State of the Art for Waste Combustion using Fluidised Bed Technology

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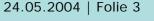
operate a plant according to the relevant laws





- it's a long list of relevant laws
- which law is the most relevant (e.g. IPPC, WID)?
- ▶ law ≠ permit ≠ operation of the plant
- state of the art / best available techniques: "open" definition, dynamic, allows interpretation
- emission limit values: restrictive (minimum standards), static
- some kind of contradiction in itself: ...a plant should be operated according to state of the art AND has to observe the following ELVs...
 - periodically update of ELVs is necessary!







Example

Waste Incineration Plant, commissioned 1995; throughput: 110.000 t/a

- Clean Air Ordinance for Steam Boiler Units: ELV for PM = 20 mg/Nm³ (hmv)
- Permit: ELV for PM = 8 mg/Nm³ (hmv)
- Emission value: 0.5 2 mg/Nm³ (hmv)

State of the Art???



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State of the Art for waste combustion using fluidised bed technology is not only to operate a plant according to the relevant laws





Important laws

EU

- Waste Incineration Directive (2000/76/EC)
 - requirements for operation of waste incineration plants
 - limit values for emissions of pollutants into air
 - limit values for the discharge of waste water from flue gas cleaning





Important laws

EU

- IPPC-Directive (1996/61/EC)
 - general principles governing the basic obligations of the operator
 - protect the environment as a whole through application of the best available techniques
 - follows an integrated approach
 - prescribes no emission limit values
 - wide range of industrial activities
 - ... energy is used in the most efficient way
 - ... existing plants are operated according to state of the art from the year 2007 on
 - ... permit conditions are periodically reconsidered and updated
 - ... use of low waste technology
 - ... recovery and recycling of waste, where appropriate





IPPC-Directive (1996/61/EC)

→ The Commission shall organize an exchange of information between Member States and the industries concerned on best available techniques, associated monitoring, and developments in them.





Exchange of Information

- → Exchange of information: BAT Reference documents (BREFs)
- → Responsible: The European IPPC Bureau: http://eippcb.jrc.es/
- → BREF should
- offer information to the competent authorities of Member States, industrial operators, the Commission and the public at large
- should serve as a driver towards improved environmental performance across the European Union
- → BREFs do not prescribe techniques nor emission limit values
- → Specific Technical Working Group
 - BREF for Waste Incineration: current state = second Draft (March 2004); finalisation: end of 2004







General BAT for Waste Incineration (2nd Draft: March 2004)

- → 75 techniques are identified as general BAT
 - Waste input/storage/pre-treatment
 - Combustion conditions
 - Furnace design
 - > Energy efficiency
 - Fluegas treatment including BAT associated Emission levels
 - Discharges of waste water including BAT associated Emission levels
 - > BAT concerning solid waste from incineration

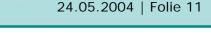






General BAT for Waste Incineration (2nd Draft: March 2004)

- → Fluidised Bed Combustion is not separately adressed, but combustion of different types of waste:
 - → municipal waste
 - → pretreated or selected municipal waste
 - → sewage sludge
 - → hazardous waste
 - → clinical waste
- → There is not one BAT but a variety of possible combinations of techniques







Austrian contribution to the BREF

- Study: "State of the Art for Waste Incineration Plants" (BMLFUW/Umweltbundesamt, 2002)
 - Technologies for flue gas cleaning
 - Description of single Plants
 - > Estimation of costs
 - State of the art
 - **>** ...





BAT associated Emission Levels – Air Pollutants

Pollutant	Unit	2. Draft (Proposal for BATAEL; hmv)	Austrian Proposal (BMLFUW/Umwelt- bundesamt; hmv)
Total dust	[mg*Nm ⁻³]	1 - 15	< 0.1 - 2
SO ₂	[mg*Nm ⁻³]	1 - 50	< 10 ⁽¹⁾ , < 50 ⁽²⁾
HCI	[mg*Nm ⁻³]	1 - 30/20 ⁽⁶⁾	< 1 ⁽¹⁾ , < 5 ⁽²⁾
N ₂ O	[mg*Nm ⁻³]	< 15	-
NO _x	[mg*Nm ⁻³]	30/40 ⁽⁴⁾ - 220/200 ⁽⁶⁾	< 50
CO	[mg*Nm ⁻³]	1 - 100 ⁽⁴⁾ , 2 - 50	< 30
Hg	[mg*Nm ⁻³]	< 0.03/0.02 ⁽⁵⁾	< 0.002 (3)
PCDD/F	[ng*Nm ⁻³]	< 0.05	< 0.05

(1) raw gas concentration of \leq 600 mg*Nm⁻³ for SO₂ and \leq 1000 mg*Nm⁻³ for HCl

(2) raw gas concentration > 600 mg*Nm⁻³ for SO₂ and > 1000 mg*Nm⁻³ for HCl

(3) using a wet scrubber and an activated coke filter

(4) municipal waste (5) sewage sludge (6) pretreated municipal waste





BAT associated Emission Levels – Austrian Plants

- > Dust
 - > ESP in combination with
 - wet scrubbers or
 - > fixed bed adsorbers or
 - flow-injection process + bag filter
- > NOx
 - > SCR
- > Hg
 - > wet scrubber, sometimes in combination with
 - activated coke filter or
 - flow-injection process
- > CO
 - Firing system (waste feeding)





Conclusion

→ Determination of State of the Art/BAT:

- > complex
- > dynamic
- whole chain of waste incineration
- integrated approach (all media)

→ BAT is to:

- > prevent or control emissions to achieve a high general level of protection of the environment as a whole
- use energy efficiently
- consider technological advances

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The END

Thank you for your attention!

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