Releases from waste incinerators

Version 4

Guidance on assessing group 3 metal stack emissions from incinerators

Scope

This guidance is for Applicants for environmental permits for Municipal Waste Incinerators (MWI) and Waste Wood Co-incinerators under Paragraph 5.1, Schedule 1, of the Environmental Permitting Regulations 2010 (EPR).

It relates to air quality impact assessments from Group 3 metals emissions to air. Metals assessments from other plant may only use the method in this guidance if they can show the data is representative.

Background

Applicants should predict the process contribution (PC) of their plant compared to the environmental standards in our risk assessment guidance[1].

The Industrial Emissions Directive (IED) has a mandatory Emission Limit Value (ELV) of 0.5 mg/m³ aggregated for nine Group 3 metals (antimony, arsenic, chromium, cobalt, copper, lead, manganese, nickel, vanadium and their components). Conservatively assuming each metal comprises 100% of this limit could result in exceedances of the environmental standards. Where this theoretical risk exists, we require a more detailed assessment using more realistic emissions data.

Detailed Modelling Assessment Methodology

Step 1 - worst case screening

Make predictions based on assuming each metal is being emitted at 100% of the group ELV (i.e. 0.5 mg/m³). Where the PC of any metal exceeds 1% of a long-term or 10% of a short-term environmental standard we consider this a potential for significant pollution. Under these circumstances the predicted environmental concentration (PEC) should be compared against the environmental standard. If the PEC is greater than 100% of the environmental standard proceed to step 2.

Step 2 - Case specific screening

Use the maximum emissions data listed in Appendix A to revise your predictions. Where the PC of any metal exceeds 1% of a long-term or 10% of a short-term environmental standard the PEC should be compared against the environmental standard. This can be screened out where the PEC is less than 100% of the environmental standard.

We require Applicants to justify their use of any data lower than the maximum emission concentrations listed, i.e. where using the maximum emission concentration cannot be screened out. We also require applicants to provide evidence for any chromium VI background levels of less than 20% of total background chromium.

[1] Environment Agency and Department for Environment, Food & Rural Affairs, Environmental management – guidance Air emissions risk assessment for your environmental permit : https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit

Appendix A

Table A1 contains a summary of 34 measured values for each metal recorded at 18 MWI and Waste Wood Co-incinerators between 2007 and 2015. Note these data may differ from previous guidance notes.

Table A1- Monitoring data[a] from Municipal Waste Incinerators and Waste Wood Co-Incinerators

Pollutant	Measured Concentrations (mg/Nm³)			Percentage of the IED group 3 ELV		
	Max	Mean	Min[b]	Max	Mean	Min[b]
antimony	0.0115	0.0014	0.0001	2.3%	0.3%	0.02%
arsenic	0.0250	0.0010	0.0002	5.0%	0.2%	0.04%
total chromium	0.0920	0.0084	0.0002	18.4%	1.7%	0.04%
chromium VI[c]	1.3×10^{-4}	3.5×10^{-5}	2.3×10^{-6}	0.03%	0.01%	0.0005%
cobalt	0.0056	0.0011	0.0002	1.1%	0.2%	0.03%
copper	0.0290	0.0075	0.0019	5.8%	1.5%	0.4%
lead	0.0503	0.0109	0.0003	10.1%	2.2%	0.1%
manganese	0.0600	0.0168	0.0015	12.0%	3.4%	0.3%
nickel[d]	0.2200	0.0150	0.0025	44.0%	3.0%	0.5%
vanadium	0.0060	0.0004	0.0001	1.2%	0.1%	0.0%

[a] Note all data are referenced to 11% oxygen. Guidance on conversion between oxygen contents can be found in Part 7 Annex VI of the IED.

[b] Minimum values correspond in some cases to the detection limit.

[c] Chromium VI concentrations presented in the table are based on stack measurements for total chromium and measurements of the proportion of chromium VI (to total chromium) in Air Pollution Control (APC) residuals collected at the same plant.

[d] The two highest nickel concentrations are outliers being 44%, as above, and 27% of the ELV. The third highest concentration is 0.53 mg/Nm³ or 11% of the ELV.