Particulars of the GF175 Biomass Boiler

Glen Farrow Biomass boiler GF175 is 175 kW max capacity. Batch fed type boiler. Combustion efficiency reaches approximately 90%. Boiler thermal efficiency is approximately 70%. Boiler fuel burn rate is 18.29 kg/hr.

Glen Farrow GF175 boiler is designed to burn biomass fuel such as wooden logs and straw bales. The boiler is batch fed type boiler, meaning that the fuel is loaded manually through the main door into a combustion chamber.

Combustion is achieved by manually lighting the fuel and with help of the burner fan the fuel keeps alight. The burner fan, located at the rear of the boiler, is forcing the air through the blower bar into the chamber to achieve intense combustion. Blower bars are positioned to direct the air underneath the fuel for primary ignition processes and deliver the air above the fuel to achieve secondary combustion. The burner fan speed can be controlled manually with speed controller located at the control panel to suit the heat demand and achieve better combustion performance. The boiler can achieve over 1500ºC temperatures.

The combustion gases leave the chamber through the heat exchange tubes into the chimney box, where the unburnt fuel particulates settle, and up to the insulated flue, then being discharged into the atmosphere being around 200ºC.

The combustion gases are heating water jacket surrounding the chamber and heat exchange tubes. To maximize amount of harvested heat, the door is filled with water which is being circulated by a shunt pump located at the rear of the boiler.

The combustion chamber is built from 8 mm thick boiler plate which increases durability of the boiler.

The water jacket around the chamber is 60 mm wide and holds approx. 690 l of water. The boiler then is insulated using insulation board and rockwool to minimize the heat loss.

The boiler then is cladded with stainless steel cladding and prime coated and painted trimming.

The GF175 boiler is batch fed type boiler, meaning that the fuel is loaded manually through the main door into a combustion chamber by trained personnel.

The boiler will be loaded with small amounts of fuel trying to build the fire up and keep it burning at high temperatures by introducing small amounts of fuel into hot fire when needed. Loading routine will be adjusted to meet the system demand.

The control panel usually located on the side of the boiler, helps operator to monitor the temperatures and adjust the burn rate by adjusting the burner fan speed.

The boiler chamber will collect most of the ash and some of it will settle in chimney box, which will be cleaned out on a weekly basis.

GF175 biomass boiler has adjustable fan speed to increase or slow down the burn. Because the boiler is batch fed type, trained operatives will suit the amount of fuel loaded into the chamber to heat demand.

GF175 biomass boiler is not exempt appliance in smoke control areas

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Boiler Operation and Maintenance

Boiler to be cleaned and de-ashed once a week manually using supplied tools. The heat exchange tubes will be cleaned weekly by brushing them with the wire bush.

The boiler will be left to cool down before de-ashing and heat exchange tubes cleaning. Cooled ash will be collected into the steel container.

Boiler operative will monitor levels of ash and dust deposits in the boiler while loading the boiler and decides if it needs cleaning more often. Boiler stack will be inspected weekly during the boiler cleaning and swept if necessary.

Daily inspections including:

- Check for build-up of ash in the chamber and clearing if necessary
- Check the blower bars clear of ash and debris
- Check the heat exchange tubes are not blocked
- Check if Doors are operating as normal
- The pumps for faults
- Leaks on the pipework and safety pressure relief valve
- Control panel operation and water temperature reading
- Burner fan working and free from blockages
- Heat meter operational
- Area around the boiler is clear of ash and debris

Weekly inspections:

- Clear the ash of the chamber
- Remove and check the blower bars
- Scrape and brush the heat exchange tubes
- Clear the chimney box
- Check the flue for blockages and sweep if necessary
- Check the burner fan for dust and debris
- Check the main pumps
- Check the shunt pump and flow switch operation
- Grease the door bearings

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6-month inspections:

- Clear/Scrape the chamber walls
- Check the blower bars manifold for blockages
- Thoroughly clean/scrape the chamber
- Sweep the chimney
- Check for rust, clear and re-paint if necessary
- Check electrical connections
- Check the pipe lagging
- Check the door rope

Boiler to be serviced by GlenFarrow biomass engineer or other competent engineer annually. Service includes checking for faults, thoroughly inspecting whole system components, repairing/replacing faulty components, cleaning the boiler, sweeping the flue, removing the rust and repainting surfaces if needed, advising customer about operational faults, etc.

GlenFarrow engineers are also available on the phone for any help or advise for the boiler operatives.

Boiler is fitted with number of safety devices which would stop the burner fan from running if the system is at fault. Failure would stop the oxygen feed into the chamber, starving the fire of oxygen

Typical Stack 200 mm ID, 6.8 m/s velocity

Maximum particulate matter and nitrogen oxides emission rates:

PM - 56.5 mg/m³; NOx 115.3 mg/m³ @ 273K, 101.3kPa, 11% oxygen

PM – 40.2 g/hr (0.01118 g/s); NOx 82.1 g/hr (0.0228 g/s) @ STP 273K, 101.3kPa, 11% oxygen

PM - 85.0 mg/m³, NOx 173.5 mg/m³ @ 273K, 101.3kPa, 6% oxygen

PM – 60.6 g/hr (0.01682 g/s), NOx 123.5 g/hr (0.0343 g/s) @ 273K, 101.3kPa, 6% oxygen

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