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TECHNICAL SPECIFICATION

Glosfume have supplied a HTMC600 filter to Novalux Energy Solutions Ltd for use with the 1,200kW Kriger wood fired boiler. The filter can operate up to a maximum flow of 8,900 Actual m^3/hr with the boiler operating at a maximum of 1,200kW output, boiler flow rate quoted as 7,920Am^3/hr. The filter would be able to handle the peak flue gas flow rate at a filtration velocity of 1.8cm/s. The filter has been proven to reduce particulate matter to very low emission levels well below the required ELV or Clean Air Act requirement, including both PM_{10} and $PM_{2.5}$ to 1 mg/m^3 operating on biomass wood fuels, which typically is 3g/GJ at 11% flue gas oxygen level.

FILTER DUTY

a) Final emission level:	**Below 3mg/m^3, typically 1mg/m^3.**
b) Gas flow at filter inlet:	up to 8,900Am^3/hr.
c) Gas temperature at filter inlet:	220°C.
d) Estimated dust loading at inlet:	250 mg/m^3.
e) Pressure drop:	100 to 300mmWG, typically 200mmWg.
f) Absorbed power @ 220°C:	11.3kW.
g) Installed motor:	18.5kW.

FILTER SPECIFICATION

a) Maximum operating temperature:	At inlet 220°C.
b) Location:	Suitable for internal or external use. Panel requires to be under cover.
c) Filtration media:	Ultra-low pressures drop ceramic fibre with micro-porous finish. Filtration Efficiency after conditioning 99.99%.
d) Filter body construction:	Heavy duty construction manufactured in Mild Steel (MS).

EMISSION LIMITS

Providing the filter is fully serviced on a bi-annual (or annual) basis, the fuel specification is correct and boiler combustion operated within specification and to the guarantee below, the filter life expected would be 5 to 7 years or more. Total Particulate Emissions (TPM) from the filter would be unchanged in this period providing any filter element failure, noted on the emission monitor, are changed immediately, Glosfume have guaranteed materials and workmanship for 12 months from date of supply. Glosfume have ceramic filters operating on biomass wood, with all original elements intact, for over 8 years and still providing TPM emissions below 5mg/m^3. Emissions from the stack can only be guaranteed whilst the filter is online with the bypass shut.

GUARANTEES

All equipment is guaranteed against defects in materials or workmanship for 12 months from date of supply. Failure to comply with any of the following conditions will result in negation of this guarantee.

1. The boiler combustion must be complete and efficient at all times: Flue gas entering the filter shall be managed such as to prevent damage from condensable fractions, these include moisture, acids and organic hydrocarbons. Moisture and acid forming compounds are always present in flue gas from wood combustion; gases entering the filter shall be maintained well above the measured dew-point as determined for the fuel in use. Condensable hydrocarbons (e.g. tars) shall be avoided by ensuring appropriate boiler conditions at all times when the filter is in use. It is advisable to bypass the filter after starting when the boiler is cold until combustion is well established and the flue gas outlet temperature is stable. Condensation of tars and oils on the filter elements will rapidly degrade filter performance by permanently blocking the pores in the elements. To avoid tar production, do not operate the filter unless the following boiler operating conditions are met: 1. Fuel moisture must not exceed the boiler manufacturer's specified maximum and be within the commissioning parameters. 2. Control residual oxygen level must be maintained at the manufacturer's specified parameters. 3. Flue gas exit temperature must be to specification.

2. It is the responsibility of the boiler manufacturer or customer to confirm the boiler exhaust temperature and actual flow. Glosfume will not be responsible for over or under sizing of filtration units.

3. The Reverse Jet Clean down system needs to be in operation at all times and in full working order. If failure does occur then the filter needs to be taken out of operation while the relevant repairs are made before operation can be resumed. Failure to do so may result in the elements being overloaded with dust and therefore breakages may occur. 'Blinding' of the elements will increase the pressure drop to above 350mm WG.

4. The clean down interval and pressure is pre-set by Glosfume and adjusted to suit the boiler during commissioning. The settings must not be changed without first consulting Glosfume.

5. The automatic bypass damper and alarm conditions are pre-set by Glosfume and adjusted to suit the boiler during commissioning. Again these settings must not be changed without first consulting Glosfume.

6. Major fires within the filter must not be allowed to occur as temperatures above 450^{o}C will distort the filter body and fan set. Fires will cause particles to sinter on the elements, in time this will cause higher operating pressure drops resulting in reduced flow.

7. Failed elements need to be replaced as soon as practical and in accordance with the installation manual. The filter head must be thoroughly vacuumed out and clean before fitting new elements. If not then the dust will "sand blast" the inner wall of the element, causing premature element failure.

8. New elements need to be 'conditioned' before use with a suitable absorbent e.g. 2C talc.

9. Filters must be serviced by qualified personnel at regular intervals.