

1. Development Details

a) Planning Application Reference	10/00958/APP
b) Name of Site	Newmill Hall
c) Address where boiler(s) will be located	Newmill Hall, Mill Brae, Newmill, Keith, Banffshire AB55 6US
d) Person completing form	
e) Contact telephone number	

f) Describe the proposed biomass boiler including make, model, manufacturer, thermal capacity (kw/MW), efficiency, maximum rate of fuel consumption (kg/hr or m³/hr).

Boiler Model: Fröling Turbomatic
manufacturer : Fröling Heizkessel- und Behälterbau Ges.m.b.H, Industriestraße 12, A-4710 Grieskirchen, Austria
Thermal capacity: 70kW
Efficiency: 90%
Fuel Consumption 20kg/hr

g) Describe the boiler combustion system and how combustion will be optimised and controlled.

The combustion process for the Froeling Turbomatic wood chip heating system can take place externally through the 'Lambdatronic H 3200' optimised control unit. The boiler can then automatically adjust to the particular characteristics of the fuel being used. The system works firstly by preparing for combustion by opening its burn back flap. The induced draught fan is also switched on and the Lambda probe heats up.

The combustion chamber is then filled with the fuel by means of the auger feed system. Pre-heating of the fuel then occurs, controlled by using a fan-assisted ignition switch, until a flame forms at the fuel. The loading unit is deactivated at this stage.

The fuel is then ignited with the fan assisted ignition and the flame is spread across the large combustion chamber. The Lambdatronic control unit regulates the combustion process according to the set, target boiler values. When the boiler is not in operation it goes into standby and then shuts down. During the shutdown process, the back-burn flap is closed and all residual material in the stoker channel is fed in as directed. The induced draught fan runs at a lower speed to burn up any remaining fuel.

h) Describe the fuel feed system.

A rotary arm sweeper and extract auger system will extract the woodchip fuel from the bunker. This system provides highly reliable trouble-free, fully automatic, dust-free operation. The energy and maintenance costs are kept to a minimum. The unique, trapezoidal feed duct prevents clogging and consumes very little energy.

i) Provide details of the abatement equipment in place for controlling particulate matter (fly ash) emissions.

The vertical tube heat exchanger is fitted with automatic "Turbulator" mechanical spring boiler tube cleaning system, for consistently high efficiency and reduced servicing (tube sweeping) requirement and to maximize particulates capture from the flue gases to ensure consistently low emissions.

Fly ash from beneath the heat exchanger is automatically extracted by auger to external fly ash bins, for ease of removal and emptying.

j) How does the biomass boiler deal with variable heat loads – is the boiler linked to an accumulation tank?

The boiler has fully modulating combustion control (30 to 100%) with lambda O₂ regulation of primary, secondary and tertiary air combustion control and automatic (within set range) adjustment for fuel quality variation, for consistently high efficiency / low emissions performance. Control features include; variable speed operation induced draught fan, for optimal draught under all operating conditions and full furnace under-pressure monitoring for continuous air flow regulation.

The boiler is to be installed with 1800 liters of accumulator heat storage capacity for optimum year round operation under variable load conditions.

k) Is the biomass boiler an exempt appliance in accordance with the Clean Air Act 1993? If yes provide evidence to demonstrate the biomass boiler has been tested and certified as an exempt appliance (for example a link to the appliance on the UK Smoke Control Areas website <http://www.uksmokecontrolareas.co.uk/appliances.php>)

The Froling Turbomatic is an exempt appliance in accordance with the Clean Air Act 1993. The following link shows the appliance on the UK Smoke Controls website.

http://www.opsi.gov.uk/legislation/scotland/ssi2009/ssi_20090214_en_1

3. Boiler Operation and Maintenance

System efficiency and emissions performance very much depend upon regular maintenance. Your installer should be able to recommend a suitable maintenance schedule.

l) Describe arrangements for cleaning and de-ashing the boiler.

The Froling Turbomatic can clean itself by use of the abatement equipment in place for controlling particulate matter emissions. This includes an automatic heat exchanger cleaning system. The multiple-pass heat exchanger has an Efficiency Optimisation System (WOS), equipped with automatically activated turbulators for cleaning and removing ash.

The automatic grate with vibration and tipping drive is located within the combustion chamber. It is combined with the eccentric support and guarantees optimum cleaning, even when using low grade fuels which tend to form cinders. The excess ash is automatically removed from the chamber for transport by an auger system to an ash box.

The customer is advised during their induction to the boiler that the ash bins must be checked and emptied on a weekly basis. It is also recommended that the client signs up for annual servicing of the boiler with HWE, where a trained engineer will service the boiler following a service schedule.

m) Provide details of the maintenance schedule associated with boiler, abatement equipment and stack. This should include frequency of boiler inspection and servicing by a trained boiler engineer.

The boiler planned maintenance programme typically includes 1 scheduled servicing visits per year by a specialist trained wood boiler engineer.

Local caretaking and servicing personnel are trained to undertake weekly boiler checks to pick up any non-optimum operation and basic servicing operations (e.g. ash emptying from bins) as well as to do a monthly boiler inspection and clean to remove any ash build up on furnace arches and to check for any obstructions to the moving grate.

The flue stack should be checked and cleaned every 6 months by a contracted professional chimney sweep.

n) Describe how incidences of boiler or abatement system failure are identified & mitigated.

The boiler controls include comprehensive fault monitoring to automatically shut down the boiler in the event of incorrect operation. Any problem with the ID fan or heat exchanger cleanings systems will trigger a boiler fault. The furnace pressure monitoring system will detect any obstruction to the flue gas pathways which might indicate a problem with the flue gas cleanup system and trigger a boiler fault.

Three stage "burn-back" fire protection is provided including: furnace under-pressure control and high limit trip, fail-safe fire flap in fuel feed and automatic fuel feed dousing system.

An emergency "heat dump" in-boiler heat exchanger is provided to dissipate heat in event of power failure stopping circulation.

4. Boiler Stack Details

The design of the stack greatly affects how pollutants produced in the boiler disperse over the surrounding area. Where the area is heavily built up, or has existing air quality issues, dispersion becomes more complicated and a computer modelling technique known as dispersion modelling may be required. Your installer should be able to provide most of the details and make a calculation on stack height and design. When dispersion modelling is required you or your installer may need to engage a specialist consultant.

o) Identify the height of the boiler exhaust stack above ground.

Stack termination height: 6.2m

p) Identify stack internal diameter (m).

Stack internal diameter: 0.2m

q) Provide maximum particulate matter and nitrogen oxides emission rates (mg/m ³ or g/hr) to standard reference conditions (<u>13</u> % oxygen, 273K, 101.3kPa).
<p>Particulates: 27 mg/m³</p> <p>NOx: 115mg/m³</p>
r) Identify the exhaust gas efflux velocity (m/s).
The exhaust gas efflux velocity is 7.5m/s.
s) Provide the grid reference of boiler exhaust stack.
NJ 436 524

5. Fuel Details

Emissions from a biomass boiler depend greatly on the type and quality of the fuel used. Reasonable guarantees are therefore needed that the fuel is compatible with the boiler, is of a high quality and that quality will be assured for a reasonable period of time. Your fuel supplier and installer should be able to provide this information.

t) Describe the fuel specification including origin, type of wood (chips, pellet, briquettes), nitrogen, moisture, ash content (%).
<p>The fuel used with the boiler is wood pellets to EN14961</p> <p>Origin: Wood Biomass</p> <p>Type of Wood: Clean timber from forest, plantation or by-product of wood processing industry</p> <p>A0.7</p> <p>M10</p> <p>N1.0</p>
u) Does the fuel comply with European or equivalent fuel quality standards such as CEN/TS 14961:2005?
Yes
v) Describe what fuel quality control procedures will be adopted to guarantee constant fuel quality from your supplier.
Fuel to be provided by a recognised supplier. Fuel to be checked at random to ensure fuel meets quality standards.

w) Provide evidence to demonstrate that the biomass boiler combustion system is applicable to the fuel specification.
Fuel specification detailed within boiler operating manual
x) Identify where and how fuel will be stored on site (e.g. bunker or silo).
The fuel is stored in a purpose built silo adjoining the boiler room
y) Describe how fuel will be unloaded from the delivery vehicle into the storage facility and what control measures will be in place to reduce particulate matter emissions to atmosphere.
The fuel will be delivered into the fuel store by an HGV equipped with a pellet blower. The blower is connected to the fuel inlet pipe located outside the fuel store. Fuel can then be blown into the fuel store. Particulate matter emissions are reduced due to the boiler and feed system being switched off during delivery. A dust collection bag, carried by the delivery vehicle, is attached to the fuel store ventilation pipe.

6. Building Details

The height and distance of neighbouring buildings will determine their exposure to emissions from the biomass boiler, and therefore the height of the stack needed. Your architect should be able to provide this information.

z) Record the distance of adjacent buildings from boiler exhaust stack.
2.5m
aa) Record the height of adjacent buildings from boiler exhaust stack.
6.5 m

bb) Record the dimensions of building to which the boiler exhaust stack is attached.

2.8m

cc) Indicate the distance from the boiler exhaust stack to the nearest fan assisted intakes and openable windows.

Openable window about 6 m around corner of hall