

Lea Fields Crematorium
West Lindsey District Council
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Key Stages of the Cremation Process

PRE-HEATING AND PURGING

The cremator, when first switched on each day, will go through a purge cycle. The control system will automatically check a number of key systems to ensure that the cremator can operate safely. Air will be introduced into the primary and secondary chambers from the air jets to push out any combustible gases out through the chimney via the flue ways..

Once the purge cycle is completed the pre-heating of the cremator can commence. The secondary chamber will, in accordance with the EPA 1990 Secretary of State's Guidance Notes – Crematoria PG5/2(LATEST VERSION), have to be preheated to 800°C before a cremation can take place (or 850°C in the case of abated cremators)

A lock-out switch on the charging door will prevent the cremator from being opened until the necessary temperature has been attained. The primary chamber will be preheated to approximately 650°C, to ensure that when the coffin is charged there is sufficient temperature in the chamber for combustion to commence.

CHARGING

The coffin is brought into the crematory after all the necessary administrative tasks have taken place and normally following a service in the chapel. It is carried on a wheel bier or automatic charging machine. The bier is positioned at the charging door and details (name(s), age, date of death) on the coffin plate checked against the identification card to ensure it is the correct coffin. The identification card can then be placed on the cremator (near to the primary chamber) to identify whose cremation is taking place. Before the coffin can be charged a number of criteria must be met. These will normally be attended to by the computer control system.

- a) The primary and secondary chambers must be at the required temperature.
- b) The burners in the primary chamber must be switched off. This is a safety requirement to reduce the possibility of the coffin igniting and the flame travelling along the coffin at speed out of the cremator (a 'flashback') and endangering the technician.
- c) The suction level must be high enough to prevent any fumes leaving the cremator and entering into the crematory when the coffin is charged.

Providing these criteria are met the operator can open the charge door and either manually push the coffin into the cremator or have it charged mechanically. The coffin should be pushed in with just sufficient force to position it centrally within the cremator, without it hitting the rear wall. The charge door should then be closed immediately. There will be an exit from the cremator available during the charging to allow the operator to escape from possible flashback. To protect the public from the same danger, family members wishing to witness the charging, (common amongst Sikhs), will be limited to a safe number and will be directed to stand well back behind a barrier by another member of staff, not the operator to ensure they do not interfere with the charging process, or block the operator's route of escape. A viewing area is to be provided.

FIRST PHASE: COMBUSTION OF COFFIN

When the charging door has closed, the process of cremation can begin. The control system ignites the burners in the primary chamber, to ignite the coffin, whilst top air is introduced. Due to the finish on the coffin and the plastic fittings, a lot of smoke can be produced during this first phase. This will be detected by the opacity meter, so air is introduced into the secondary chamber to ensure it is burnt off. As a result of the burners and air being introduced a sudden increase in pressure takes place within the cremator. This is monitored and the suction is increased accordingly.

As the process of combustion becomes established the temperature within the primary chamber increases rapidly.

SECOND PHASE: COMBUSTION OF THE COFFIN AND CADAVER

As the coffin burns away the primary source of combustion becomes the cadaver. The temperature rises to a peak during this phase and the maximum amount of volatiles are given off. The primary chamber burners are often automatically switched off during this phase, as the heat produced from the burning volatiles and air sustains the process of combustion of the cadaver. The remaining volatiles enter the secondary chamber where, once again, they are mixed with air and heat to be burnt off. As this is the hottest phase of the cremation process, the gases entering the secondary chamber are often in excess of the 800oc/850°C required in the Secretary of State's Guidance Notes – Crematoria PG5/2(LATEST VERSION). The temperature will thus be monitored and if it exceeds the required 800°C/850°C the secondary burners (in the secondary chamber) will either be reduced or switched off.

THIRD PHASE: CALCINATION

As the cadaver is reduced the amount of combustible material also decreases. The rate of combustion begins to decline and the temperature and pressure decrease within the primary chamber. This will be monitored and suction decreased accordingly. Since less air will be required to sustain the combustion process the top air jets will be switched off. But side air, at hearth level, will be introduced to help the combustion of any remaining material. In addition, primary chamber and secondary chamber burners will be switched back on. This is to ensure the temperature within the primary chamber remains high enough to sustain combustion and the temperature within the secondary chamber does not fall below the 800°C /850oc required by the Secretary of State's Guidance Notes – Crematoria PG5/2(LATEST VERSION). The cremation process, and this final phase, does not conclude until there is no longer any combustion taking place, in accordance with both the Code of Cremation Practice and the Guiding Principles:

'Once a coffin or container has been placed in the cremator, it must not be disturbed until the process of cremation is complete.'

Institute of Cemetery and Crematorium Management

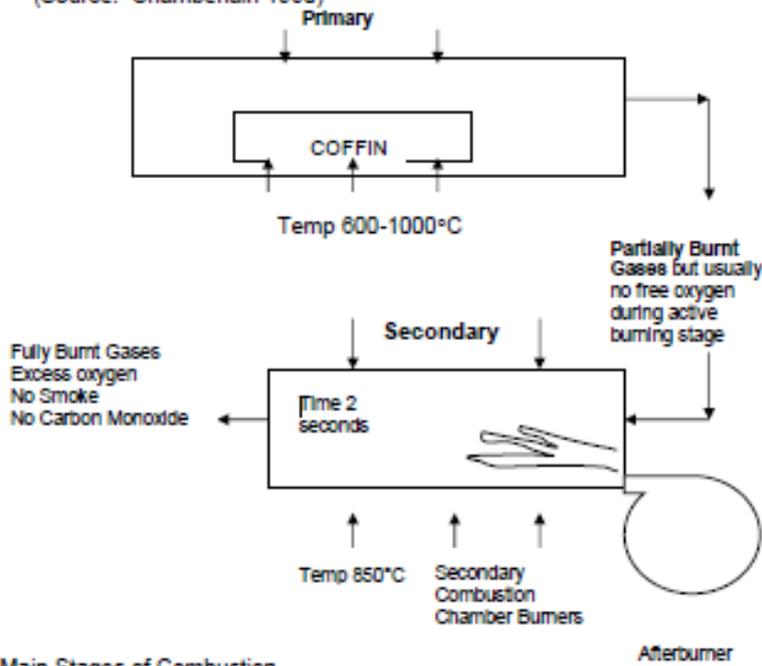
"Guiding Principles of the Charter for the Bereaved"

The combustion process is complete when the last flame from the cadaver and coffin has ceased.

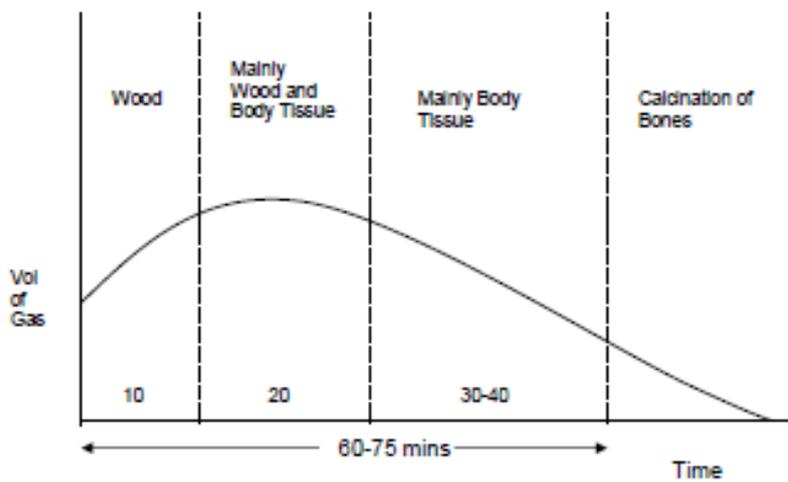
The high temperature will have calcified bones and the remaining skeletal material will be brittle. Coffin ash will also be present. However it would be difficult to distinguish in the smaller particles what is coffin ash and what is bone ash. The cremation is not complete if there are any flames and air jets and burners should continue to be used until combustion ceases i.e. the last flame has ceased.

Providing there are no flames, the cremation is complete and the operator can proceed to remove the cremated remains/ashes from the primary chamber.

Cremator performance
(Source: Chamberlain 1990)



Main Stages of Combustion



Source Institute of Cemetery & Crematorium Management **BTEC Certificate for ICCM Crematorium Technical Operations, accredited by Pearson**