

EMISSIONS, TECHNIQUES AND MONITORING

The point source of all emissions to atmosphere is confined to the plant chimney stack which has been designed to provide sufficient dispersion and dilution in the atmosphere to ensure that they ground at concentrations that are deemed harmless.

The Stack Discharge Height has been calculated in accordance with HMIP Technical Guidance Note (Dispersion) D1 as required by PG5/2(12) 5.39 (Document C2a D1)

There will be no emissions from any fugitive source (e.g. stockpiles or storage areas).

Emissions from the cremation plant will, in normal operation, which includes start up and shut down, be free from visible smoke.

All emissions to air will be free from persistent visible emissions and droplets, other than condensed water vapour.

There will be no odorous emissions from any part of the process as perceived by the regulator, and there will be no burning of materials, including waste, in the open air, inside buildings, or in any form of incinerator other than the cremator.

The concentration of emissions will not exceed the limits as specified by PG5/2(12) Table 4:

Reference conditions 273.1K, 101.3kPa, 11% oxygen/v dry gas

- Mercury 50 micrograms/m³
- Hydrogen Chloride 30 mg/m³ *hourly average*
- Particulate Matter 20 mg/m³ *hourly average*
- Carbon Monoxide 100 mg/m³ *2 x 30 minute averages*
- Organic Compounds 20 mg/m³ *hourly average*
- Dioxins & Furans 0.1 nanogram/m³

No monitoring has been undertaken as this a new site, however, the cremation and abatement plant to be installed here is identical to that installed at our The Vale Crematorium , which an extractive emission monitoring test was carried out by Davies & Co in November 2020.

The summary of results from this test are included to give an indication of the emission levels that are expected to be achieved at Waseley Hills Crematorium (Document C2b)

COMBUSTION CONDITIONS

Temperature

The temperature in the secondary combustion zone will not be less than 800^oC (1073K) measured at the last measuring thermocouple at the exit of the secondary combustion zone.

When operating under emergency conditions without abatement the temperature in the secondary combustion zone will not be less than 850^oC (1123K).

The charging system will be interlocked to prevent the introduction of a coffin to the primary combustion zone unless the temperature in the secondary combustion zone exceeds that specified.

Residence Time

The residence time in the secondary zone will be a minimum of 2 seconds without correction for temperature, oxygen or water vapour.

Oxygen

At the outlet of the secondary combustion zone the oxygen concentration will be a minimum average of 6% measured wet or dry, and a minimum of 3%.

BEST AVAILABLE TECHNIQUES USED TO MINIMISE EMISSIONS

Mercury

Mercury emissions are abated from the cremator flue gases by injecting powdered reagent - activated carbon into the gas stream which adsorbs the mercury vapour, which is then captured by the fabric bag filter.

The spent reagent is collected in dedicated drums which are sealed and transported to a specialist recycling company under license, to recover the mercury for recycling.

Hydrogen Chloride

The levels of Hydrogen Chloride from cremations have reduced over recent years, mainly due to guidelines on materials which may be used in coffin manufacture, and due to avoiding the use of chlorinated materials within the coffin.

The levels of HCL are further reduced by post cremation flue gas treatment which neutralises the acidic components of the flue gases by reaction with the powdered alkaline reagent.

The reaction products are separated, as solid material, from the flue gases by the fabric bag filter.

Particulate Matter

Particulate Matter reduction is achieved by efficient combustion in the secondary combustion zone of the cremator where gases are held for a minimum of 2 seconds at a minimum of 800°C.

Particulate Matter concentrations are further reduced in the cremator flue gases by the fabric bag filter as part of the mercury abatement system.

Carbon Monoxide

Carbon Monoxide reduction is achieved by efficient combustion in the secondary combustion zone of the cremator where the gases are held for a minimum of 2 seconds at 800°C.

Organic Compounds

Volatile Organic Compounds are released as by-products of incomplete combustion.

VOC reduction is achieved by efficient combustion in the secondary combustion zone of the cremator where gases are held for a minimum of 2 seconds at 800°C.

Dioxins and Furans

Dioxins and Furans are common by-products from the combustion of organics in the presence of chlorine.

Dioxin/Furan emission levels are minimised by good combustion in the secondary combustion zone and low particulate matter emissions.

PCDD/F are further reduced by avoiding the use of PVC and Chlorinated materials within the coffin, and lessened by the mercury abatement system.

Odour

Odour is prevented by efficient combustion in the secondary combustion zone.

EMISSION MONITORING

Continuous Monitoring

Carbon Monoxide concentration is measured by extractive sampling from the flue gases through an electrochemical based analyser – Fuji ZRJ Multi Gas Analyser.

Particulate Matter concentration is continuously monitored by an electrodynamic probe – PCME. Normal particulate levels in the flue gases following the fabric filter are extremely low, often close to or below the limits of detection. Therefore, the particulate monitor is set to manufacturers parameters and functions as a filter leak detector.

During operation, including start-up and shut-down, all continuously monitored data and temperatures are logged by the computer software which produces cremation reports, daily reports, weekly reports and monthly reports which are stored on the computer and easily accessed for the regulator to examine.

The monthly reports are forwarded to the regulator every 6 months as required by PG5/2(12) 4.37.

Continuous Monitoring Equipment will have visual alarms and each alarm event will be recorded.

Non-Continuous Emission Testing

Emissions will be tested annually by an independent specialist company for mercury, hydrogen chloride, particulate matter, carbon monoxide and organic compounds, to demonstrate compliance with the emission limits specified in Table 4 of PG5/2(12).

The proposed test methods for each pollutant will be:

Mercury	BS EN 13211
Hydrogen Chloride	BS EN 1911 Parts 1 – 3
Particulate matter	BS EN 13284 Part 1
Carbon Monoxide	BS EN 15058
Organic Compounds	BS EN 12619
Oxygen	BS EN 14789

The regulator will be notified at least 7 days in advance of any extractive emission monitoring exercise, and the results of each exercise will be forwarded to the regulator within 8 weeks of the completion of the sampling.

Failure of Abatement Plant

In the event of a failure of the abatement plant where there is only one gas cleaning system, the temperature of the secondary combustion zone will automatically increase to a minimum of 850°C and cremations will continue for up to 48 hours to provide an opportunity for the necessary repairs to be completed as required by PG5/2(12) 5.17.

The regulator will be notified immediately.