



Tankless Water Heaters



CenterPoint Energy

Rising Above

Vertical Subdivision Workshop





Tankless Water Heaters



History of Tankless Water Heaters

- **It started in the USA with – Edwin Ruud**
 - In 1889 Edwin Ruud was awarded a patent for his design of a tankless water heater. It was a cast iron all copper heat exchanger with an actuator valve which turned on the burner when a water faucet was opened
- **The American Desire for Storage Tanks**
 - Sometime in the 1920's the cast iron all copper heat exchanger design became too expensive to produce
 - During that period America was introduced to a galvanized steel tank and then glass lined tanks in the 1940's
 - And it's been that way ever since...until now



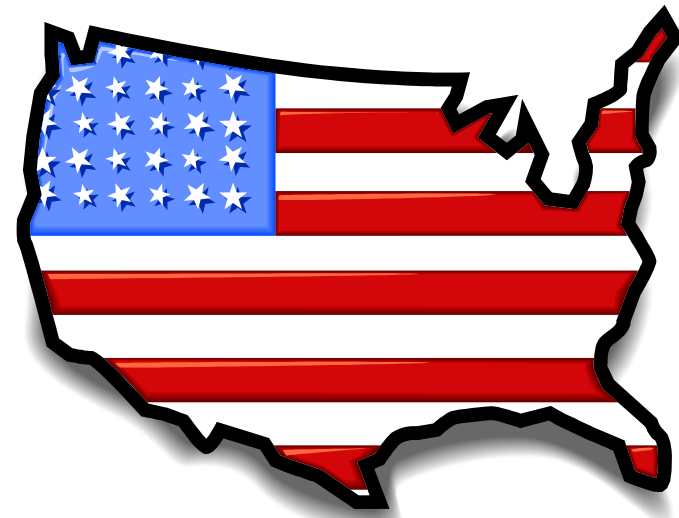


Tankless Water Heaters



US Market Today

- 2008 Total US Market was 340,000 units
 - 40% growth between 2003-2005
 - 50% growth in 2004 alone
 - 36% growth in 2006
 - 35% growth in 2007
 - >4% growth in 2008
 - Tanks down 7%
 - Future impact estimated as high as 50-60% of market
 - Australia: 0 to 30% of market in @7 years





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The Technology

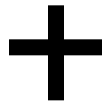


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Advanced Technology – Most Models

- Self-modulating burner provides maximum energy efficiency



Btu input automatically increases as demand for hot water increases

Only operates when there is a demand for hot water

- No standing pilot
 - Electric spark ignition
- Temperature rise determines maximum output capacity
 - $((\text{HW outlet}) - (\text{CW inlet})) = \text{Temperature rise}$
- The greater the temperature rise, the lower the capacity



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Tanks - General Advantages

- **Large stored volume for high demands**
- **Longer vent run options**
- **Lower peak fuel demand**
- **Standardized as an industry**
 - Fuel pressure, capacity, ratings
- **Status quo**
 - No learning curve





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Tankless - General Advantages

- Unlimited hot water
- Multiple installation options
- Easier to zone
- System redundancy in manifold
- Green image & efficient
- Space saving
- **Consumer Driven!**





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Tankless Vs Tank at 90° Rise

40,000 Btu's

151 lbs



.62 EF

13 Ft³

67 gal 1st hour
(55 gal electric)

199,900 Btu's

55 lbs



.82 EF

2 Ft³

222 GPH



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● 3 Primary Tankless Designs

– Indoor power vent (PV)

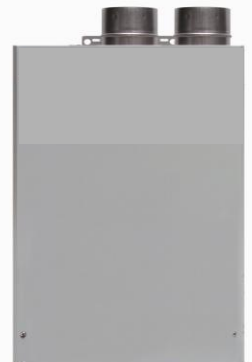
- Primary
 - Attics, garages & basements with ample combustion air
- Secondary
 - Confined spaces without ample combustion air

– Outdoor

- Mounted on wall - with or without pipe skirt
- Mounted in recessed box

– Indoor direct vent (DV)

- Primary
 - Indoor confined spaces
- Secondary
 - Attics, garages & basements with ample combustion air





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Options and Accessories



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Optional Pipe Covers

- For indoor and outdoor models
- Used for cosmetic purposes
- Can enhance freeze protection





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Recessed Box – Typical Installation

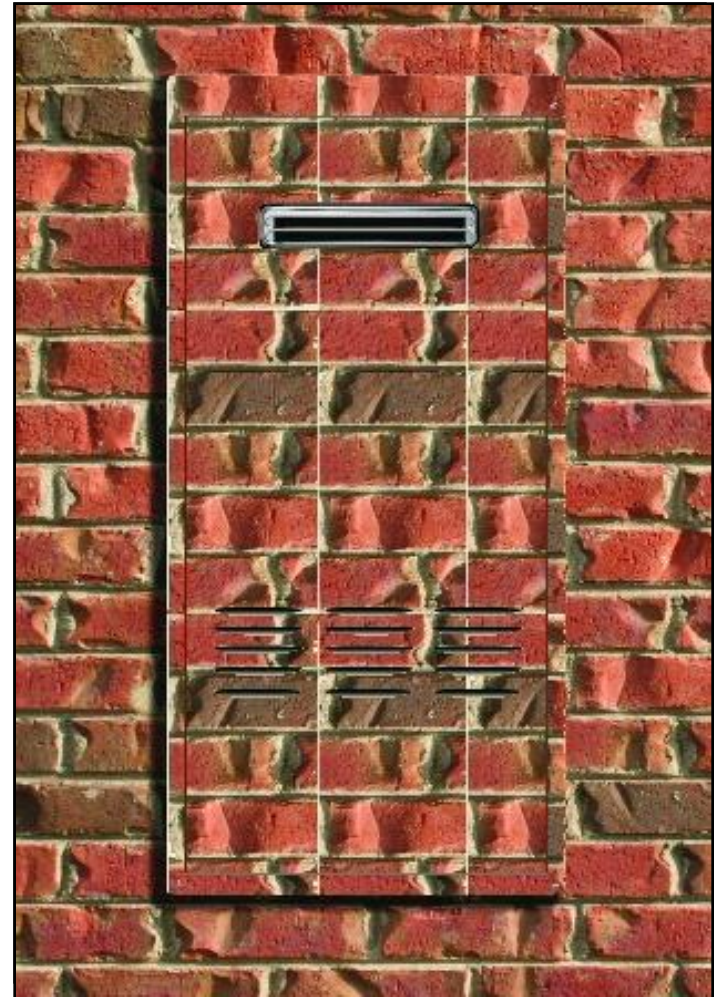




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Custom Installation – Enhances Aesthetics





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Isolation and de-liming valve kits

- ✓Lowers installation labor and long-term maintenance costs
- ✓Easier to install unit when pipe covers and recessed boxes are used
- ✓Aids in troubleshooting of units in manifold installations
- ✓Aids in installation of pressure relief
- ✓Aids significantly in de-liming if necessary





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Remote Controls

- For the end-user - not the contractor
- Change temperature settings
- Monitors operation of unit
- Install in a location convenient for the owner
- Can have up to 3 controls per unit on some brands
- Contractor should have one in toolbox for troubleshooting





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Important

Tankless Water Heaters

Are Not Standardized!



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Market Awareness – Know Your Product

Understanding the technology is key

- Temperature rise determines max capacity
- 60⁰F rise in Houston => 60⁰F rise in Denver
- Compare units at same temperature rise
 - Not a 45⁰F rise with a 35⁰ rise
 - GAMA rates at 77⁰ rise





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Know Your Product

@200,000 Btu input

Temperature Rise in °F	<u>45</u>	<u>50</u>	<u>60</u>	<u>70</u>	<u>80</u>	
Brand XXXX	7.4	6.6	5.5	4.7	4.2	GPM
Brand YYYY	7.4	6.6	5.5	4.7	4.1	GPM
Brand ZZZZ	7.5	6.7	5.6	4.8	4.2	GPM

@180,000 Btu input

Temperature Rise in °F	<u>45</u>	<u>50</u>	<u>60</u>	<u>70</u>	<u>80</u>	
Brand XXXX	6.7	6.0	5.0	4.3	3.8	GPM
Brand YYYY	6.6	5.9	4.9	4.2	3.6	GPM
Brand ZZZZ	6.3	5.8	4.8	4.1	3.6	GPM



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Market Awareness – Know Your Product

- Know the minimum fuel pressure required
 - Varies from 4” to 6” w.c. natural
 - 8” to 10” w.c. propane
- Know the clearance to combustibles
 - Varies from ½” to 6” or more on the sides
 - 0” to 2” in rear
 - 12” to 36” to the top and 6”-24” to the front
- Know your warranties
 - Heat exchanger, parts, labor
 - Recirc policies
 - Heat exchanger failure policies



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Market Awareness – Know Your Product

- Know the minimum activation flow
 - Varies from .5 to .78 GPM
- Know the high altitude limitations
 - Does the unit compensate
 - » If yes – how
 - » What are its limits
- Does the unit offer freeze protection
 - If yes, what is its low temperature limit
 - » Important, the units are protected but not the pipes



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Market Awareness – Know Your Product

- Can the unit detect scale buildup
 - Single unit
 - Manifold
 - » Preventive maintenance requirements
- Is bigger better? Saves space, but
 - » Generally lower efficiency
 - » Possible loss of system redundancy
 - » >200,000 Btu are not Energy Star rated
- Right product for the job
 - Tankless may not be the answer



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EnergyStar Ratings

- Natural Draft Gas Tanks - .62 until 9/1/10, then .68EF
 - 67 GPH first hour rating and a 6 year warranty
 - Meets ANSI Z21.10.1/CSAA4.1
 - Note: .68EF will be difficult for natural draft water heaters
- Tankless - .82 EF minimum
 - While producing 2.5 GPM or greater at a 77^o temperature rise with a BTU input of 140,000 per hour or more
- For tax credit info
 - www.energytaxincenetivess.org/consumers/
- For LEED and Green Building info
 - www.usgbc.org/



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Important

Design Considerations



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Key Design Considerations

Location! Location! Location!

- The shorter the vent,
the more economical the installation
- The closer to the fuel supply,
the more economical the installation
- Communicate with (and within) your utility
 - Right meter – right pressure
- Remember,
Your design is only as good as the contractor installing it!

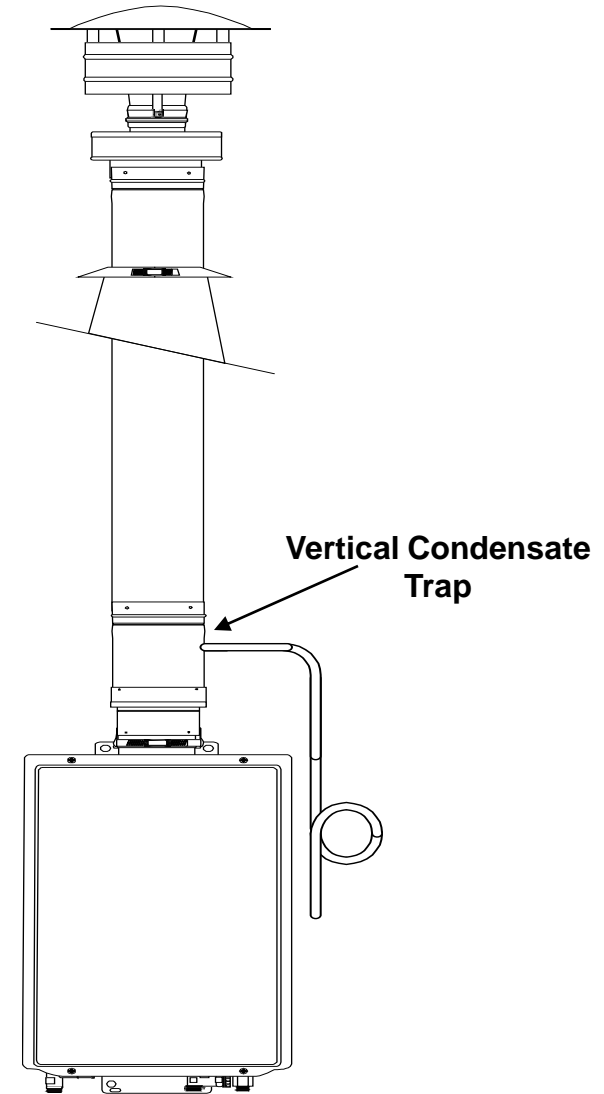
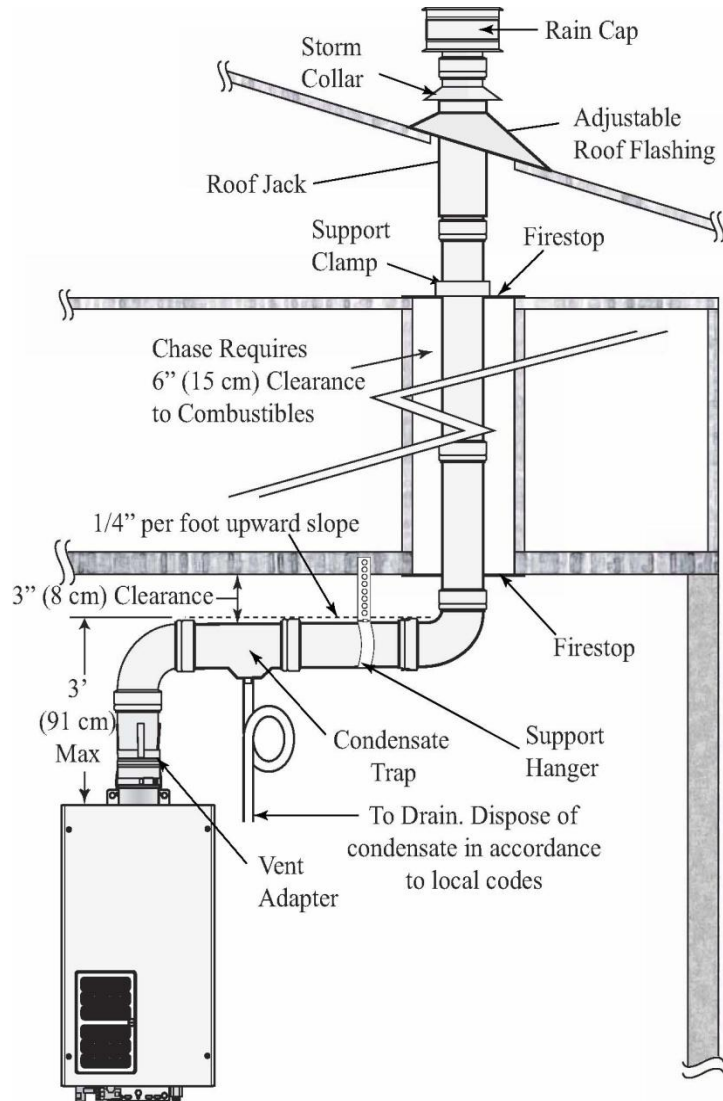




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Vertical Venting – Least Preferred Option



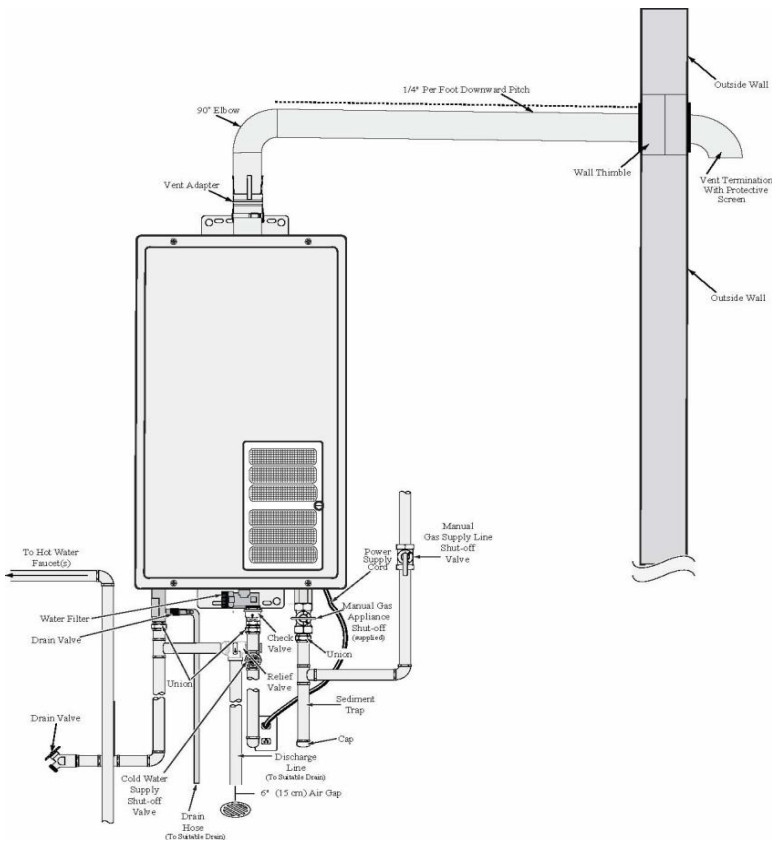


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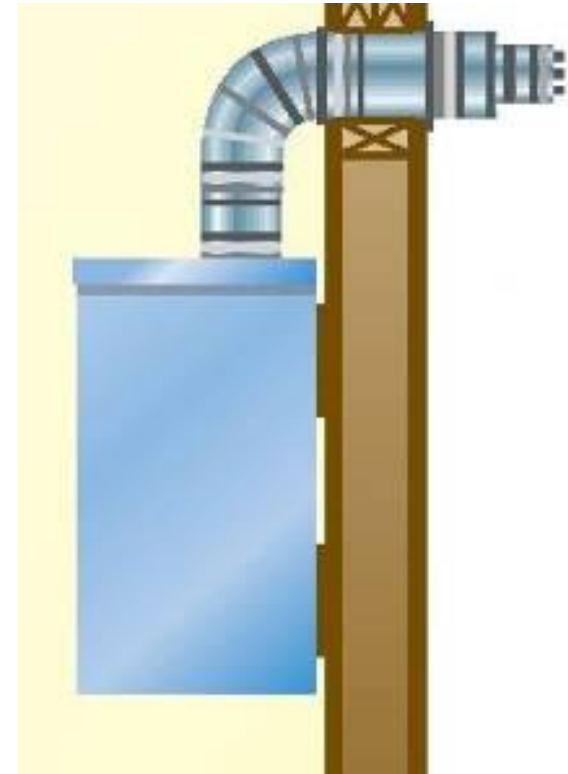


Horizontal venting or outdoor is preferred

Better



Best





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Proper Sizing

It's GPM - Not GPH!



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Important Residential Sizing Considerations

- What is the most logical GPM usage
 - Number & GPM of showers, appliances, Roman tubs, etc.
 - » 2.5 GPM shower heads are Green fixtures
- What is the temperature rise required
 - The greater the temperature rise the lower the capacity
 - Use lowest inlet temperature at peak occupancy/usage
 - Or, default to January or February inlet water temperature
- Typical residential fixture uses approximately 80% hot water
 - Refer to GPM charts furnished by manufacturer
 - Refer to manufacturer's sizing program if provided



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Communicate With The Manufacturer

Utilize the services some may offer:

- **Application and sizing assistance**
- **PC based sizing program**
- **Pressure drop and flow rate curves**
- **Installation drawings – some engineering approved**
 - **Manifold, recirculation, combo-heat, etc.**
- **Product training**



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Typical Industry Standard

Manifold Installation Drawings

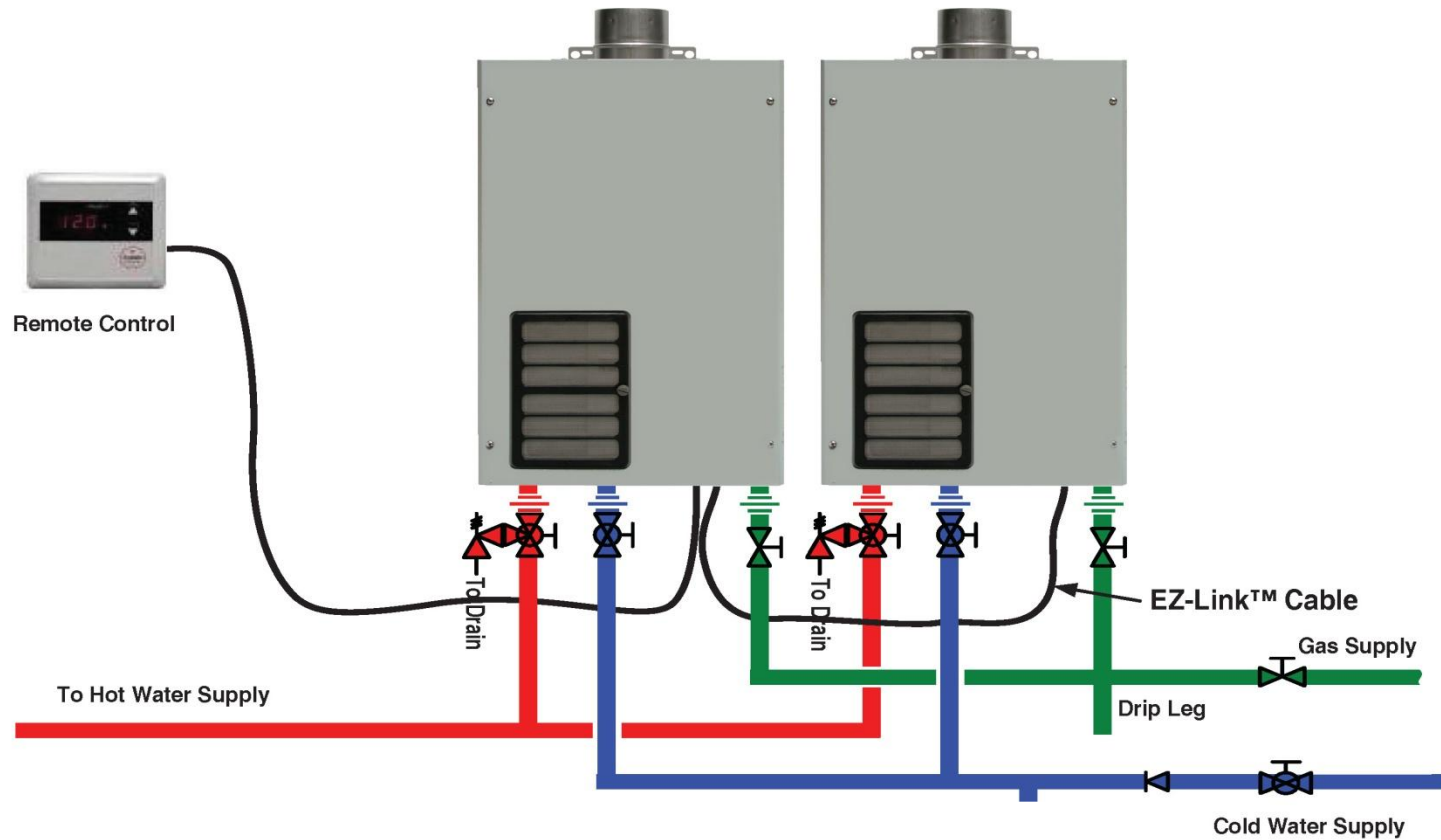
Important: Supply and return water headers should be sized in accordance with manufacturer's specifications



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Typical EZ or Quick Link Manifold Installation

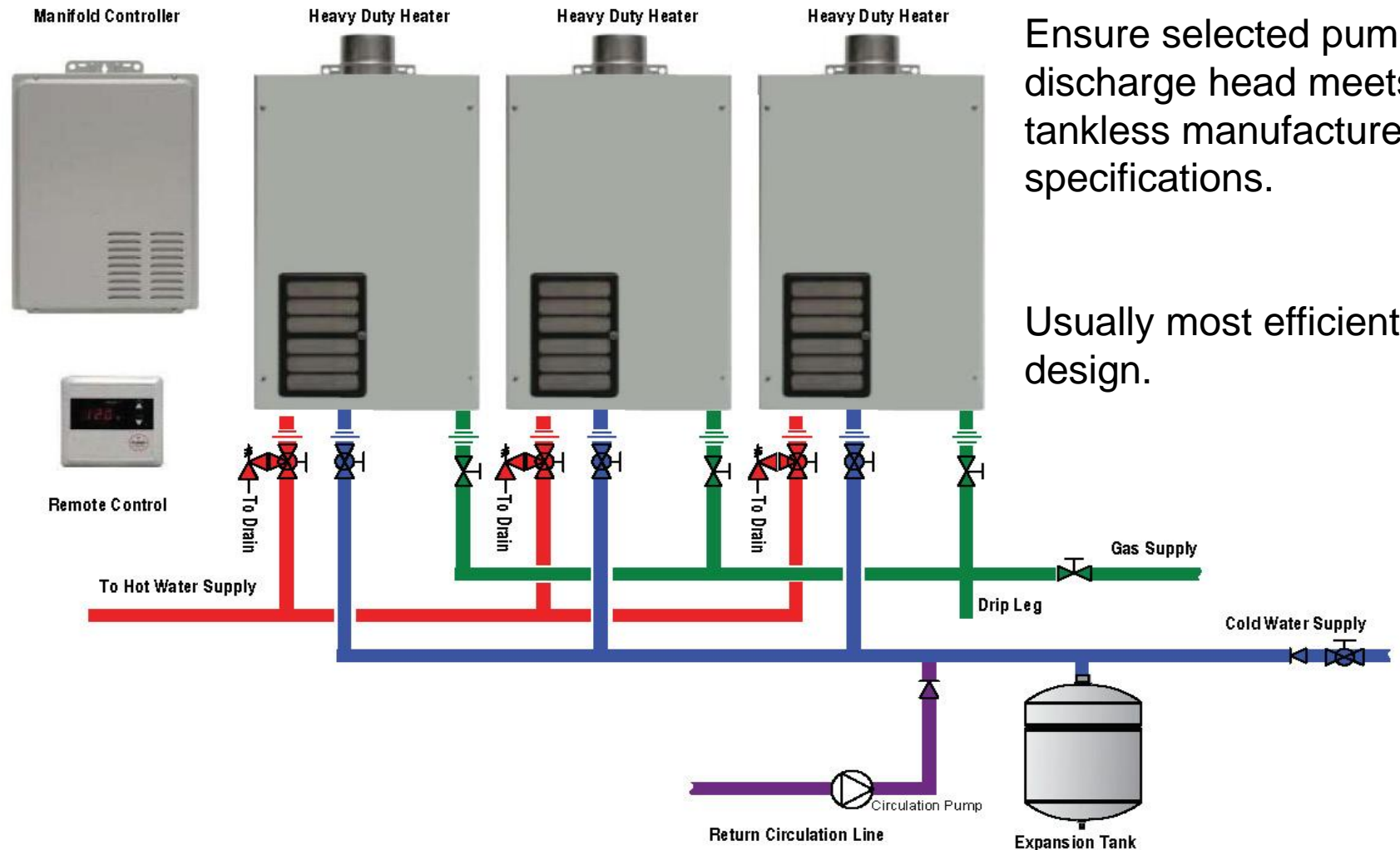




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Typical Commercial Manifold with Direct Recirculation



Ensure selected pump discharge head meets tankless manufacturer specifications.

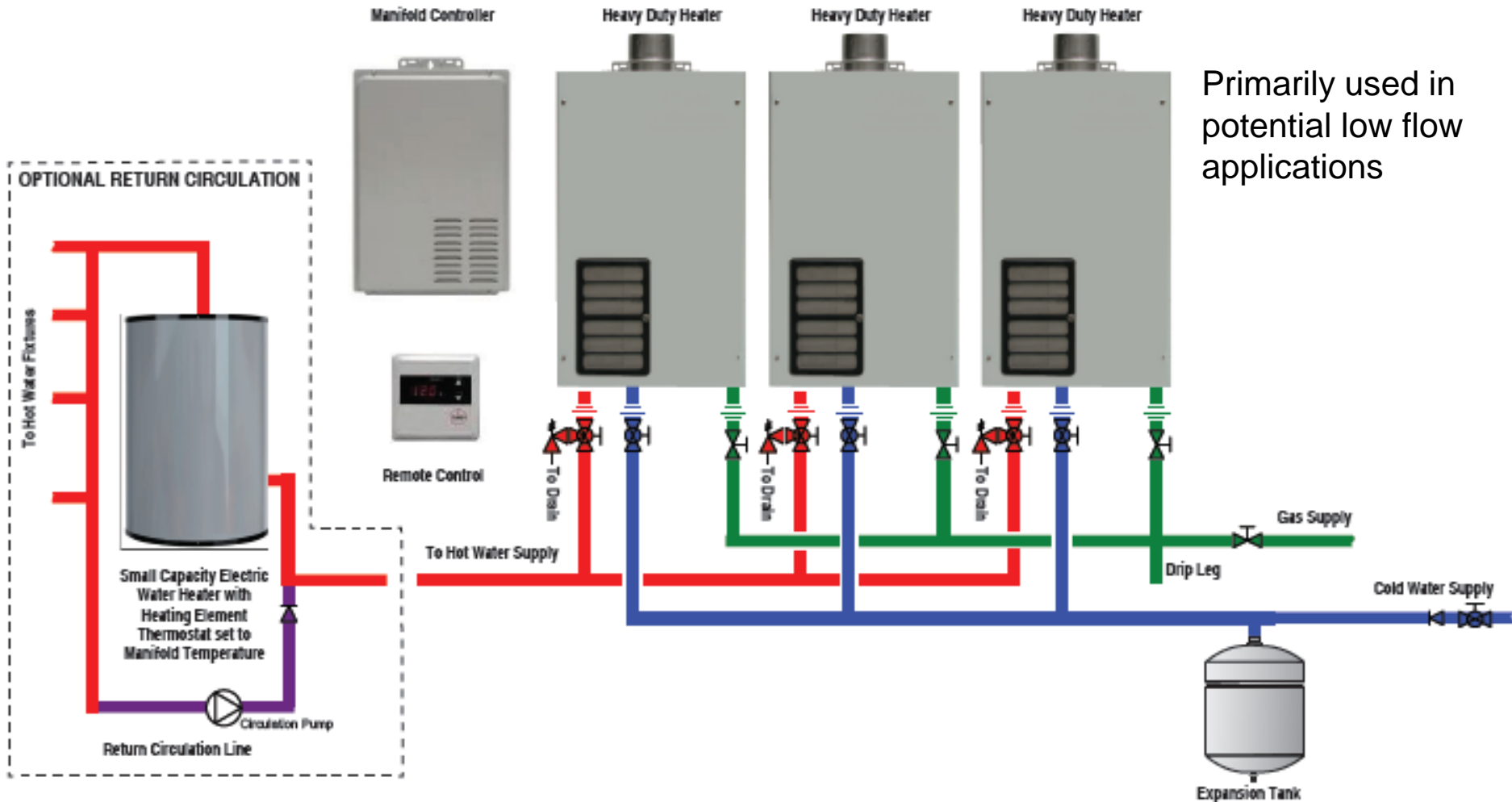
Usually most efficient design.



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Typical Manifold without Direct Return Circulation





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Summary *and* *Q&A*



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Summary – Key Design Considerations

What is the normal GPM demand of system

- Are there any large commercial loads
- Most logical residential usage

What is the temperature rise required

- Minimum cold water inlet temperature
- Maximum design outlet temperature required

What is the water quality

- Is scale buildup and detection a concern

What are the ratings of the tankless unit

- GPM output at required temperature rise
- Pump head requirements
- Minimum flow activation



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Summary - Key Design Considerations

What are the fuel requirements?

- Can the unit operate at the available pressure
- What are the piping requirements
- Communicate with the utility

What are the venting requirements?

- Does it require proprietary or Cat III SS vent material
- Will it require a condensate trap

Where will it be installed - indoors or outdoors?

- Remember..
- ✓The shorter the vent the more economical the installation
- ✓The closer the fuel source the more economical the installation

And finally, is tankless the right product for the job?

- More than likely yes, but.....

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Questions and Answers



Thank you!

