



Rijkswaterstaat
Ministerie van Infrastructuur en Milieu

Use of BAT at waste incineration plants in the Netherlands to reduce emissions of hexachlorobenzene

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Colophon

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This report was produced in cooperation with the Netherlands Waste Incineration Sector Team.

Although this report was prepared with the utmost care, the Directorate-General for Public Works and Water Management ('Rijkswaterstaat') declines any and all liability for errors.

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Introduction

The volume of incinerated waste has been increasing in the Netherlands in recent years. Twelve percent more waste was incinerated in 2011 than in 2010, followed by a further volume increase in 2012. This upward trend may be attributed to an increase in incineration capacity. Much of the new capacity is being used for imported waste (approximately 250 kton extra) and waste dug up from landfills (350 kton)¹.

The increase in the total volume of incinerated waste results in an increase in hexachlorobenzene (HCB) emissions by waste incineration plants, as explained below. In the Netherlands no other source categories contribute to the reported HCB-emission levels.

The individual waste incineration plants (WIPs) do not report on hexachlorobenzene in their Pollutant Release and Transfer Registers. As they do not exceed the reporting threshold of 10 kg of hexachlorobenzene, reporting is not mandatory. The HCB emissions have been included in the upward adjustment of emissions since 2005. The European CORINAIR database states an emission factor of 2 mg/ton of waste for HCB emissions by waste incineration plants. In 2011, the Netherlands Organisation for Applied Scientific Research (TNO) produced an estimate of the HCB emission factor for the situation in the Netherlands, where use is made of the Best Available Technology (BAT) at all waste incineration plants. The emission factor applicable specifically to the Netherlands is 0.2 mg/ton. The upward adjustment for HCB emissions was calculated using this emission factor and the total weight of incinerated waste. Approximately 8 Mton of waste was incinerated in the Netherlands in 2012, so the upward adjustment works out to approximately 1.6 kg of HCB. In the second half of 2013, TNO will check whether the emission factor applied for emissions registration purposes in the Netherlands is still up-to-date or requires review .

This report provides an overview of waste incineration plants in the Netherlands. Information is provided on the BAT being used at each plant to reduce emissions of hexachlorobenzene.

¹ Data on waste processing in the Netherlands, 2011

1 Dutch legislation

The conditions for operating waste incineration plants set out in Article 50 of the EU Directive on Industrial Emissions has been implemented in the Netherlands in the Regulation on Environmental Management Activities (*Activiteitenregeling Milieubeheer*). Article 5.23 (1) (b) includes the requirement that gas resulting from waste incineration must have a combustion temperature of at least 850°C and a residence time of at least two seconds, after the final injection of combustion air. This requirement has been embodied in legislation to ensure the incineration of compounds like dioxins and PCBs. The incineration temperature in combination with the residence time is a BAT conclusion for waste incineration plants.

All Dutch waste incineration plants satisfy this legal requirement.

2 Best Available Techniques

Waste incineration plants in the Netherlands are equipped with activated carbon filters to remove dioxins and mercury from flue gases. An active carbon filter also removes HCBs. The incineration temperature in combination with the residence time is a BAT conclusion: 850°C for domestic waste and 1100°C for hazardous waste.

The Waste Incineration BAT Reference Document (2006) designated an activated carbon filter as the BAT. An overview of waste incineration plants in the Netherlands and a description of the technologies that they use can be found in Chapter 3.

3 Overview of waste incineration plants and BATs used

Province of Groningen

Name of site:

1. E.ON (EEW)

Technology used to minimize hexachlorobenzene emissions

This site uses two identical lines. Both have an incineration temperature of at least 850°C and a residence time greater than 2 seconds, in accordance with Article 5.23 of the Regulation on Environmental Management Activities. Both lines use a gas scrubber with a mixture of active carbon and lime.

Province of Friesland

Name of site:

2. REC Harlingen

Technology used to minimize hexachlorobenzene emissions

The combustion gases of this line satisfy the 850°C / 2 seconds rule laid down in Article 5.23 (1) (b) of the Regulation on Environmental Management Activities. The combustion gases are cleaned by methods including the injection of active carbon. Bound pollutants are captured by a cloth filter. No hazardous waste is incinerated at the REC site.

Company information about the technology used:

http://www.omrin.nl/Over_Omrin/REC_Harlingen/Rookgasreiniging.aspx

Province of Drenthe

Name of site:

3. Attero Noord BV

Technology used to minimize hexachlorobenzene emissions

The incineration temperature is at least 850°C, the residence time exceeds 2 seconds and an active carbon filter is in place.

Company information about the technology used:

www.attero.nl/nl/bedrijf-organisatie/activiteiten/energie-uit-afvalenergiecentrales/emissies/

Province of North Holland

Name of site:

4. HVC waste incineration plant, Alkmaar site

Technology used to minimize hexachlorobenzene emissions

This site has four incineration lines and a Bio-Energy Station. The requirement of a residence time of 2 seconds at 850°C applies to all five lines. Flue gas cleaning includes injection of active carbon to reduce emissions of PCDD/F, heavy metals and thus also HCB.

Name of site:

5. AEB, Amsterdam

Technology used to minimize hexachlorobenzene emissions

The Waste Energy Station has four incineration lines and the High Efficiency Station has two lines. The lines are subject to the aforementioned requirements and flue gas cleaning techniques.

Province of South Holland

Name of site:

6. HVC Baanhoekweg, Dordrecht

Technology used to minimize hexachlorobenzene emissions

Refer to the annex to the HVC Environmental Report for 2012 (figures on pages 7, 8 and 9). Additional information: Furnace 1 and Furnace 4 each have a capacity of 7 tons per hour, while Furnace 5 (new) has a capacity of 32 tons per hour.

Name of site:

7. ZAVIN

Technology used to minimize hexachlorobenzene emissions

The incineration temperature is at least 850°C, the residence time exceeds 2 seconds, and an active carbon is in place to reduce emissions of PCDD/F, heavy metals and thus also HCB. Also refer to the ZAVIN Environmental Report for 2008, page 7.

Company information about the technology used:

www.zavin.nl/athena/site/php/page_show_21.html

Name of site:

8. AVR Rijnmond, Gerbrandyweg

Technology used to minimize hexachlorobenzene emissions

The incineration temperature is at least 850°C, the residence time exceeds 2 seconds, and an active carbon filter is in place to reduce emissions of PCDD/F, heavy metals and thus also HCB.

Comment [DBF1]: In de brontekst staat hier geen komma tussen, maar volgens onze informatie gaat het hier om twee aparte categorieën. Dezelfde passage komt hieronder nog een aantal keren voor.

Name of site:

9. Sludge incineration plant of the HVC group (formerly DRSB) in Dordrecht

Technology used to minimize hexachlorobenzene emissions

This site has three incineration lines that are subject to the requirement of a residence time of 2 seconds at 850°C. Flue gas cleaning includes injection of active carbon to reduce emissions of PCDD/F, heavy metals and thus also HCB. Also refer to the description of flue gas cleaning on page 6 of the 2012 Annual Environmental Report.

Province of North Brabant

Name of site:

10. AEC Moerdijk (Attero BV)

Technology used to minimize hexachlorobenzene emissions

The incineration temperature is at least 850°C, the residence time exceeds 2 seconds, and active carbon is injected to reduce emissions of PCDD/F, heavy metals and thus also HCB. Also refer to the information provided by the company.

Company information about the technology used:

www.attero.nl/nl/bedrijf-organisatie/activiteiten/energie-uit-afvalenergiecentrales/emissies/

Name of site:

11. SITA ReEnergy, Roosendaal

Technology used to minimize hexachlorobenzene emissions

The incineration temperature is at least 850°C, the residence time exceeds 2 seconds, and active carbon is injected to reduce emissions of PCDD/F, heavy metals and thus also HCB.

Name of site:

12. Waste terminal Moerdijk

Technology used to minimize hexachlorobenzene emissions

The incineration temperature is at least 850°C, the residence time exceeds 2 seconds, and active carbon is injected to reduce emissions of PCDD/F, heavy metals and thus also HCB. Also refer to the information provided by the company.

Company information about the technology used:

<http://www.atmmoerdijk.nl/web/Over-ATM/Verwerkingsinstallaties/Thermische-Reiniging/Procesbeschrijving.htm>

Name of site:

13. Sludge incineration plant, Moerdijk

Technology used to minimize hexachlorobenzene emissions

The incineration temperature is at least 850°C, the residence time exceeds 2 seconds, and active carbon is injected to reduce emissions of PCDD/F, heavy metals and thus also HCB. Also refer to the information provided by the company.

Company information:

<http://www.snb.nl/feiten-en-cijfers/milieu/1197>

Province of Gelderland

Name of site:

14. ARN B.V.

Technology used to minimize hexachlorobenzene emissions

This site has two incineration lines. Both are subject to the requirement of a residence time of 2 seconds at 850°C. Flue gas cleaning includes injection of active carbon to reduce emissions of PCDD/F, heavy metals and thus also HCB. Also refer to the ARN Annual Environmental Report for 2013 (figure on page 77).

Name of site:

15. AVR Afvalverwerking BV, Duiven

Technology used to minimize hexachlorobenzene emissions

The incineration temperature is at least 850°C and the residence time exceeds 2 seconds. Also refer to the company's Sustainability Report for 2012

Province of Overijssel

Name of site:

16. Twence Afval & Energie

Technology used to minimize hexachlorobenzene emissions

This site has three incineration lines. Besides adherence to the requirement of a residence time of 2 seconds at 850°C, a number of other methods are used to influence HCB emissions, mainly in adsorption processes:

- In active carbon
- On fly ash
- On the DeNOx catalyst package

Company information about the technology used:

www.twence.nl/wat%20doet%20twence/techniek%20afvalverwerking/070828_rokgasreiniging_def.doc/