**PREFACE**

**SCOPE**

**1. Common techniques**

General Information

**2. Biological treatment**

**2.1. Biological treatment of source separated bio- waste**

2.1.1 Aerobic treatement – composting

2.1.2 Aerobic treatement – remediation of contaminated soils

2.1.3 Anaerobic digestion

**2.2. Mechanical-biological treatment of non source separated municipal solid waste (MSW)**

2.2.1 Aerobic treatment – production of compost like output

2.2.2 Aerobic treatment – bio-drying/production of SRF

2.2.3 Aerobic treatment – biological stabilisation before landfilling

2.2.4 Aerobic treatment – other further use specific treatment

Depending on response from questionnaire and data collection further processes could taken into account

**3. Physico - chemical treatment**

ECN does not comment on this chapter

**4. Mechanical treatment of waste**

It has to be clarified if the shredding of bulky green waste (bush and tree cuttings) as important pre-processing step in composting of biowaste will be included under the chapter of *Mechanical Treatment* or as part of the associated activities and processes in the chapter *Biological Treatment / Aerobic Treatment*

Otherwise, ECN does not comment on the structuring of this chapter

**5. Treatment in shredders of waste**

ECN does not comment on this chapter

**6. BAT conclusions**

**6.1. General BAT conclusions**

We consider that due to the specific features of the processes and techniques involved the *general BAT Conclusions* which are commonly applicable to all of them will be very limited. Those common areas are listed below. Others, not mentioned, should be addressed in the specific BAT conclusions only.

- Environmental & quality management systems (EMS, QMS)

- Reception, handling and storage

- Mixing and blending

- Resource efficiency

- Prevention of accidents and control of accidental release

- Noise prevention

- Decommissioning

**6.2. BAT conclusions for biological treatment**

**6.2.1. General primary techniques**

**6.2.2 General environmental performance**

The environmental performance must be described in differentiation of:

1. the principal process (e.g. composting, AD, waste air treatment, shredding etc.)
2. the technique /technology applied (open or closed compostintg ; several AD techniques etc.)
3. the operation, maintenance and process / quality management implemented
4. waste stream(s) included (e.g. source separated biowaste including green waste, municipal sewage sludge, MSW)
5. the output produced which also has an influence on the process /steps/duration and performance : (matured quality compost, bio-dried SRF, stabilised MBT material for landfilling etc.; liquid digestate for direct use or after dewatering as feedstock for composting …)

Therefore this chapter would list the key processes and the most common / important techniques following (such as open and closed composting, the different AD techniques and treatment steps, the biological treatment within an MBT plant for the different purposes …) and describe the ranges of potential impacts caused by the standard emission categories as well as the process outputs)

**6.2.3 BAT conclusions specific to aerobic treatment (composting) of source-segregated biowaste and sludge**

*6.2.3.1 BAT conclusions specific to outdoor composting of source-segregated biowaste and sewage sludge*

… addressing specifically the main techniques as there are:

* with or without roofing
* with or without forced aeration of initial *active decomposition phase*
* with or without coverage with fabric or semi-permeable fleece
* Intensity of mechanical turnings

a) Resource efficiency

b) Quality management of operational process with a view to enhance environmental performance

c) Monitoring

d) Emissions to air

e) Emissions to water

f) Emissions to soil

g) Energy consumption

Energy Consumption might not be a relevant performance indicator. As a principle, better performance and product quality would consume also more energy!

*6.2.3.2. BAT conclusions specific to indoor composting of source-segregated biowaste and sewage sludge*

… addressing specifically the main techniques as there are:

* Boxes; tunnel; windrows in halls
* Waste are treatment by open or closed biofilters with or without wet scrubbers
* Intensity of mechanical turnings
* Duration of treatment in closed area (active decomposition phase only or also maturation phase)

a) Resource efficiency

b) Quality management of operational process with a view to enhance environmental performance

c) Monitoring

d) Emissions to air

e) Emissions to water

f) Emissions to soil

g) Energy consumption

Energy Consumption might not be a relevant performance indicator. As a principle, better performance and product quality would consume also more energy!

*6.2.3.9. BAT conclusions specific to combined outdoor and indoor composting of source-segregated biowaste and sewage sludge*

Included criteria as addressed above.

**6.2.4 BAT conclusions specific tor anaerobic treatment (anaerobic digestion) of source-segregated biowaste**

… addressing specifically the main techniques as there are:

* Wet to dry fermentation techniques
* Pre-processing processes (pulping, mixing, hygienisation, unpacking etc.)
* Mesophile/thermophile techniques
* Continuous/discontinuous (batch) techniques
* One/two/three stage fermentation
* Duration of entire fermentation time
* Storage of digestate
* Post treatment of digestate (dewatering, aerobisation, composting [indoor/outdoor], pelleting …)
* Biogas storage
* Biogas use (CHP station, gas grid, fuel)
* Biogas upgrading/purification

a) Resource efficiency

b) Quality management of operational process with a view to enhance environmental performance

c) Monitoring

d) Emissions to air

e) Emissions to water

f) Emissions to soil

g) Energy consumption

Energy Consumption might not be a relevant performance indicator. As a principle, better performance and product quality would consume also more energy!

**6.2.5 BAT conclusions specific to aerobic and anaerobic treatment of mixed municipal solid waste as part of MBT of municipal and similar waste (not source-segregated)**

A MBT includes considerable activities in mechanical treatment. I could be located at the same as well as at a physically separated location. It includes (not conclusive):

* Shredding
* Screening (separation)
* Separation by a number of other techniques (hand sorting, gravimetric, floating, magnetic separation, wind sifting, optical …)
* ……..

It has to be made clear where in the BREF/BAT conclusions those associated mechanical treatments are tackled!

Here for all BAT conclusions the following sub-processes have to be considered:

A) Anaerobic treatment only

B) Aerobic treatment only

B.1) Encapsulated rotting (reactor, hall) at least for intensive rotting/decomposition phase)

B.2) Open rotting (Maturation)

C) Combined Anaerobic and aerobic treatment

Reference could be made to 6.2.3 and 6.2.4.

*6.2.5.1 BAT conclusions specific to MBT – Indoor bio-drying & SRF production*

a) Resource efficiency

b) Quality management of operational process with a view to enhance environmental performance

c) Monitoring

d) Emissions to air

e) Emissions to water

f) Emissions to soil

g) Energy consumption

Energy Consumption might not be a relevant performance indicator. As a principle, better performance and product quality would consume also more energy!

*6.2.5.2 BAT conclusions specific to MBT – indoor rotting for production of CLO (compost-like output) to be used as soil amendment based on national legislation*

a) Resource efficiency

b) Quality management of operational process with a view to enhance environmental performance

c) Monitoring

d) Emissions to air

e) Emissions to water

f) Emissions to soil

g) Energy consumption

Energy Consumption might not be a relevant performance indicator. As a principle, better performance and product quality would consume also more energy!

*6.2.5.3 BAT conclusions specific to MBT – indoor biological stabilization before disposal*

a) Resource efficiency

b) Quality management of operational process with a view to enhance environmental performance

c) Monitoring

d) Emissions to air

e) Emissions to water

f) Emissions to soil

g) Energy consumption

Energy Consumption might not be a relevant performance indicator. As a principle, better performance and product quality would consume also more energy!

*6.2.5.4 BAT conclusions specific to MBT- pre-treatment for further use [X]*

To keep it as reserve in order to include further specific processes reported from the data exchange/questionnaire.

a) Resource efficiency

b) Quality management of operational process with a view to enhance environmental performance

c) Monitoring

d) Emissions to air

e) Emissions to water

f) Emissions to soil

g) Energy consumption

Energy Consumption might not be a relevant performance indicator. As a principle, better performance and product quality would consume also more energy!

**6.3. BAT conclusions for physico- chemical treatment**

ECN does not comment on this chapter

**6.4. BAT conclusions for the mechanical treatment of waste**

ECN does not comment on this chapter

**6.5. BAT conclusions the treatment in shredders of metal waste**

ECN does not comment on this chapter