



Olympus Life Science Research Europa GMBH

Fuel Supply

Fuel Silo

The silo is manufactured from corrugated galvanised steel sheets, it is:



- Diameter: 6.24m
- Vertical wall height: 4.00m
- Total volume: 128m³

The usable volume is approximately 85m³, which is equal to 15 tonnes of wood chips at 35%MC. This is equal to about 230 full load hours, assuming 10 hours running time per day this equates to approximately 23 days.

The wood chips are delivered by tipper trailer into an above ground reception bin. The chips are conveyed from the bin by auger to a blower, which blows the chips into the silo. Using this system it takes about an hour to unload 6 tonnes of chips. The exhaust air is fed through a filtration system, preventing dust being blown around the site.



Once the desired moisture content is achieved, the logs will be chipped using a fuel wood chipper. These chippers are designed to produce woodchips, which conform to the standard set by the boiler manufacturers. These standards determine the cross sectional area of the chips and percentage of large or small pieces permitted in each load and the required moisture content.



Over sized chips can block the augers in the fuel feed system or too much dust can result in difficulties with ignition or the formation of clinkers on the grate.



Fuel Supply

The woodfuel will be sourced from either of two sources; the Olympus estate and privately owned plantations. Approximately 10ha of first thinnings will be required to meet the annual requirement of 120 tonnes. The annual fuel supply is planned on a five year cycle. The Olympus plantations will supply the annual requirement of wood for the first year of this cycle.



The remaining four years will be met by fuel wood sourced from locally owned plantations within a 15km radius of the Olympus site. To ensure continuity of supply a group of 10 growers has been established with the Olympus boiler as its focus. As these plantations mature younger ones will be added to ensure that there is always sufficient timber being produced to meet the demand.



The wood will be delivered as round logs to the purpose built storage yard. The logs will be piled with the cut ends facing south so that the prevailing wind can penetrate the pile, improving the drying conditions. The piles of logs are also covered using a reinforced, recyclable paper cover, which prevents rainfall wetting the logs.

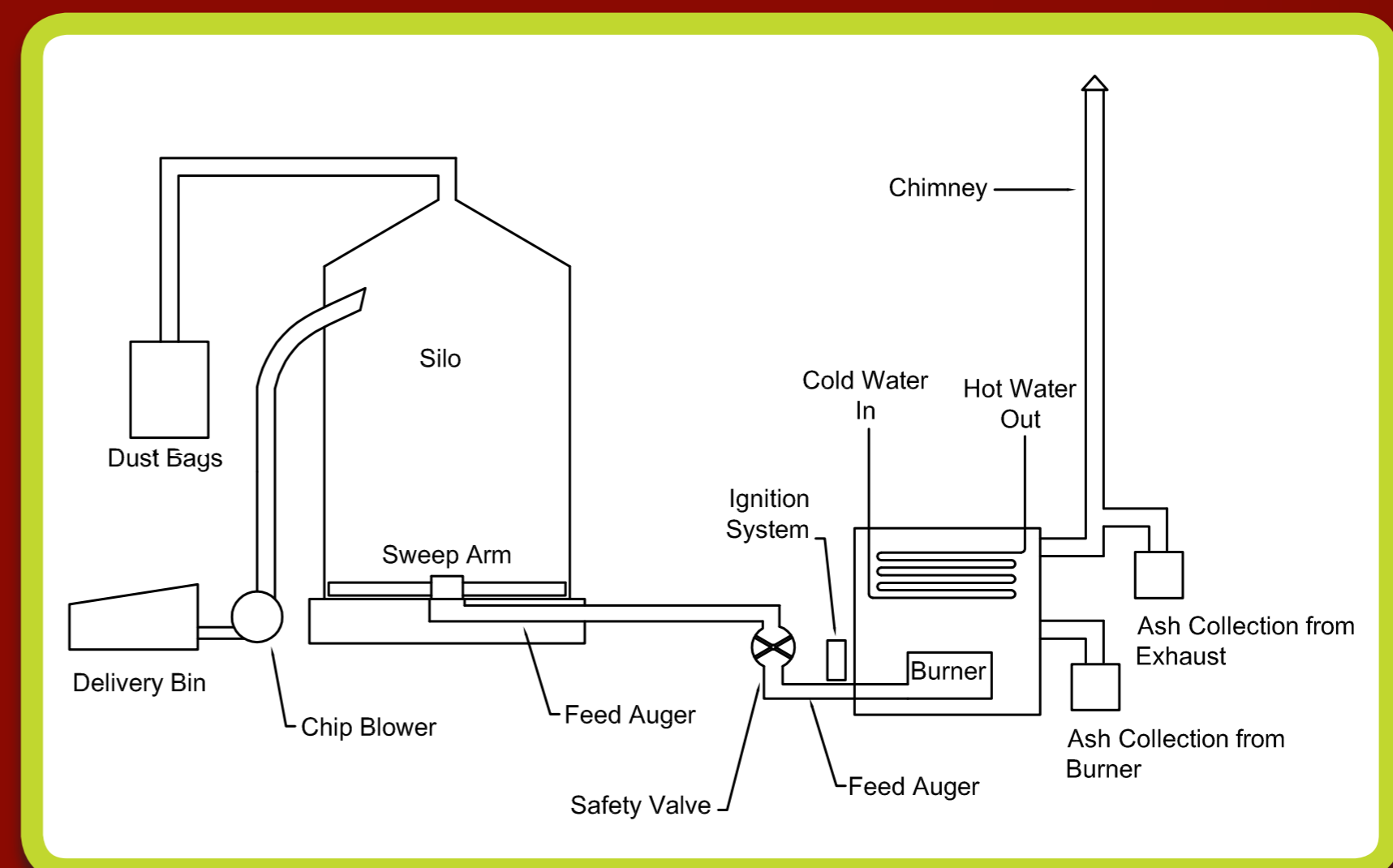


When the logs are delivered the moisture content is about 50-55%. The logs must be air dried down to a maximum moisture content of 35% before the logs are chipped. The time required to achieve this is a minimum of 12 months. It is best if the logs can be dried to a low moisture content as the energy yield per tonne increases as the moisture content decreases. The moisture content of the round logs is monitored during the drying process.

To ensure that the chips comply with the specifications, a sample of approximately 2.5kg is taken from each load. The moisture content of the sample is determined using microwave, the sample is then sieved, using a grader and the proportion of over sized pieces and dust is determined as a percentage of the total weight of the sample. A hard copy of the results is provided to both the suppliers and the end user.

The Olympus supply chain is different from other supply chains in the area in that Olympus will purchase freshly felled round logs and store them in their own drying yard. Furthermore, Olympus plan to build a storage shed, which will hold six weeks supply of wood chips. Chipping will be done on contract by a local chipping contractor.

By switching from fossil fuel to woodchips Olympus have forged closer links with the local community in that their suppliers are local growers, the material is harvested and processed by local contractors and a much larger proportion of the money spent on woodchips stays within the local community.



Olympus Schematics





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Boiler Installed March 2007 and commissioned April 2007

Technical Specifications

Summary

This system is a 220 kW Kob Pyrot biomass boiler, burning woodchips, to heat the Olympus building. The woodchip is stored in a 85m³ woodchip silo, which is automatically fed into the boiler via a fuel transfer auger. The system supplements two pre-existing Hoval ST-plus oil boilers rated at 587kW each, one of the existing boilers was retained and is used as a secondary backup heat supply.

As the boiler will only operate during the heating season, the estimated consumption of woodchips will be 120 tonnes per annum at an average MC of 35%.

A flue gas recirculation system reduces the temperature in the fire box while maintaining the highest possible degree of efficiency. This increases the service life of the uncooled refractory elements in the incineration zone. The ratio of recirculated gas to fresh air is geared precisely to the material to be burned. A mechanical flow volume regulator provides a constant ratio of the quantity of recirculated gas to fresh air over the entire output range.

The exhaust fan is specially designed for wood heating operation and is very quiet. The motor has a solid, heat resistant design with a heat dissipation hub and is spring-supported.



Spring-Operated Extraction System

The wood fuel is conveyed from the silo by means of a sweep mechanism with two profile articulated arms that fill an auger through recesses in the bottom. When the silo is full, the arms settle on a cup washer. They are driven by a worm-gear motor to the extraction auger via an angular gear to the sweeping mechanism. The spring operated extraction system is suited for round spaces.



Exhaust Gas De-Duster

The exhaust gas de-duster minimises dust emissions. The de-duster is completely insulated and provided with three lids for cleaning. The crude gas space is cleaned via the cleaning lid on the side. The clean gas chamber is cleaned via the top or rear cleaning lid. The ash container, which is provided with a trolley, connects to the de-duster by quick-action fasteners and moves out simply for emptying.

Sluice Valve

A fire protection device has been installed in the down pipe to mechanically separate the furnace and the pressureless fuel store. The sluice valve is opened with a motor and is closed by spring action.

Pneumatic Cleaning System

The system provides auger de-ashing from the ash chamber for the fire block into an externally situated movable galvanised ash bin (standard 240 litres). A light barrier control system keeps the level of the ashes constantly over the auger. As a result, the ash in the ash pan under the incineration system can burn out, and in normal operation only cool ash that has burned out is conveyed to the container.

KOB PYROT Rotation Heating System – The Boiler

The PYROT Rotation Heating System (patent no: EP 0 905 442 B1) was developed for automatic incineration of all dry to moist wood fuels (remnant wood, pellets and forest woodchips to a maximum moisture content of 35-40%). It is characterised by high efficiencies and perfect incineration at all load levels. It has been tested and approved in accordance with up to date quality criteria as per EN 303-5 Heating Boilers for solid fuels, CE-certification in accordance with the European Machinery Directive.

Ecotronic Control System

A microprocessor control system adjusts the heat output of the furnace in a modulating fashion. It allows:

- automatic ignition
- output and control circuits with modulating output operation (25%-100%)
- air-conducted by means of a speed-regulated exhaust fan, depending on the forward flow temperature
- re-supplying of fuel by the feed auger from the metering container with an isolating layer
- refilling of the metering container with the use of a level monitoring system
- limitation and distribution of the mass burning in the fire box by means of a level monitoring system in the fire box along with movement of the feed grate
- optimised air supply through motor-operated air vents for the best possible incineration using a lambda sensor
- upholding the return flow temperature with the boiler mixer provides for a long service life of the boiler.



How It Functions:

The feed auger conveys the material to be burned diagonally from below into the firing system. The holding devices for the burn-back sensor and the thermal extinguishing valve are situated on the conveyor pipe. Above the auger, there is a metering container with a light barrier to ascertain the level of the fuel isolating layer required.

The material to be burned is ignited automatically by an electric heat gun. The gasification of the fuel is carried out on a feed grate moved by a worm-gear motor. The ash falls into an ash bin below. The fire block is lined with highly refractory insulation and fired refractory concrete elements.



Operation of the control system is carried out by means of a control panel with a membrane keyboard and plain language display. All the operational data can be read on the display. The set points for all the important parameters can be entered using the keyboard. Malfunctions are displayed in plain language and indicated in the order of their occurrence.

The combustion gases rising from the fire block are swept up by the rotating secondary airflow brought to bear by the rotation blower and burned out completely in the round combustion chamber.

The thermal energy from the combustion gases is transmitted to the boiler water in a horizontally positioned pipe-type heat exchanger. The boiler is heavily insulated, with access through the boiler door on the end side.

