



THE CASE FOR CONDENSING WATER HEATERS

Condensing water heaters have been manufactured since the 1980s, and now represent a fully mature technology used extensively throughout the world.

What is a Condensing Boiler?

The condensing water heater is a system of technologies, consisting of the water heater itself fuelled by gas or oil, the flue stack, and the condensate collection system. Condensing water heaters operate at around 95% gross efficiency, compared with 80-85% gross efficiency for conventional water heaters.

They achieve higher efficiencies by using newer technology and by condensing the water vapour that is produced during combustion and trapped in the flue gases.

In traditional water heater technologies, the latent heat contained in the water vapour is allowed to escape through the flue. Condensing water heaters reclaim that latent heat by condensing the water vapour and transferring its heat to the return water via a secondary heat exchanger with a resultant increase in water heating efficiency.

The flue stack temperature is considerably reduced and the return water temperature raised. Hence the term 'Condensing Water Heater'.

These potential efficiency gains are achieved if the water heater is operating in or near condensing mode, which requires the temperature of the water returning from the building to the water heater to be as low as possible. Having said that, condensing water heaters will achieve increased efficiencies over non-condensing water heaters even in a situation utilizing the existing building return water temperature, due to the larger surface area of the heat exchanger in a condensing water heater and the reduced flue temperature.

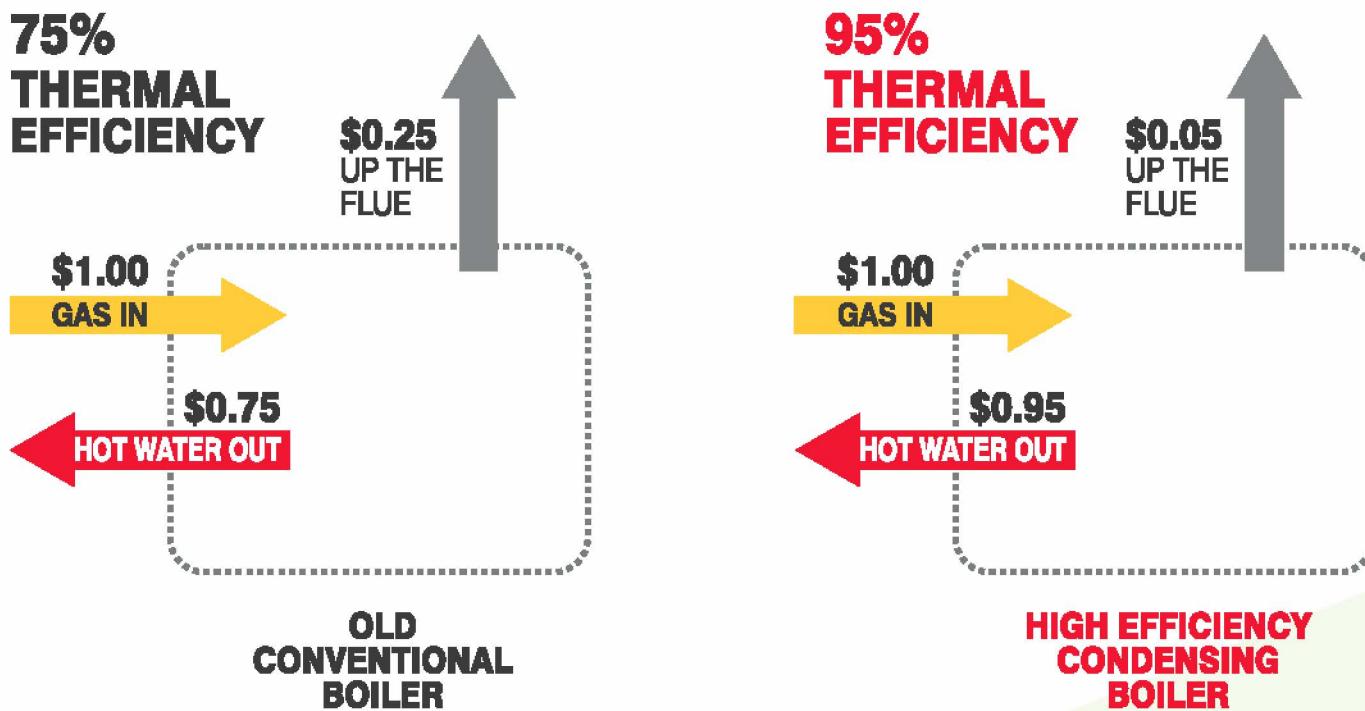
Optimum return water temperatures are achieved when the return water is below the dew point of the water vapour in the flue gas. The dew point is determined by several variables, including altitude, outdoor air temperature, and the type of fuel the water heater consumes. The critical variable, however, is combustion efficiency: excess oxygen in the combustion process leads to lower efficiency and requires a lower dew point before condensation can begin. In general, with efficient combustion, return water temperatures (RWT) should be below 54°C, with lower RWT resulting in more condensation and greater efficiency.

Condensing water heaters require Stainless Steel flues to prevent corrosion. The condensate produced is also slightly acidic so a condensate neutraliser is required before piping condensate to the drain. Plastic piping must be used for the condensate drain to prevent corrosion.



Conventional vs. Condensing

The following diagram illustrates the superior financial and environmental benefits achieved by Condensing Water Heaters over Conventional Water Heaters.



More advantages than meets the eye

Apart from the obvious cost saving advantages of condensing water heaters, they also offer other benefits. They don't heat up the plant room (low radiation losses), hot water is supplied when needed (low standby losses) and minimal energy is lost via the flue. According to Terry Plaisted at Automatic Heating, one of the leading suppliers of condensing water heaters in Australia, the comparatively small footprint of the modern equipment supplied today is also an advantage when floor space is at a premium.

Terry says "Many plant rooms in Australia house relatively old equipment. It's not uncommon for equipment to be in excess of thirty years old and property managers can sometimes overlook the fact that this inefficient equipment is costing them a lot more money to run than it needs to. Many businesses, particularly hotels and aquatic centres are still spending tens of thousands of dollars more on heating than they need to every year because of low-efficiency equipment, outdated technology and suboptimal system maintenance".

Interestingly, a client of Automatic Heating compared their gas usage data from before and after a recent installation of three Modulux 770kW condensing water heaters and reported consistent savings of in excess of 20% with monthly gas usage on average reducing by more than 500,000 MJ.

This energy saving story is also reflected in a recent study in the US where condensing water heaters were installed in several federal buildings and the energy usage data was carefully recorded and analysed. In the six facilities studied, all facilities experienced significant reductions in natural gas consumption, with savings greater than 14% when compared to conventional water heaters.



In Summary

Gas condensing water heaters are an ideal choice when you want a highly efficient heating system. They achieve a high thermal efficiency by using waste heat to pre-heat the return water entering the water heater. Quality gas fired water heaters deliver consistent warmth without the noise and draft related with forced air systems. Potential energy savings can be significant. Some companies such as Automatic Heating offer free energy usage appraisals, system designs and technical advice.

Supplementary equipment such as deaeration and dirt separation technologies are also available to further improve system efficiencies and extend the life of plant and equipment. In the current age of economic downturn and financial strain, can anyone not afford to implement a more efficient and intelligent heating solution?

Examples of Condensing Water Heaters



Meridian Condensing Water Heaters provide very high efficiency in compact formats for the ultimate installation flexibility and are stainless steel boilers. They are available in both wall hung and floor standing models. Meridian condensing boilers work at very high and constant efficiencies reaching up to 95% gross efficiency enabling seasonal savings up to 35%

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Examples of Condensing Water Heaters



Eurogen Condensing Water Heaters are available in output ranges from 450kW to 2100kW and offers the large water volume feature which is important for some projects. Eurogen are stainless steel gas condensing boilers.



Modulex Condensing Water Heaters are available for both indoor and outdoor installations. Their unique multiburner design and controllers provide built in redundancy. The combination of pre-mixed radiating combustion with high turn down ratios produces unparalleled efficiency throughout the operating range of the water heaters.



AutomaticHeating
efficiency □ performance □ solutions