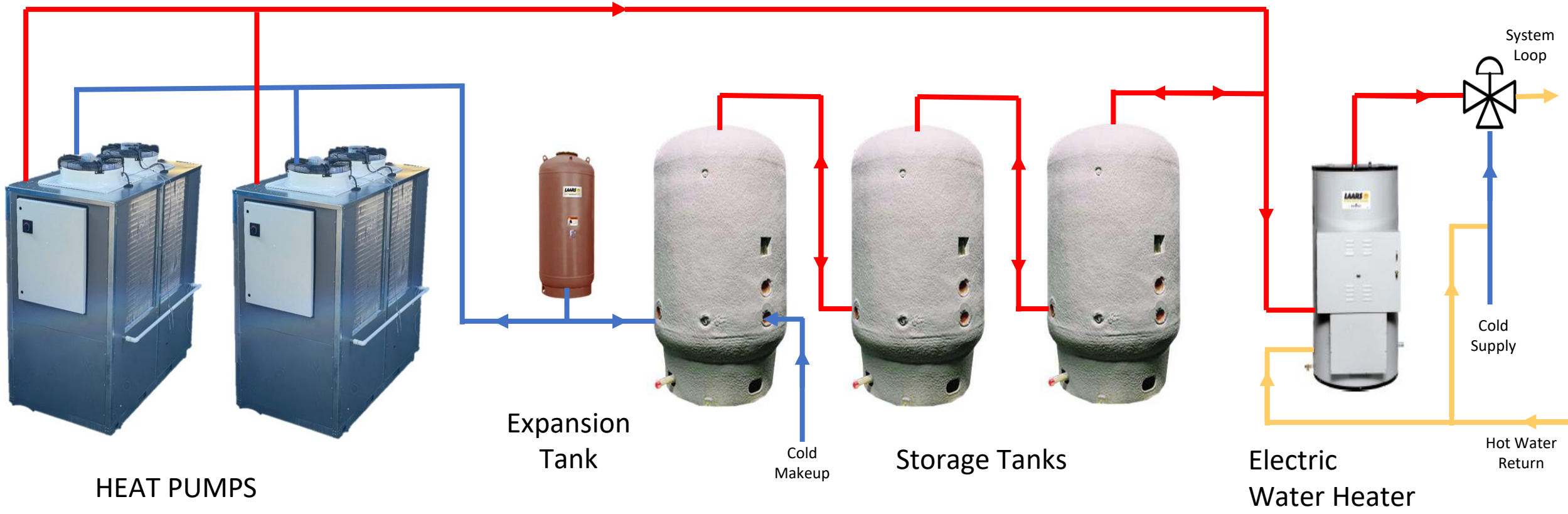
What are the Alternatives?

- Commercial DOE Compliant Solutions

- Electric Storage Tanks

What are the Alternatives?

- Commercial DOE Compliant Solutions
  - Air to DHW Heat Pump System



What are the Alternatives?

- Commercial DOE Compliant Solutions

- Standard or High Efficiency Hydronic Boiler and Indirect Hot Water Generator

What are the Alternatives?

- Commercial DOE Compliant Solutions

- Instantaneous Condensing Water Heater and Storage Tank

What are the Alternatives?

- Commercial DOE Compliant Solutions

- Condensing Volume Water Heater and Storage Tank

What are the Alternatives?

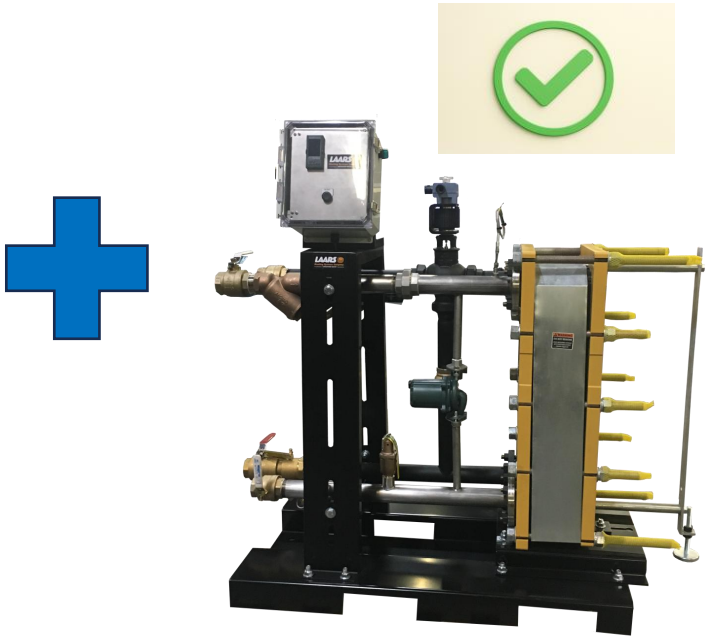
- Commercial DOE Compliant Solutions

- Condensing Storage Tanks

What are the Alternatives?

- Commercial DOE Compliant Solutions

- Hydronic Boiler
  and Instantaneous HX



Introducing Commercial Combination Boiler Plant Application

Benefits of the Combination Plant

- Minimizes total Btu capacity requirements
- Reduces initial capital investment
- Provides reduced total fuel capacity requirements
- Results in smaller plant footprint
- Increases overall system efficiency by lowering the system's return water temperature and eliminating DHW standby losses
- Delivers simultaneous redundancy on DHW and Space Heating
- Meets new 2026 DOE Commercial DHW requirements

How to Size a Combination Plant

- Must be designed by an engineer...
- Modern heating plants are already designed N+1
- DHW Btu/Heating plant Btu ratio is called a Diversity Factor (DF)
- In great majority of commercial applications when DF is < than 0.3 then N+1 is enough – 1000Mbh DHW & 4000Mbh Heating = 0.25 DF
- When DF is = 1 (occurs very rarely) then add 50% capacity to the original heating plant size

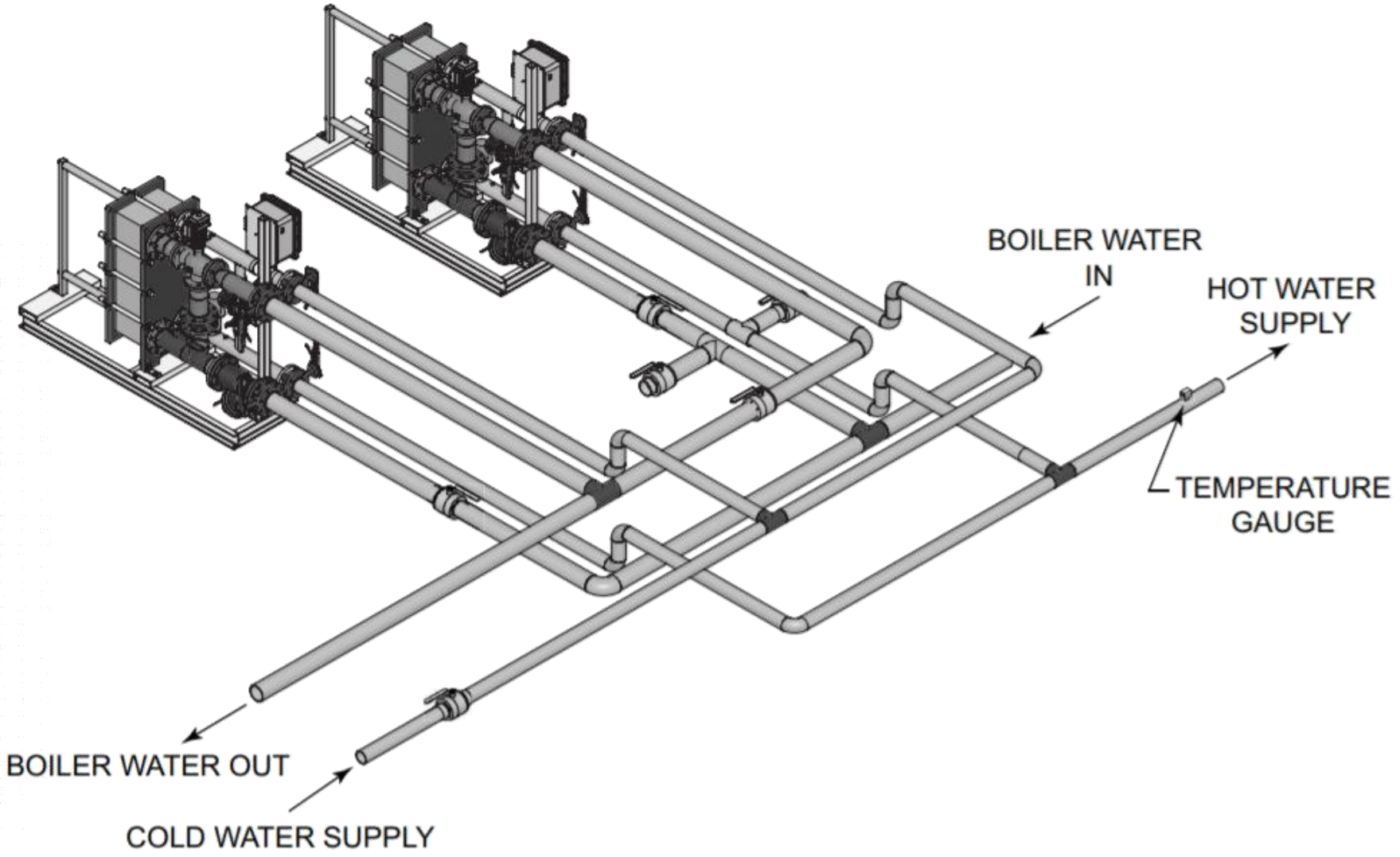
How to Size a Combination Plant

$$\frac{\text{Domestic Water Load}}{\text{Heating Load}} = \text{Diversity Factor}$$

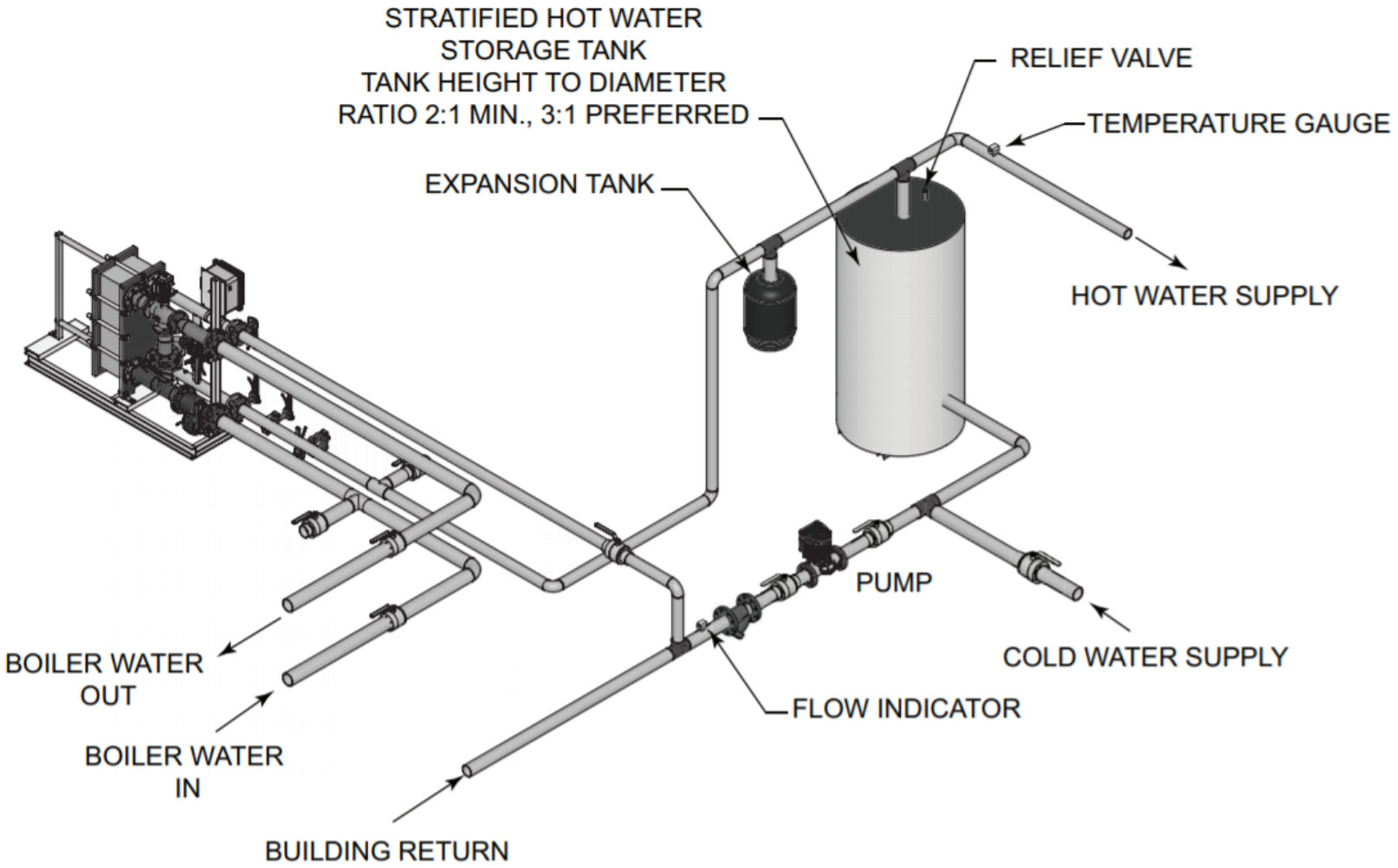
Diversity Factor	2	1	.8	.6	.5	.4	.3
Percentage of DHW Load Added to Space Heating Load	60%	50%	40%	30%	20%	10%	0%

How to Pipe a Combination Plant

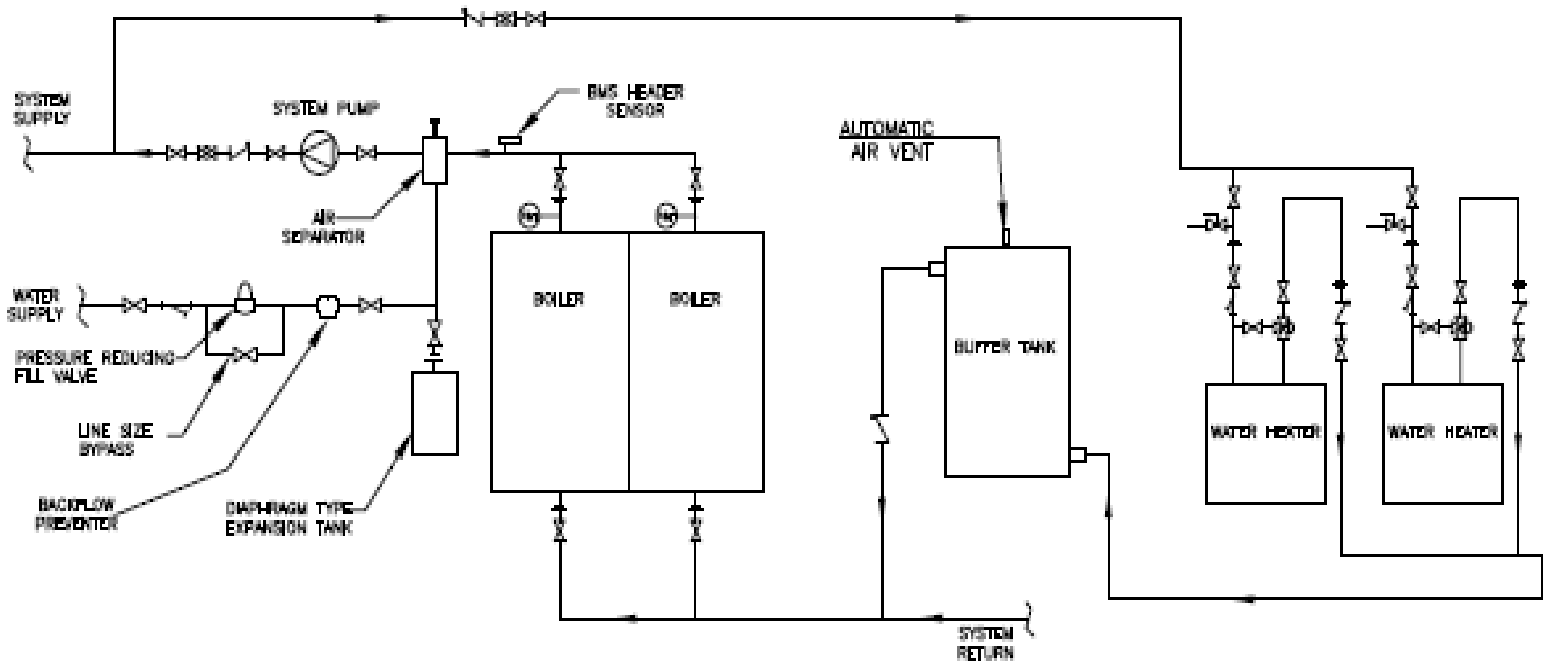
Multiple Unit Piping for 100% redundancy



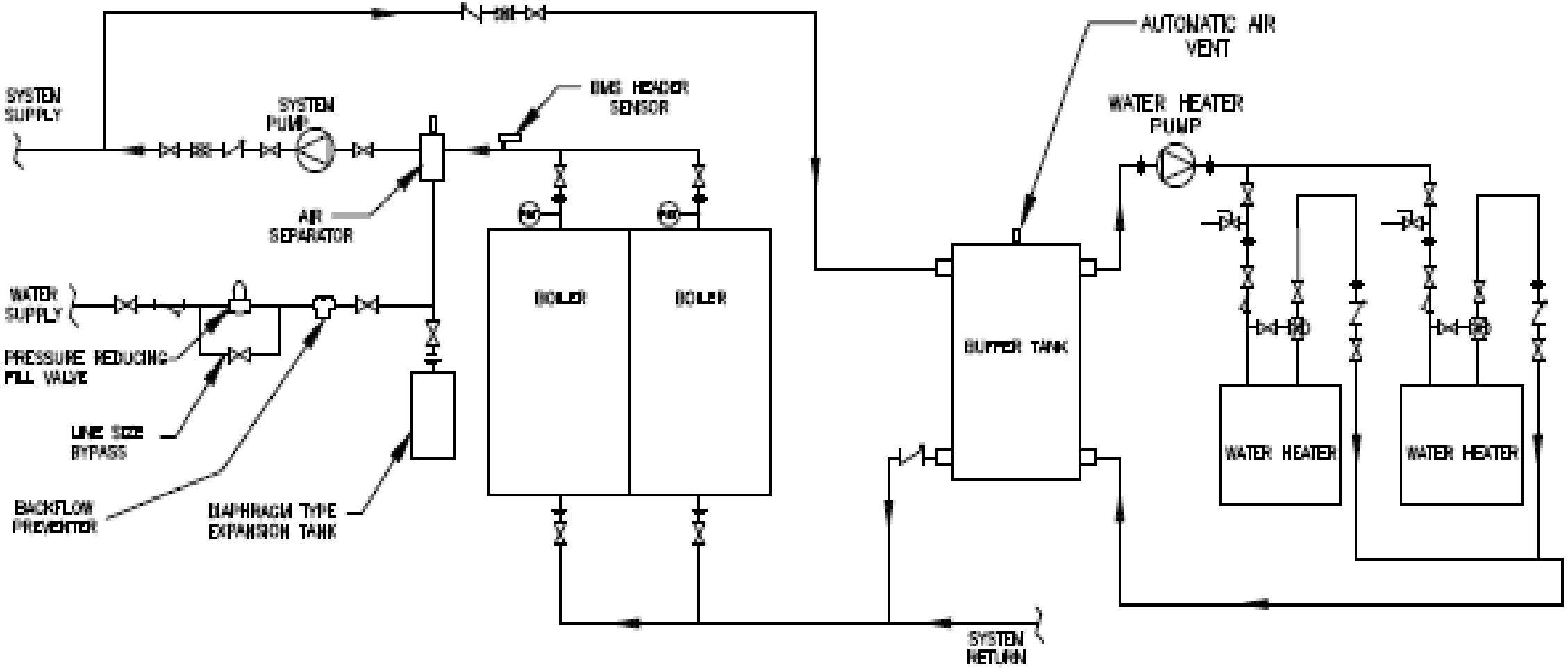
Single Unit with Stratified Storage Tank



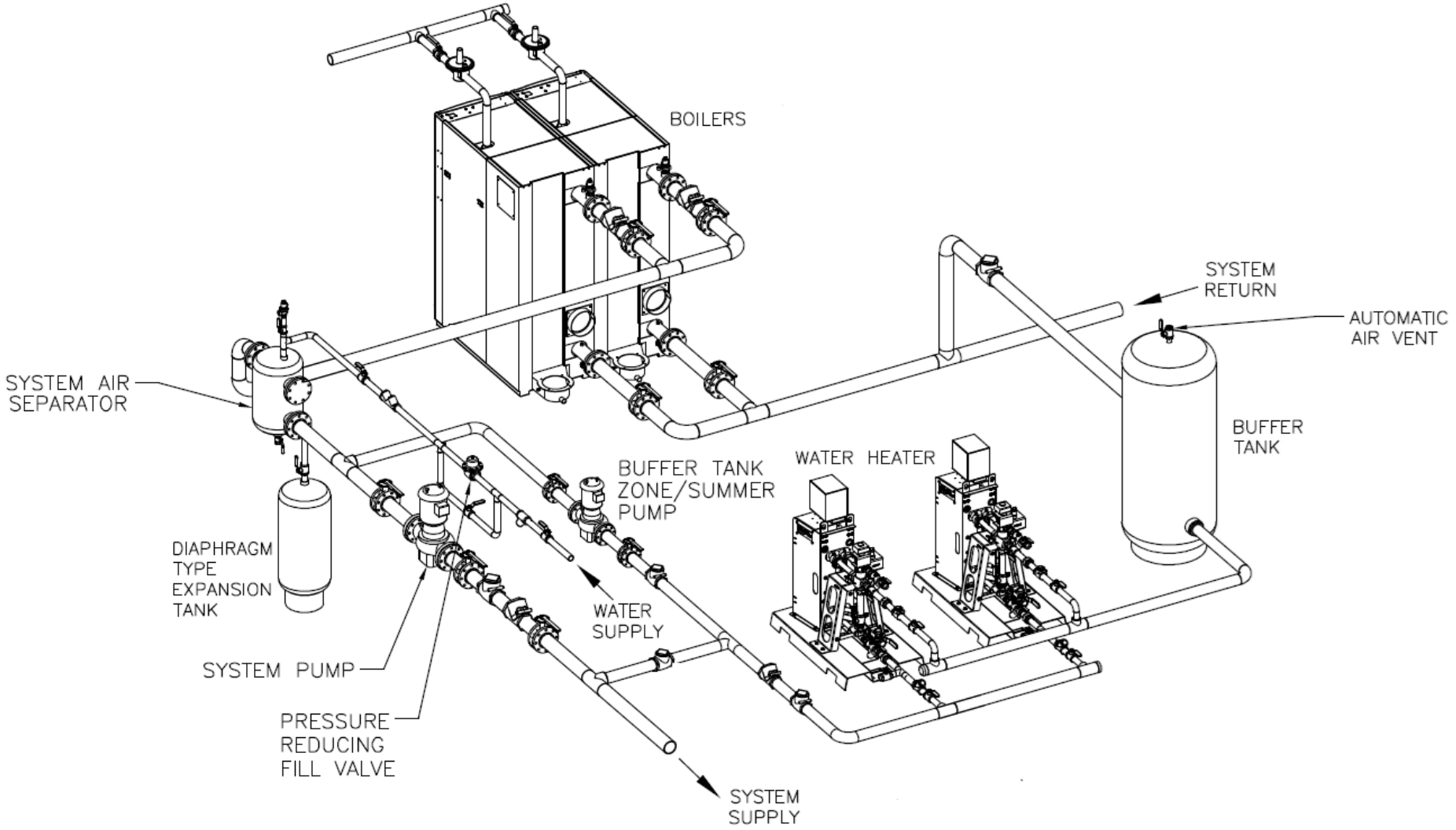
Low Mass Condensing Boiler and Buffer Tank



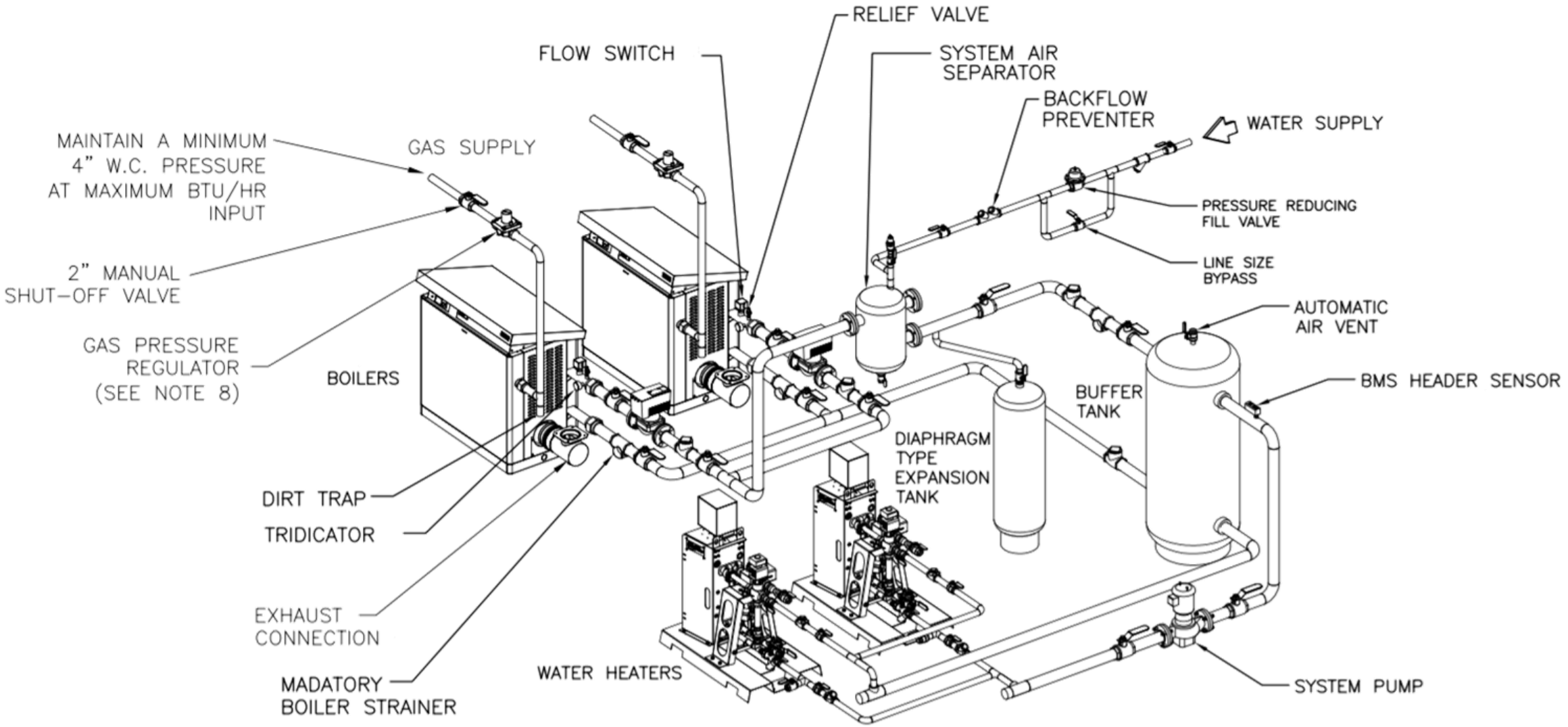
Low Mass Condensing Boiler, 4 Port Buffer Tank



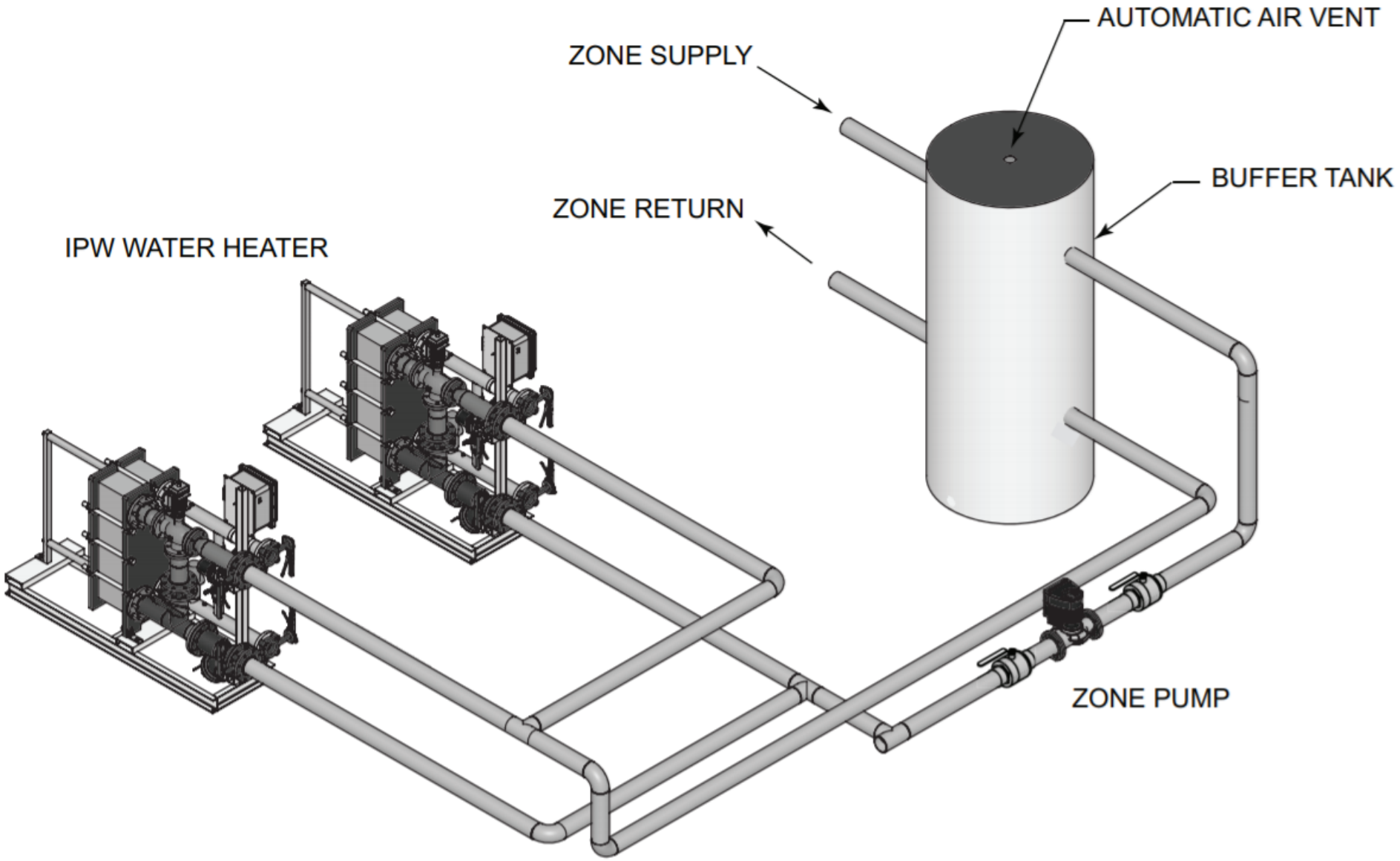
Low Mass Condensing Boiler, Buffer Tank & Summer/Zone Pump



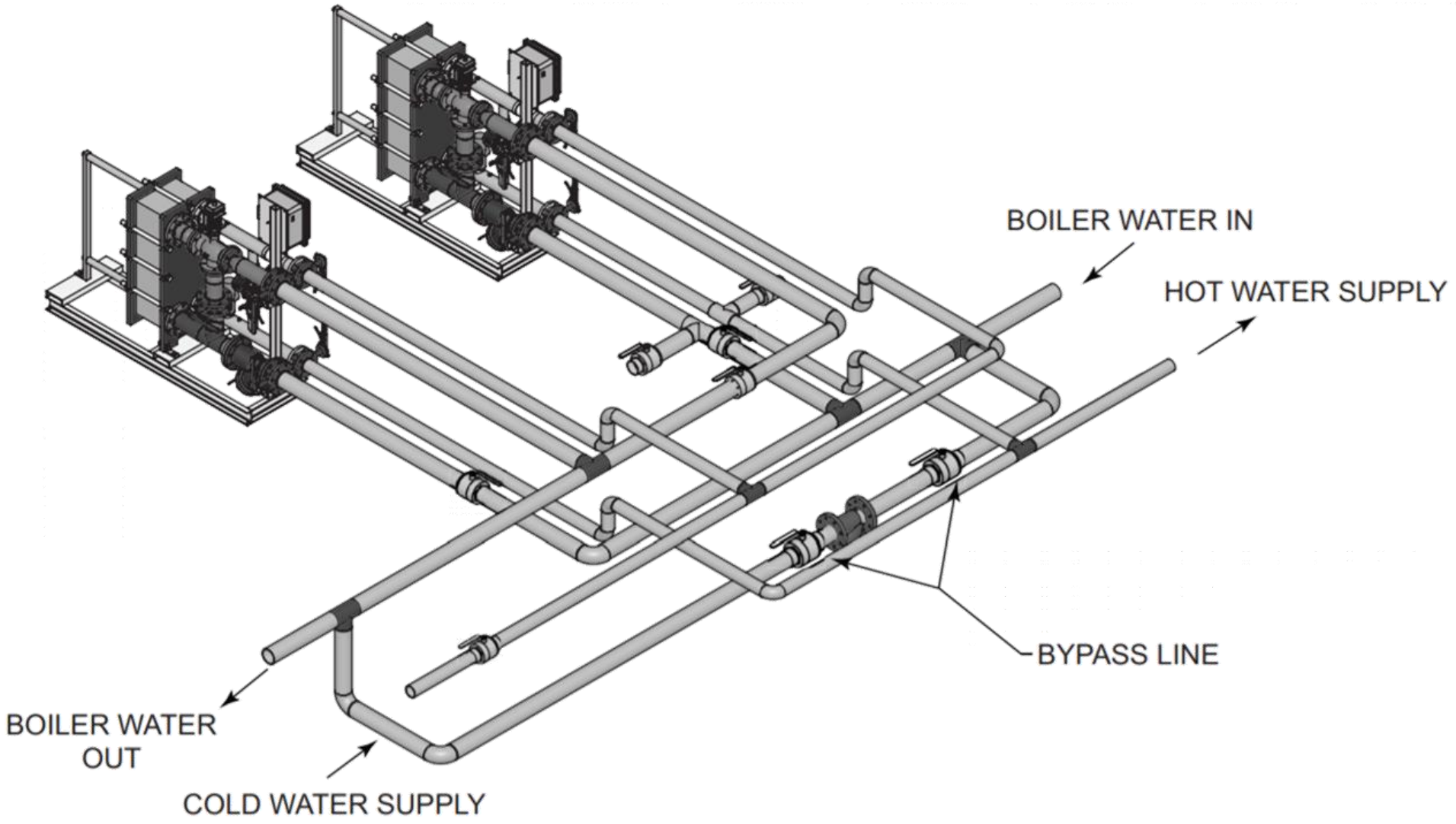
Condensing Boilers & 4 Port Buffer Tank



Buffer Tank Piping Detail

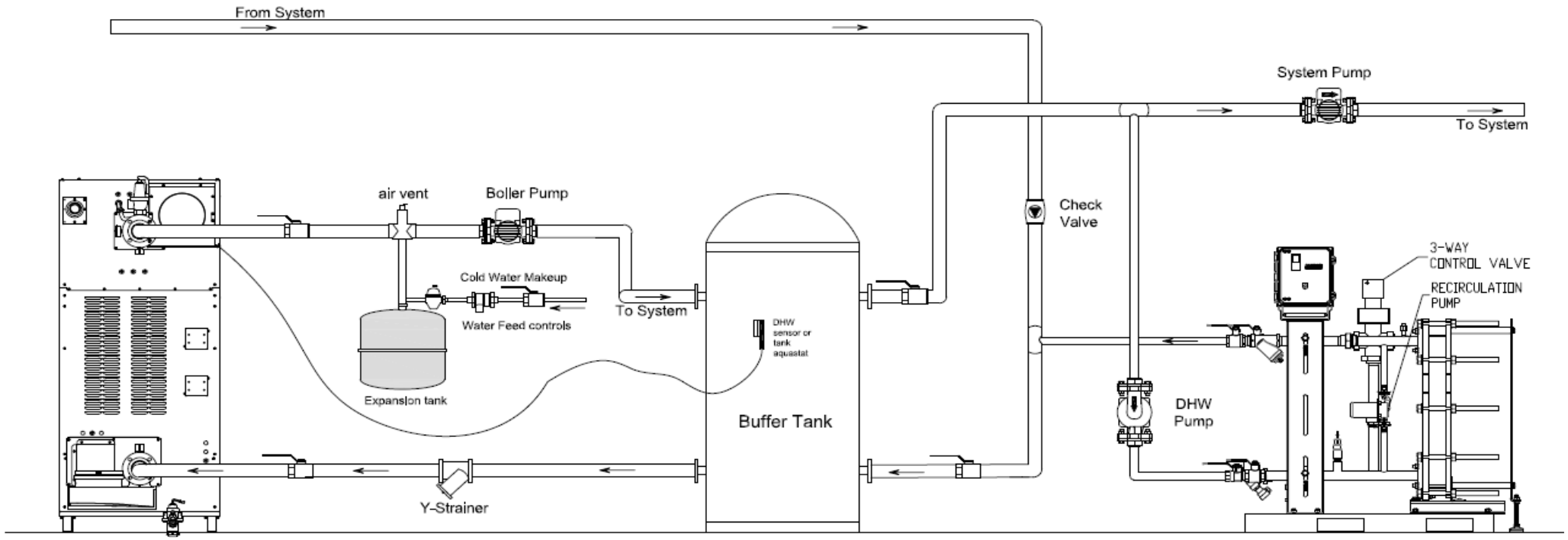


Non-Condensing Boiler - Bypass



How to use Plate HX with Boilers

How to Pipe Plate HX with any Condensing Boiler



How to size a buffer tank to avoid boiler short cycling?

- Data required for sizing adequate tank volume:
- Boiler BTU size
- Boiler turndown ratio
- Minimum cycling rate per hour (typically max 2.5 per hour)
- Hydronic Piping Volume from plate HX to the boiler plant.
- DHW load minimum
- Most OEM’s have a sizing program... (let them do the work)

How to Size Plate HX?

What sizing data is needed?

- Need full range of domestic water inlet (40 – 70°F) and outlet (110 – 180°F) conditions
- Need range of boiler water inlet conditions (220 – 115°F) down to 5°F approach to the domestic water outlet temperature
- Need total pressure drop, inlet to outlet

Typical Sizing Chart

Domestic Water Temperature Rise °F	Heat Exchanger Inlet Water Temp From Boiler °F	Model	Domestic Water		Boiler Water		
			Water Flow gpm	Pressure Drop PSIG	Water Flow gpm	Temp Back to Boiler °F	Pressure Drop PSIG
40-140	150	LP-18D	15	2	33	105	8
		LP-26D	21	2	41	99	8
		LP-36D	29	2	57	100	8
		LP-52D	39	2	67	92	8
		LP-80D	48	2	74	86	8
	160	LP-18D	20	3	33	100	8
		LP-26D	27	3	41	95	8
		LP-36D	39	3	57	92	8
		LP-52D	49	3	67	87	8
		LP-80D	61	2	74	79	8
	170	LP-18D	24	4	33	98	8
		LP-26D	33	4	41	90	8
		LP-36D	47	4	57	88	8
		LP-52D	59	4	67	82	8
		LP-80D	72	3	74	73	8
	180	LP-18D	29	6	33	93	8
		LP-26D	38	5	41	88	8
		LP-36D	53	5	57	88	8
		LP-52D	69	5	67	78	8
		LP-80D	81	4	74	71	8

Example:

- Unit at 25 GPM
- 40 to 140 °F DHW
- 160 °F boiler water

Model # : LP-26D

Summary

Simplify System Design on the DHW Side

- More hot water from a smaller footprint

- Greater Capacity vs U-Tube HX

- Eliminate Need for DHW storage
- Resistant to Scaling
- Operate down to +5°F approach temperature to eliminate combination controls & motorized valves
- Low boiler flow requirements

- Reduce size of pumps, pipes, valves & fittings to lower costs by 25% to 50%

- Easier when replacing older systems

Laars Combination System – Key Features

- Excellent alternative to electric or heat pump
- Maximize system efficiency
- Reduce total cost
- Decrease total footprint
- Accurate temperature control (without storage)
- Simplify system design & integration
- Excellent VE option for projects over budget

Combination System – Applications

New Construction & Retrofits

- Large Campus Style Systems
  -Lower pipe radiation losses provide significant $avings
- Condensing Boilers in Low Temperature Systems
  -Cold return temperatures promote condensing
- Conventional, Non-Condensing Boilers
  -Easily handles variable reset supply temperatures
- High Volume, Instantaneous Loads
  -Kitchens, Laundries or Process Applications
  -Hotels, Hospitals, Prisons, Apartments

As Easy as 1, 2, 3!

1. Design it

2. Save Energy and Space

3. 100% DOE Compliance

Plate HX – The Highlights

Multi-Family Building Example

Multi-Family Tower (25 Stories)

- 250 Suites
- 650 Occupants

Condensing Gas Offering Typical:
2 x MGV1600, 2 x 325 US Gal tanks

Plate Offering Typical:
2 x LP-52D


LAARS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