

HIGH EFFICIENCY COMMERCIAL CONDENSING PRESSURE JET BOILERS: IDEAL FOR LARGE HEATING LOADS



Written by Charlie Mowbray,
Senior Product Manager,
Ideal Heating - Commercial

REGULATORY CHANGES HAVE REMOVED THE MAJORITY OF DOMESTIC AND COMMERCIAL NON-CONDENSING PRESSURE JET BOILERS FROM THE MARKET. HOWEVER, THOSE THAT REMAIN, THAT CAN OPERATE IN CONDENSING MODE, CAN REPRESENT A GOOD OPTION FOR COMMERCIAL USERS WITH LARGE HEATING LOADS OR WHERE LARGE CAPACITY BACKUP IS REQUIRED TO SUPPORT PRIMARY LOW/ZERO CARBON HEAT SOURCES.

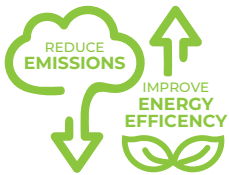
Boilers that operate with a pressure jet burner are common in industrial applications but over recent years have been largely removed from the domestic and commercial heating spheres. Several regulatory changes have been responsible for this, including the Energy related Product (ErP) Directive which placed efficiency requirements on outputs under 400kW; the emission limit value requirements of the Medium Combustion Plant Directive (MCPD) for boilers with thermal inputs exceeding 1MW; and, most recently, the uplift to Building Regulations Part L which increased the Gross Seasonal Efficiency of natural gas boilers by 2% in new buildings to 93% for single boilers with less than 2MW output and to 88% to those with more than 2MW. For oil boilers, the increase is even greater, going from 84% to 93%. Compliance with Part L is required in new build and existing properties, including where comparatively large extensions are being built, where fixed building services are being modified or installed, or where there is an increase to the capacity of fixed building services.

and the systems within. Many pressure jet boilers designed to work in commercial applications have been unable to comply and have been withdrawn from the market. But not all. Those that can be operated in condensing mode are able to achieve the new, more demanding efficiencies and emission limits when matched to a suitable burner.

WHAT IS A CONDENSING PRESSURE JET BOILER?

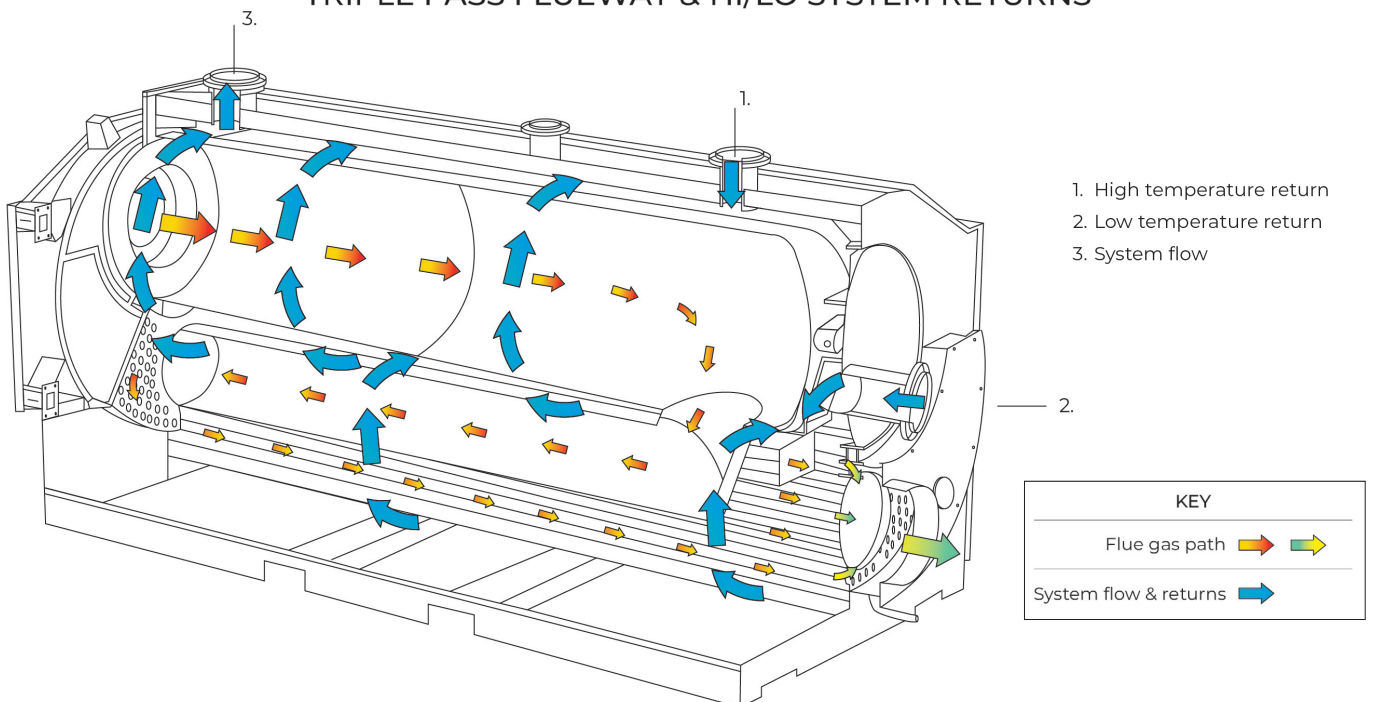
The description of a boiler as a “pressure jet” appliance would most accurately be applied to a boiler being fuelled with oil. The pressure jet burner features an opening at the end of a pressurised tube, typically a series of nozzles that are matched to the oil fuel type being combusted. The substantial pressure drop created over the opening when the fuel is discharged into the furnace results in atomisation of the fuel.

However, the term “pressure jet” has become synonymous with large shell & tube boilers where a fanned burner with associated fuel controls is mounted to the combustion chamber. For a pressure jet boiler fuelled with gas this fuel is mixed with air that is blown



These changes are necessary to reduce emissions and improve overall energy efficiency of the buildings

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through the burner by a fan, and ignited at the combustion head of the burner.

Burner controls ensure proper fuel / air ratio and mixing across the range of operation, for efficient and complete combustion. It also determines the shape and direction of the flame.

All commercial pressure jet burners used on gas or oil boilers work in this way, but only those that are fully able to operate in condensing mode are compliant.

Condensing pressure jet boilers, such as our Evojet range, feature a double return condensing system (connections for high or low temperature return water) which enables them to keep the temperature difference between the heat exchanger wall and the return water high, thus maximising the formation of condensation. This design, plus the three-pass layout for the combustion gases, the titanium stabilised stainless steel internal components and extensive insulation, combine to provide a high level of efficiency and reliability.

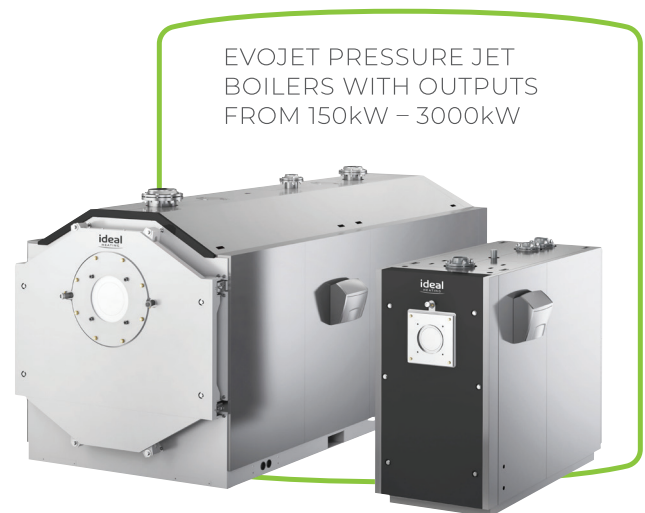
Not all pressure jet boilers can be operated in condensing mode. Those that are constructed from standard steel or iron, as opposed to high grade stainless steel, will, in time, corrode from the condensate which can be mildly acidic. Condensate from oil fired operation can be extremely corrosive. So even with boilers constructed from high quality materials, condensing oil fired operation is only permitted on ultra-low sulphur fuel types. Given the variability of fuel oils, in this respect condensing operation is largely limited to gas fired installations.

WHY OPT FOR A CONDENSING PRESSURE JET BOILER?

In commercial settings, pressure jet boilers are rarely the first option to turn to as high-efficiency condensing boilers will normally suffice. Even in commercial applications with large energy usage, high-efficiency condensing

boilers can achieve several megawatts. Our Imax Xtra EL condensing boiler is available in 1240kW outputs as a dual unit, for example, and our Evomod will achieve an output up to 1MW from a single unit solution. Plus, you have the option to cascade boilers; up to four Imax Xtra 2 boilers can easily be cascaded for 1120kW output. Cascading boilers also has the advantage of a very high modulation rate as the turn down across the total cascade increases with the number of boilers used, e.g. one boiler has a turn-down of 5:1, for each additional boiler in a cascade that is controlled sequentially you increase the turn-down by 5:1. So for a cascade of four boilers controlled sequentially you can achieve a turn-down of 20:1.

However, when plant room space is limited cascades can, in some instances, take up quite a large floor area and present challenges installing all the flues and pipework to each boiler. This is where it is worth considering a condensing pressure jet boiler, which can deliver several megawatts from a single unit. Our latest Evojet models have outputs up to 3000kW.



With a reduced number of pressure jet boilers overall, due to the high capacity of each individual boiler the system design and installation work for a pressure jet boiler can be considerably less complex in terms of the

number of connections and the pipeline you have to put in, and the number of pieces of equipment you've got to deal with.

In the commercial sector, condensing pressure jet boilers are therefore most frequently suited to leisure facilities, hotels, healthcare facilities and the increasingly popular heat networks.

IMPORTANT CONSIDERATIONS

Condensing pressure jet boilers may be able to deliver high outputs from a comparatively small footprint, but they need to be considered carefully.

Firstly, specialist installers and commissioning engineers are required who have the appropriate training for this type of equipment. The people who operate and maintain them also need suitable training, especially on the health and safety aspects such as Pressure Systems Safety Regulations; these are far more complex than your typical commercial boiler. A robust water treatment and ongoing maintenance regime is essential to ensure safe and reliable operation. Inadequate water treatment will result in scale and corrosion, reducing the efficiency of the installation and potentially reducing the working life.

Furthermore, the condition of the water supply used to initially fill the system can directly impact the quality of the overall heating system, if the water treatment is not correct.

REVALUATE YOUR OPTIONS

Where there is high demand for heating and hot water, delivered efficiently with minimum emissions, don't exclude pressure jet boilers from your considerations when weighing up the best option for your application. Pressure jet boilers may have been around for some time, but modern commercial condensing pressure jet boilers and burners might well surprise you yet!



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