Lea Fields Crematorium

West Lindsey District Council
Gainsborough Road
Lea
Gainsborough
Lincolnshire DN21 2AA

Document LFC – C2

Description of the proposed installation and activities

The disposal of the dead by cremation constitutes the burning of a human body contained within a coffin made of wood or other suitable combustible material. Legislation requires that the process is carried out in such a way that potential pollutants in the emissions are minimised. Operators are also encouraged to adopt operating procedures which save fuel and consequently reduce carbon dioxide emissions.

To achieve this The Cremation Authority will install one Facultatieve Technologies FTIII cremator fuelled by natural gas. This machine meets the essential premise stated in relevant statutory legislation of achieving good combustion to control volatile compounds.

Also attached to the cremator will be flue gas cooling and filtration equipment. CO, dioxins and particulates are controlled through improved oxygen control techniques. Dioxins, mercury, hydrogen chloride and furans are removed through absorption abatement by a mixture of activated carbon and sodium bicarbonate neutraliser (trade name Factivate), the whole being removed from the flue stream, along with any remaining particulates, by a fibre filter. The spent reagent is predominantly in the form of sodium salts and will be removed from the site by a licensed contractor.

As the first step to controlling harmful emissions prior to cremation the applicant for cremation, or the funeral director on their behalf, shall submit a signed declaration on the preliminary application form, agreeing to abide by the requirements for the coffin and its contents to help comply with the requirements of PG5/2 (12), Section 5 Control Techniques, paragraph 5.20.

Foreseeable emissions to air

Emissions from the proposed plant will be those detailed in and at consecration levels in compliance with the required levels stated in Table 4 of PG5/2 (12).

The cremator

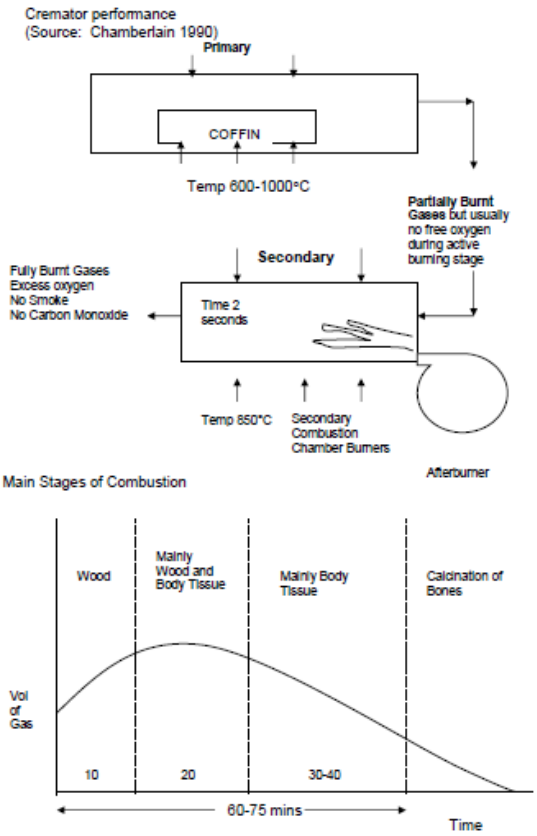
The cremator comprises a primary chamber, into which the coffin is inserted through an actuated charge door, and within which the primary combustion takes place. The charging door is interlocked to prevent the introduction of a coffin into the primary combustion zone unless the temperature in the secondary combustion zone exceeds 1073K (800ºC). The primary chamber hearth is flat and contains no openings, so that all materials are retained for combustion, and avoids the by-passing of flue gases.

The waste gas from this primary combustion phase exits the primary chamber via transfer ports and enters the secondary chamber in which the gas phase combustion takes place. To be compliant with Process Guidance Notes PG 5/2 (12) the secondary chamber maintains the flue gas combustion temperature at 800C minimum (when the abatement plant is operational), with a minimum gas residence time of 2 seconds during operation, and with an oxygen concentration of minimum 6% average measured wet or dry, and minimum 3%.

The cremator will have an automatic process control system, which supervises the operation of the cremator and a combustion process based upon a programmable logic controller (PLC) with dedicated operating software. An automatic data logging system which stores operational information and cremation data, is used to generate reports in a format fully compliant with PG 5/2 (12).

An internet Broadband link will allow remote technical support and enable technicians to remotely monitor cremator performance and to provide online fault diagnosis.

Please refer to document FTIII - UK - SE and FTL Compact Cooler SFGC UK Spec. for the technical specification.

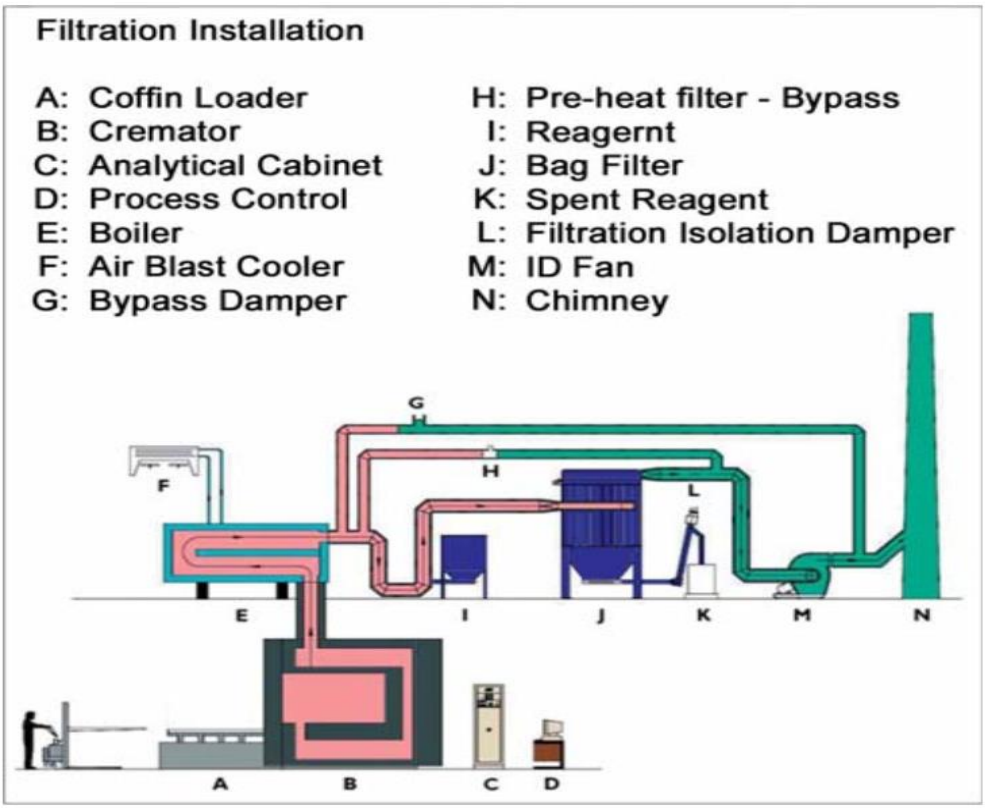


Stages of cremation – see ref LFC C-4

- First Phase: combustion of the coffin
- Second Phase : Combustion of the coffin and cadavar
- Third Phase: Calcination

Flue gas treatment

Hot gases leaving the cremator are cooled to around 120C by passing through a flue gas cooler (E) filled with a glycol/water mixture which is continuously circulated through an air blast cooler (F) to dissipate the excess heat to atmosphere. The Factivate mixture (I) is dosed into the cool gas stream which adsorbs mercury vapour and other potential pollutants, and is then captured by the bag filter (J) forming a filter cake. An automatic compressed air system for cleaning the fabric filter ensures there is sufficient additive on the filter, whilst ensuring that the gases pass freely through the filter. Spent reagent is collected in dedicated drums (K) which are sealed and transported to a specialist disposal and recycling centre under license. An ID fan (M) creates the required suction to draw the cleaned gas through the filter and finally through to the stack (N).



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Regent dosing station

The pre-mixed chemical reagent ‘Factivate’ is supplied in easily manageable sealed 15kg containers. The reagent is easily introduced into the automatic dosing station by inserting the closed container of reagent via the dedicated door which is then closed and sealed before the reagent is introduced, thus ensuring the automatic

addition of reagent under controlled, clean and safe conditions. Under fully controlled conditions the reagent is fed via a dosing screw into the gas stream and filtration system in the required amount necessary to ensure compliance with current emission regulations.

Continuous emission monitoring systems

- The cremator is supplied, as standard, with an extractive flue gas analysis system based the Fuji Electric Zr Oxide O2 analyser.
- Oxygen concentration at the outlet from the secondary chamber will be continuously monitored using a dedicated analyser.
- Particulate Control Measuring Equipment (PCME) will continuously monitor particulates, and reference levels will be set upon commissioning to provide a filter leak monitor.

Abnormal events

Control of emissions can be potentially affected by, for example, emissions going straight to atmosphere without being filtered (bypass) which happens mostly for safety reasons, for example in the event of a power cut to protect the equipment and help prevent fumes entering the crematory, or if the stack temperature rises too high risking a filter fire. Other issues which can affect emission control include burner failure, meaning the minimum secondary chamber temperature cannot be maintained, or failure of the oxygen monitoring equipment which controls the operation of the cremator.

Abnormal events will be dealt with in accordance with clause 4.42 of PG5/2(12). Procedure aside, in any such event which cannot be resolved immediately then the cremation in progress will be completed and no further cremations will be carried out until the problem is rectified. Permission will be requested of the regulator in the event of wishing to operate through the bypass vent for a temporary period whilst repairs are being carried out.

Cremation ashes and metal residues

At the end of each cremation cycle, when calcination is complete as required by PG5/2 (12) section 5 para 5.23 and the Code of Cremation Practice, the hearth is raked to move the cremation ashes through an integral ash chute into a refractory sump where the ashes are air cooled for one hour prior to removal in a covered stainless steel container. The cremator is now ready for the next cremation.

The cremation ashes are transferred from the cremator in a covered container, thus avoiding any particulate matter escaping into the atmosphere, and placed directly into a Cremulator, which works on the principle of a ball mill. The cremation ashes are then reduced to a fine granular consistency in the drum of the Cremulator which automatically separates any metal residues and places the resultant ashes directly into a temporary storage container. The metal residues are then removed from the drum at the end of each cycle.

Should the cremation ashes need to be transferred from the temporary storage container to another casket or urn, then this is carried out in the ashes transfer cabinet. The Cremulator and transfer cabinet both have an integrated dust

suppression system with a high efficiency air filter, thus preventing any escape of particulate matter.

In accordance with the instructions of the applicant for cremation the cremation ashes are either disposed of in the garden of remembrance at the crematorium or removed from the crematorium for disposal elsewhere.

Disposal of metal residues

The metal residues which result from the cremation process are placed within designated bins. Lea Fields Crematorium will be a member of the metal recycling scheme operated by the Institute of Cemetery and Crematorium Management, the profits from which are donated to death related charities. All metals are collected by a registered specialist recycling company connected with the scheme which is currently Orthometals B.V. which is based in Holland.