

# Hydronic Times

High Efficiency Hydronics • Domestic Hot Water • Solar

Newsletter of JTG Muir • Tankless or Boiler... What is the best choice?



TANKLESS

## Tankless or Boiler Hydronic Space Heating What Is The Best Choice?



BOILER

### CONSIDERATIONS

#### THE TANKLESS HEAT EXCHANGER

Tankless copper heat exchangers have a very small diameter, relatively thin wall tubing sized for high Delta T applications such as 60°F supply in and 120°F out (60°F Delta T). Hydronic systems are typically design for a 10-20°F Delta T to provide balanced heat distribution to the system. So higher flow rates are required to extract energy from a heat exchanger in hydronic applications. Wait....if the tankless heat exchanger has small diameter tubing configured in series, then you will need a larger, energy consuming circulator to get the proper flow or you will just not extract the heat. Bingo. Used in hydronic applications, tankless water heaters will provide only a fraction of the heaters rated output when using a standard low energy circulator. If you use a much bigger circulator the heat exchanger can erode by high velocity, resulting in a short life span plus a significant increase in circulator energy costs over the life of the system. The tankless heat exchanger was just not designed for recirculation. Compare the tankless heat exchanger to the low pressure drop, rugged 316 L stainless steel heater exchanger of Munchkin Contender boiler that is designed for the high flow rigors of hydronic recirculation.

#### TANKLESS PERFORMANCE

**STANDARD EFFICIENCY (81%):** A standard tankless water heater is listed at approximately 81% Thermal Efficiency by GAMA (The water heater listing agency). The water heater standard tests cold water in and hot water out. If the same heaters were tested to AFUE hydronic boiler standards that test recirculation of hot water, the efficiencies would be about 77%. It is much harder to achieve efficiency at higher return water temperatures. So, the customer is getting a product that actually performs below the government minimum efficiency standards when applied in a hydronic application. Inexpensive, yes but they are not very efficient for space heating.

**HIGH EFFICIENCY (90+%):** Condensing tankless water heaters are just now being introduced to the market place but they have the same heat exchanger issues of regular tankless while costing about the same as a Contender condensing boiler designed for the application.

#### DURABILITY

The small, thin-walled heat exchangers of tankless and the tendency to cycle on/off regularly lead to excessive short cycling and shorter life spans.

#### WARRANTY

Some tankless water heater manufacturers do not recommend tankless for recirculation applications. Others reduce their heat exchanger warranty to 3 years. A Munchkin Contender boiler has a 12 year, prorated warranty. The warranties of tankless water heaters would suggest that the tankless industry has reservations about the longevity of

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these products in recirculation applications. Then why do they show diagrams of tankless being used for hydronic heating? This falls into the category that one CAN use any product for any range of applications but that does mean the product is the BEST for a given application.

## PRICE/BENEFIT

Standard tankless water heaters can cost about 35% less than good 82% AFUE boiler. The buyer must compare the overall operating costs, warranty and durability of each product to make a fair comparison. In short, a standard efficiency tankless can be a very efficient choice for water heating but a very inefficient and inappropriate choice for space heating. The cost of a good condensing tankless water heater can be about the same price the cost effective Contender condensing boiler, however, the Contender boiler is a more durable choice.

## SIZING COMPARISONS

When sizing a hydronic heater one looks to the rated output at an expected flow rate. The output of a tankless can often be much lower than the rated output due to flow velocities. So it is safe to use 1/3 of the rated output of a tankless heater as the energy available for space heating assuming a design with reasonable fluid velocity rates. A 50,000 BTU Contender boiler can efficiently deliver the same space heating as a 199,000 BTU tankless water heater.

## ALTERNATIVES TO TANKLESS WATER HEATERS BOILERS (CONTENDER WITH INDIRECT)

Boilers typically have more durable, high flow heat exchangers and controls specifically designed for recirculation. A high efficiency boiler does not have to be that much more expensive than a condensing tankless. The Munchkin Contender wall hung boiler from Heat Transfer Products is both durable and cost effective. With the historical rise in fuel costs, it is economically sensible to select a high efficiency heat source in homes. Contender or Superstor stainless indirect water heaters can be used in conjunction with boilers to provide large quantities of hot water on demand.



Contender w/ Ultra505

## COMBI BOILERS

Combi boilers that combine a boiler and a tankless water heater in one cabinet can be an excellent choice as a packaged hydronic appliance that has a tiny footprint and great performance. They do have domestic hot water output that limits them to maximum two bathroom applications. Combi boilers dominate the world-wide combined hydronic market. The Sime combi boiler is an excellence choice for 84% and condensing applications.



SIME Combi Boiler

## TANK WATER HEATERS

While standard efficiency tank water heaters are very inefficient for space heating (below minimum standards) and short lived, condensing water heaters can be an excellent choice for combined space heating and water heating. To be truly effective, a condensing water heater must modulate to the load, be very quiet and have properly located heating taps. The Phoenix water heater is a far superior choice than any tankless for any applications that requires both space heating and large demand domestic hot water.



Phoenix Water Heater