

# Engineering Specification

## Gas Fired High Efficiency Commercial Condensing Boiler

**200kW, 250kW, 300kW, 350kW, 440kW, 550kW, 660kW, 770kW, 900kW**

The following information is intended to support the specification of commercial gas fired condensing boilers with a rated output of between 200kW and 900kW. This is not intended to be a full system design and should only be read as a solution for equipment supplied with additional hydraulic design and controls. For guidance please contact the technical department of Alpha Heating Innovation.

### OVERVIEW

The boiler shall be of the floor standing type and designed to combust natural gas (or LPG) pre-mixed with air to generate space heating and/or indirect DHW production, adjustable up to 85°C at an operating pressure of up to 6bar [200kW-900kW].

The boiler must be of the modular type, with each module having an individual fan, burner, PCB and gas valve. With the main heat exchanger being low maintenance to be constructed from cast aluminium/silicon and magnesium making it light strong and corrosion resistant. Combustion chamber to be of cast pin design to increase surface area and boiler efficiency.

### PERFORMANCE, EFFICIENCY AND SAFETY

The boiler output must be fully modulating and have a minimum turn down ratio of the following for each model selected:

200kW 1:16	250kW 1:20	300kW 1:24	350kW 1:28	440kW 1:19	550 kW 1:25
660kW 1:29	770kW 1:34	900kW 1:39			

The boiler shall have a seasonal efficiency of at least 94.9% [net] in non-condensing operation and at least 100.2% [net] in full load condensing operation and 106.8% net in part load condensing.

The Boiler must meet NO<sub>x</sub> Class 5 levels and indeed be lower than 54mg/kWh [200kW-350kW] and 49mg/kWh [440kW-900kW].

The electrical consumption in stand-by mode shall be no more than 20W.

The boiler shall be quiet in operation, and have noise emissions of less than 50dBA.

The boiler should have the ability to continue to operate on all available modules should any others be in a fault condition, giving an uninterrupted heat supply.

The boiler shall have a low gas pressure switch fitted to interrupt burner operation should gas supply pressure drop below 12mb.

## HYDRAULICS

The boiler shall have one-piece interconnecting hydraulic flow and return manifolds, reversible left/right up to 350kW.

The boiler shall be of the low water content type with rapid warm-up and turn down times.

## FLUEING

The boiler shall have optional flue positions (rear or either side) and have the option of a room sealed configuration.

The boiler shall have a max flue resistance of 100Pa.

## CONTROLS

The boiler shall have an integral controller that is capable of continuously monitoring the boiler operation. The boiler controller shall be capable of sequencing and modulating and must be able to manage a minimum of 1 direct heating circuit, 1 mixed heating circuit and a DHW circuit with the possibility of secondary circulation, it must also provide full commissioning and fault diagnostic display for individual modules. The controller must be able to provide independent time and temperature for each of the heating and DHW circuits. The boiler must have provision for an external run/fault signal, and be able to integrate as part of a cascade system of up to 8 boilers.

The boiler shall be supplied complete with an external temperature sensor, a flow temperature sensor and a DHW cylinder sensor.

The boiler shall be compatible with renewable energy technologies such as solar thermal systems, with the boiler manufacturer able to offer advice on renewable integration.

The boiler controls must be compatible with Building Management Systems and have the ability, through the built-in interface, to accept an on-off enable signal, a 0-10V signal, or a ModBUS signal for full boiler control. The boiler must have the capability to run in manual mode in the event of an external controls signal failure.

## APPROVALS

The boiler manufacturer must hold ISO 9001 certification with the boiler itself being CE approved.

## SITING AND MOUNTING

The boiler should be supplied on a purpose provided pallet, with the boiler able to fit through a standard doorway (up to and including 350kW).

The boiler gross weight to be no more than 900kg including packaging for the largest model. The boiler shall be IPX5D rated for optional siting outdoors.

## CASCADE SYSTEM

The boiler shall be compatible with the manufacturers controls package being able to control monitor and program the operating sequence of up to 8 boilers.

## WARRANTY

The Boiler must be available with a 2 year parts and labour warranty, 5 years with manufacturers provided plate heat exchanger kit.