HELCOM RECOMMENDATION 29/1

Adopted 5 March 2008
having regard to Article 20, Paragraph 1 b)
of the Helsinki Convention

REDUCTION OF EMISSIONS FROM CREMATORIA

THE COMMISSION,

RECALLING Paragraph 1 of Article 6 of the Convention on the Protection of the Marine Environment of the Baltic Sea Area, 1992 (Helsinki Convention), in which the Contracting Parties undertake to prevent and eliminate pollution of the Baltic Sea area from land-based sources by using, *inter alia*, Best Environmental Practice for all sources and Best Available Technology for point sources,

HAVING REGARD also to Article 3 of the Helsinki Convention, in which the Contracting Parties shall individually or jointly take all appropriate legislative, administrative or other relevant measures to prevent and abate pollution in order to promote the ecological restoration of the Baltic Sea area,

RECALLING ALSO Article 5 of the Convention on the Protection of the Marine Environment of the Baltic Sea area, 1992 (Helsinki Convention), in which the Contracting Parties undertake to prevent and eliminate pollution of the marine environment of the Baltic Sea caused by harmful substances,

RECALLING that mercury was identified by HELCOM in 1998 as a chemical for priority action,

RECOGNISING that the practice of cremation raises sensitive cultural and societal issues, and that there are different attitudes and approaches among Contracting Parties that need to be respected in addressing the environmental problems concerning crematoria,

RECOGNISING ALSO that the costs of fitting existing crematoria with flue gas cleaning system could be excessive,

NOTING that “Crematorium” means an establishment for the disposal of human remains by cremation,

RECOMMENDS that the Governments of the Contracting Parties to the Helsinki Convention take the following measures for crematoria with a capacity exceeding 500 cremations/year:

1. Application of BAT

1.1. Contracting Parties should ensure that the operators of crematoria apply BAT at their crematoria to reduce emissions, especially to prevent the dispersal into the environment of mercury from human remains, especially from dental amalgam.

1.2. The specific techniques to be applied will depend not only on the size, construction, economic feasibility, location and age (new or existing) of the crematorium furnace, but also on the societal and cultural practices associated with cremation in the Contracting Party, or the region of the Contracting Party, concerned.

1.3. By limiting the introduction of harmful materials contained in coffins into the cremator in the first place one can lower emissions (no PVC plastics, solvent free glues, paints and varnishes, etc.).

1.4. In deciding what is BAT, either in general or in individual cases, Appendix 1 provides examples of techniques that could be used in order to minimise emissions (particularly of mercury)

2. Operation of the crematoria

2.1. The temperature of the flue gas before entering the chimney should be at least 110°C.

2.2. The temperature in the afterburn chamber of the oven should be controlled and should be both before the insertion of the coffin and during the cremation at least 800°C.

2.3. The addition of combustion air should be controlled by the influx of oxygen. The content of O_2 should be at least 4%.

3. Requirements for the reduction of emissions to the air and discharges to water

The crematoria should be provided with a flue gas cleaning system like listed in para 1.4 or operated in a way that ensures that the following limit values will not be exceeded:

Table 1

Substance	Limit values - mg/normal m^3 *
Total dust	10
CO	50 – (500)**
Hg	0.1

* Mg/normal m^3 means mg substance pr. m^3 dry flue gas calculated at O°C and 101.3 kPa at an oxygen-content between 11% and 15%.

** 500 mg CO/normal m3 can be accepted in maximum two minutes.

Analysis of substances above should follow applicable CEN-standards.

The discharges of waste water from cleaning of exhausted gases should not exceed the emission levels adopted in national regulations of the Contracting Parties.

4. Measurement and analyzing methods

The installation should be equipped with technique to control, regulate and monitor the combustion process.

A. The equipment should as minimum show the temperature in the afterburning chamber and include automatic measurement of O_2 and CO concentrations. The crematoria should keep record of these parameters for each cremation. Furthermore the temperature in the afterburning chamber and chimney and the content of O_2 and CO in the fluegas.

B. **After entry into force of the Recommendation and** at the latest three months after a new installation has been started up a performance test should be implemented: three single measurements each with a duration equivalent to one cremation should be accomplished with the aim of documenting that limit values for emission in Table 1 are observed.

Internationally accepted standardized sampling, analyzing and quality assurance methods (e.g. CEN-Standards, ISO-Standards, OECD-Guidelines) should be used whenever available.

RECOMMENDS FURTHER that the Contracting Parties report on the implementation of the Recommendation to the Commission, based on reporting requirements developed by the Land-based Pollution Group,

RECOMMENDS FURTHER that the provisions of the recommendation applies immediately for installations established after **1 January 2010** and to existing installations within the scope of the recommendation from **1 January 2015**. If existing installations are significantly changed, the recommendation applies to these immediately.

Appendix 1

Examples of Techniques

1. Introduction

This appendix describes a number of techniques and practices which can either prevent or reduce mercury emissions from crematoria. The list is not exhaustive, and additional factors such as the temperature at various stages in the cremation cycle, the residence time of the flue gas in the afterburn chamber and the height of the stack which emits waste gases may also need to be considered as required in Paragraph 2 of the Recommendation. Steps should be taken to ensure that mercury removed from flue gases is not transferred to other environmental compartments.

2. Removal of mercury from flue gases during the cremation cycle

2.1 There are a number of methods which limit the emission of mercury via flue gases. The following section describes those which are currently available.

The Co-flow filter

2.2 In this process an adsorbant is injected into the flue gases, after which adsorption of the mercury takes place in the flue gas channel or in an installed reaction chamber. The adsorbent is removed from the flue gases in an "end of pipe" cloth filter. An adsorbent layer is formed on the cloth filter, so that extra filtering of the flue gases takes place. Removal efficiencies in excess of 98% and mercury concentrations in flue gas in the range of 0,001-0,1 mg/Nm³ are reported for this technique in large installations.

The Solid-bed filter

2.3 In this process, the flue gases are guided through the filter material, whereby the pollutants are left behind in the adsorbent. The filter must be regularly replaced or regenerated on site. In practice, solid-bed filters, with adsorbents such as cokes or zeolites, are applied for the removal of mercury and dioxins. It is reported that this type of filter can also achieve a removal efficiency of well over 90% (up to 99.9% for mercury concentration in flue gas of 0,005 mg/Nm³).

Gas Scrubbing

2.4 Traditional gas scrubbing and quenching are also effective for reducing emissions to air. Emission measurements for the flue gas treatment show that this technique reduces the mercury concentration in the flue gases to approximately 0.1-0.2 mg/m³.

Honeycomb Catalytic Adsorber

2.5 This precious metal (gold/platinum) catalytic adsorber is specially designed for mercury removal (honeycomb structure). The functional principle is based on a catalytic reaction with an operating temperature of 75 °C. An upstream removal of particulates (e.g. fabric filter) is also required. A removal efficiency of 99.9% (mercury concentration of flue gas of 0.005 – 0.013 mg/Nm³) is reported.