Final Meeting of the Technical Working Group (TWG) for the review of the BAT reference document for Large Combustion Plants (LCP BREF)

Preliminary draft conclusions – Day 5

Draft

HFO / gas oil in boilers

BAT 32 in Revised Draft 1

Techniques to reduce NO_X and CO emissions (1/5) – BP 1.5.1.2.1

BAT 32. In order to prevent and/or reduce NO_X emissions to air while limiting CO emissions to air from the combustion of HFO and/or gas oil in boilers, BAT is to use one or a combination of the techniques given below.

Technique		Description	Applicability
a	Fuel choice	See description in Section 10.8	Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State

Draft

HFO / gas oil in boilers

BAT 32 in Revised Draft 1

Techniques to reduce NO_X and CO emissions (2/5) – BP 1.5.1.2.1

Technique		Description	Applicability
b	Water/steam addition	See description in Section 10.8.	Applicable within the constraints of water availability
c	Air staging		Generally applicable
d	Fuel staging		Generally applicable
e	Flue-gas recirculation		Generally applicable

Draft

HFO / gas oil in boilers

BAT 32 in Revised Draft 1

Techniques to reduce NO_X and CO emissions (3/5) – BP 1.5.1.2.1

	Technique	Description	Applicability
f	Low-NO_X burners (LNB)	See description in Section 10.8.	Generally applicable
g	Advanced control system	See description in Section 10.8.	Generally applicable to new plants. The applicability to old plants may be constrained by the need to retrofit the combustion and/or control command system(s)

Draft

HFO / gas oil in boilers

BAT 32 in Revised Draft 1

Techniques to reduce NO_X and CO emissions (4/5) – BP 1.5.1.2.1

Technique		Description	Applicability
h	Selective catalytic reduction (SCR)	See description in Section 10.8.	Not applicable in the case of plants operated in emergency-load mode. There may be technical and economic restrictions for retrofitting existing plants operated in peak-load mode. Not generally applicable to plants of < 100 MW_{th}

Draft

HFO / gas oil in boilers

BAT 32 in Revised Draft 1

Techniques to reduce NO_X and CO emissions (5/5) – BP 1.5.1.2.1

	Technique	Description	Applicability
i	Selective non-catalytic reduction (SNCR)	See description in Section 10.8.	Not applicable to combustion plants operated in emergency-load mode with highly variable loads. The applicability may be limited in the case of combustion plants operated in peak-load mode with highly variable boiler loads

Draft

HFO / gas oil in boilers

Table 10.16 in Revised Draft 1

BAT-AELs for NO_X and CO (1/3) – BP 1.5.1.2.2.1–1.5.1.2.2.3

- The decision on the BAT-AELs is not supported by CAN Europe.

Draft

HFO / gas oil in boilers

Table 10.16 in Revised Draft 1

BAT-AELs for NO_X and CO (2/3) – BP 1.5.1.2.2.1–1.5.1.2.2.3

Table 10.16: BAT-associated emission levels (BAT-AELs) for NO_X and CO emissions to air from the combustion of HFO and/or gas oil in boilers

Combustion plant total rated thermal input (MW_{th})	BAT-AELs (mg/Nm^3)				
	NO_X				CO
	Yearly average		Daily average or average over the sampling period		Yearly average (2)
	New plant	Existing plant (2)	New plant	Existing plant	New or existing plant
< 100	75–200	150–270	100–215	210–330	10–30
≥ 100	45–75	45–110	85–100	85–145	10–20

(2) These BAT-AELs do not apply when plants operate in peak- or emergency-load modes. (to be revisited)

HFO / gas oil in boilers

BAT 3 ter in Revised Draft 1

BAT-AELs for NO_X and CO (3/3) – BP 1.5.1.2.2.1–1.5.1.2.2.3

Substance/ Parameter	Fuel/ Process	Combustion plant total rated thermal input	Standard(s) (1)	Minimum monitoring frequency	Monitoring associated with
NO_X CO	HFO- and/or gas oil-fired boilers	All sizes	Generic EN standards	Continuous (2)	BAT 32

(2) In the case of plants with a rated thermal input of < 100 MW_{th} operated in emergency-load mode, the monitoring frequency may be reduced to at least once every year. In the case of plants with a rated thermal input of < 100 MW_{th} operated in peak-load mode, the monitoring frequency may be reduced to at least once every six months.

Draft

HFO / gas oil in boilers

BAT 33 in Revised Draft 1

Techniques to reduce SO_X, HCl, HF emissions (1/4) – BP 1.5.1.3.1

BAT 33 In order to prevent and/or reduce SO_X, HCl and HF emissions to air from HFO- and/or gas oil-fired boilers, BAT is to use one or a combination of the techniques given below.

Technique		Description	Applicability
a	Fuel choice	See description in Section 10.8	Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State
b	Flue-gas condenser	See description in Section 10.8	Generally applicable

Draft

HFO / gas oil in boilers

BAT 33 in Revised Draft 1

Techniques to reduce SO_X, HCl, HF emissions (2/4) – BP 1.5.1.3.1

	Technique	Description	Applicability
c	Wet flue-gas desulphurisation (Wet FGD)	See description in Section 10.8.	There may be technical and economic restrictions for applying the technique to combustion plants of < 300 MW_{th}. Not applicable to combustion plants operated in emergency-load mode. There may be technical and economic restrictions for retrofitting existing plants operated in peak-load mode

Draft

HFO / gas oil in boilers

BAT 33 in Revised Draft 1

Techniques to reduce SO_X, HCl, HF emissions (3/4) – BP 1.5.1.3.1

Technique		Description	Applicability
d	Duct sorbent injection (DSI)	See description in Section 10.8. The technique is combined with a dust abatement technique	Generally applicable
e	Spray-dry absorber (SDA)	See description in Section 10.8	Generally applicable

Draft

HFO / gas oil in boilers

BAT 33 in Revised Draft 1

Techniques to reduce SO_X, HCl, HF emissions (4/4) – BP 1.5.1.3.1

	Technique	Description	Applicability
f	Seawater FGD	See description in Section 10.8.	~~Applicable to plants of ≥ 100 MW_{th}.~~ There may be technical and economic restrictions for applying the technique to combustion plants of < 300 MW_{th}. Not applicable to combustion plants operated in emergency-load mode. There may be technical and economic restrictions for retrofitting existing plants operated in peak-load mode

Draft

HFO / gas oil in boilers

Table 10.17 in Revised Draft 1

BAT-AELs for SO_2 (1/3) – BP 1.5.1.3.2

- The decision on the BAT-AELs is not supported by EEB, CAN Europe.

Draft

HFO / gas oil in boilers

Table 10.17 in Revised Draft 1

BAT-AELs for SO_2 (2/3) – BP 1.5.1.3.2

Table 10.17: BAT-associated emission levels (BAT-AELs) for SO_2 emissions to air from the combustion of HFO and/or gas oil in boilers

Combustion plant total rated thermal input (MW_{th})	BAT-AELs for SO_2 (mg/Nm^3)			
	Yearly average		Daily average or average over the sampling period	
	New plant	Existing plant (3)	New plant	Existing plant
< 300	50–175	50–175	150–200	150–200
≥ 300	35–50	50–110	50–120	150–175

(3) These BAT-AELs do not apply when plants operate in peak- or emergency-load modes.

HFO / gas oil in boilers

BAT 3 ter in Revised Draft 1

BAT-AELs for SO_2 (3/3) – BP 1.5.1.3.2

Substance/ Parameter	Fuel/ Process	Combustion plant total rated thermal input	Standard(s) (1)	Minimum monitoring frequency	Monitoring associated with
SO_2	HFO- and/or gas oil-fired boilers	All sizes	Generic EN standards	Continuous (2)	BAT 33

(2) In the case of plants with a rated thermal input of < 100 MW_{th} operated in emergency-load mode, the monitoring frequency may be reduced to at least once every year. In the case of plants with a rated thermal input of < 100 MW_{th} operated in peak-load mode, the monitoring frequency may be reduced to at least once every six months.

Draft

HFO / gas oil in boilers

BAT 34 in Revised Draft 1

Techniques to reduce dust and metal emissions (1/4) – BP 1.5.1.4.1

- Change the name in the technique descriptions to 'Multicyclones'.

Draft

HFO / gas oil in boilers

BAT 34 in Revised Draft 1

Techniques to reduce dust and metal emissions (3/4) – BP 1.5.1.4.1

BAT 34 In order to reduce dust and particulate-bound metal emissions to air from HFO- and/or gas oil-fired boilers, BAT is to use one or a combination of the techniques given below.

Technique		Description	Applicability
a	Fuel choice	See description in Section 10.8	Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State
b	Electrostatic precipitator (ESP)	See description in Section 10.8.	Generally applicable

Draft

HFO / gas oil in boilers

BAT 34 in Revised Draft 1

Techniques to reduce dust and metal emissions (4/4) – BP 1.5.1.4.1

Technique		Description	Applicability
c	Bag filter	See description in Section 10.8	Generally applicable
e	Multicyclones	See description in Section 10.8 Multicyclones can be used in combination with other dedusting techniques.	Generally applicable
f	Dry, semi-dry or wet FGD system	See description in Section 10.8 The technique is mainly used for SO_X, HCl and HF abatement	See BAT 33 ~~Generally applicable when the technique is mainly used for SO_X, HCl and/or HF abatement.~~

Draft

HFO / gas oil in boilers

Table 10.18 in Revised Draft 1

BAT-AELs for dust (1/3) – BP 1.5.1.4.2

- The decision on the BAT-AELs is not supported by CAN.

Draft

HFO / gas oil in boilers

Table 10.18 in Revised Draft 1

BAT-AELs for dust (2/3) – BP 1.5.1.4.2

Table 10.18: BAT-associated emission levels (BAT-AELs) for dust emissions to air from the combustion of HFO and/or gas oil in boilers

Combustion plant total rated thermal input (MW_{th})1	BAT-AELs for dust (mg/Nm^3)			
	Yearly average		Daily average or average over the sampling period	
	New plant	Existing plant (2)	New plant	Existing plant
< 300	2–10	2–20	7–18	7–25
≥ 300	2–5	2–10	7–10	7–15

(2) These BAT-AELs do not apply when plants operate in peak- or emergency-load modes. (to be revisited)

HFO / gas oil in boilers

BAT 3 ter in Revised Draft 1

BAT-AELs for dust (3/3) – BP 1.5.1.4.2

Substance/ Parameter	Fuel/ Process	… thermal input	Standard(s) (1)	Minimum monitoring frequency	Monitoring associated with
Dust	HFO- and/or gas oil-fired boilers	All sizes	Generic EN standards and EN 13284-2	Continuous (2)	BAT 34

(2) In the case of plants with a rated thermal input of < 100 MW_{th} operated in emergency-load mode, the monitoring frequency may be reduced to at least once every year. In the case of plants with a rated thermal input of < 100 MW_{th} operated in peak-load mode, the monitoring frequency may be reduced to at least once every six months. (to be revisited)

Draft

HFO / gas oil in engines

BAT 36 in Revised Draft 1

Techniques to reduce NO_X emissions (1/3) – BP 1.5.2.2.1

- Add in the BREF chapter on 'Concluding remarks and recommendations for future work' that more information on the use of the SCR technique in small isolated systems should be collected during the next BREF review.
- The decision on the SCR technique is not supported by FR, EL, UK, CAN Europe, Euromot, Eurelectric, IT, ES, CY.

Draft

HFO / gas oil in engines

BAT 36 in Revised Draft 1

Techniques to reduce NO_X emissions (2/3) – BP 1.5.2.2.1

BAT 36 In order to prevent and/or reduce NO_X emissions to air from the combustion of HFO and/or gas oil in reciprocating engines, BAT is to use one or a combination of the techniques given below.

	Technique	Description	Applicability
a	Low-NO_X combustion concept in diesel engines	See description in Section 10.8	Generally applicable
b	Water/steam addition	See description in Section 10.8	Applicable within the constraints of water availability. The applicability may be limited in the case of engines where a retrofitting package is not available. ~~to existing engines may be constrained due to major modifications to the fuel injection system~~

Draft

HFO / gas oil in engines

BAT 36 in Revised Draft 1

Techniques to reduce NO_X emissions (3/3) – BP 1.5.2.2.1

	Technique	Description	Applicability
e	Selective catalytic reduction (SCR)	See description in Section 10.8	Not applicable in the case of plants operated in emergency-load mode. There may be technical and economic restrictions for retrofitting existing plants operated in peak-load mode. Retrofitting existing plants may be constrained by the availability of sufficient space
f	Exhaust-gas recirculation (EGR)	See description in Section 10.8	Not applicable to four-stroke engines

Draft

HFO / gas oil in engines

BAT 37 in Revised Draft 1

Techniques to reduce CO and VOC emissions (1/1) – BP 1.5.2.2.2

BAT 37 In order to prevent and/or reduce emissions of CO and volatile organic compounds to air from the combustion of HFO and/or gas oil in reciprocating engines, BAT is to use one or a combination of the techniques given below.

Technique		Description	Applicability
d	Oxidation catalysts	See description in Section 10.8	Not applicable to combustion plants operated in emergency-load mode The applicability may be limited by the sulphur content of the fuel.
e	Combustion optimisation	See description in Section 10.8	Generally applicable

Draft

HFO / gas oil in engines

Table 10.20 in Revised Draft 1

BAT-AELs for NO_X, CO and TVOC (1/5) – BP 1.5.2.2.3

- The decision on the BAT-AELs and indicative levels is not supported by DE, CAN Europe, Eurelectric, EEB, Euromot.

Draft

HFO / gas oil in engines

Table 10.20 in Revised Draft 1

BAT-AELs for NO_X, CO and TVOC (2/5) – BP 1.5.2.2.3

Table 10.20: BAT-associated emission levels (BAT-AELs) for NO_X, CO and TVOC emissions to air from the combustion of HFO and/or gas oil in reciprocating engines

Draft

HFO / gas oil in engines

Table 10.20 in Revised Draft 1

BAT-AELs for NO_X, CO and TVOC (3/5) – BP 1.5.2.2.3

Combustion plant total rated thermal input (MW_{th})	BAT-AELs (mg/Nm^3)				Indicative levels, only for HFO (mg/Nm^3)	
	NO_X *				CO	TVOC
	Yearly average		Daily average or average over the sampling period		Yearly average (2)	Average over the sampling period
	New plant	Existing plant (2)(4)	New plant	Existing plant (3)(5)	New or existing plant	
≥ 50	115–225	125–625	145–225	150–750	50–175	10–40

(2) These BAT-AELs do not apply when plants operate in peak- or emergency-load modes. (to be revisited)

(3) The BAT-AEL range for plants operating in emergency- or peak-load modes is 1150–1900 mg/Nm^3. (to be revisited)

(4) These BAT-AELs do not apply to plants that cannot be fitted with secondary abatement techniques.

(5) The BAT-AEL range for plants that cannot be fitted with secondary abatement techniques is 1150–1900 mg/Nm^3.

* Consistency with the Gothenburg protocol to be checked.

HFO / gas oil in engines

BAT 3 ter in Revised Draft 1

BAT-AELs for NO_X, CO and TVOC (4/5) – BP 1.5.2.2.3

Substance/ Parameter	Fuel/ Process	… thermal input	Standard(s) (1)	Minimum monitoring frequency	Monitoring associated with
NO_X	HFO- and/or gas oil-fired boilers and engines	All sizes	Generic EN standards	Continuous (2)	BAT 36
CO					BAT 37

(2) In the case of plants with a rated thermal input of < 100 MW_{th} operated in emergency-load mode, the monitoring frequency may be reduced to at least once every year. In the case of plants with a rated thermal input of < 100 MW_{th} operated in peak-load mode, the monitoring frequency may be reduced to at least once every six months.

Draft

HFO / gas oil in engines

BAT 3 ter in Revised Draft 1

BAT-AELs for NO_X, CO and TVOC (5/5) – BP 1.5.2.2.3

Substance/ Parameter	Fuel/Process	… thermal input	Standard(s) (1)	Minimum monitoring frequency	Monitoring associated with
TVOC	HFO- and/or gas oil-fired boilers and engines	All sizes	EN 12619	At least once every six months (8)	BAT 37

(8) The monitoring frequency may be reduced if ~~it is demonstrated that the emission levels are consistently within the BAT-AELs set.~~ the emissions are proven to be sufficiently stable. In these specific cases, periodic measurements could be carried out each time that a change of the fuel and/or waste characteristics may have an impact on the emissions, but in any case at least once every year.

HFO / gas oil in engines

BAT 38 in Revised Draft 1

Techniques to reduce SO_X, HCl, HF emissions (1/2) – BP 1.5.2.3.1

BAT 38 In order to prevent and/or reduce SO_X, HCl and HF emissions to air from the combustion of HFO and/or gas oil in reciprocating engines, BAT is to use one or a combination of the techniques given below.

Technique		Description	Applicability
a	Fuel choice	See description in Section 10.8	Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State

Draft

HFO / gas oil in engines

BAT 38 in Revised Draft 1

Techniques to reduce SO_X, HCl, HF emissions (2/2) – BP 1.5.2.3.1

Technique		Description	Applicability
c	Duct sorbent injection (DSI)	See description in Section 10.8. The technique is used in combination with a dust abatement technique	~~Generally applicable~~ There may be technical restrictions in the case of existing plants
d	Wet flue-gas desulphurisation (Wet FGD)	See description in Section 10.8.	There may be technical and economic restrictions for applying the technique to combustion plants of < 300 MW_{th}. Not applicable to combustion plants operated in emergency-load mode. There may be technical and economic restrictions for retrofitting existing plants operated in peak-load mode

Draft

HFO / gas oil in engines

Table 10.21 in Revised Draft 1

BAT-AELs for SO_2 (1/4) – BP 1.5.2.3.2

- The decision on the BAT-AELs is not supported by EL, CY, FR, ETN, Euromot, UK, Eurelectric.

Draft

HFO / gas oil in engines

Table 10.21 in Revised Draft 1

BAT-AELs for SO_2 (2/4) – BP 1.5.2.3.2

Table 10.21: BAT-associated emission levels (BAT-AELs) for SO_2 emissions to air from the combustion of HFO and/or gas oil in reciprocating engines

Combustion plant total rated thermal input (MW_{th})	BAT-AELs for SO_2 (mg/Nm^3)			
	Yearly average		Daily average or average over the sampling period	
	New plant	Existing plant (2)	New plant	Existing plant
All sizes	45–100	100–200 (3)	60–110	105–235

(2) These BAT-AELs do not apply when plants operate in peak- or emergency-load modes.

(3) The upper end of the BAT-AEL range is 280 mg/Nm^3 if no secondary abatement techniques can be applied. This corresponds to a sulphur content of the fuel of 0.5 %.

HFO / gas oil in engines

BAT 3 ter in Revised Draft 1

BAT-AELs for SO_2 (3/4) – BP 1.5.2.3.2

Substance/ Parameter	Fuel/Process	… thermal input	Standard(s) (1)	Minimum monitoring frequency	Monitoring associated with
SO_2	HFO- and/or gas oil-fired engines	All sizes	Generic EN standards	Continuous (7) (10)	BAT 38
(7) In the case of plants operated in emergency-load mode, the monitoring frequency may be reduced to at least once every year. In the case of plants operated in peak-load mode, the monitoring frequency may be reduced to at least once every six months.					

Draft

HFO / gas oil in engines

BAT 3 ter in Revised Draft 1

BAT-AELs for SO_2 (4/4) – BP 1.5.2.3.2

Substance/ Parameter	Fuel/Process	… thermal input	Standard(s) (1)	Minimum monitoring frequency	Monitoring associated with
SO_2	HFO- and/or gas oil-fired engines	All sizes	Generic EN standards	Continuous (7) (10) (11)	BAT 38

(10) The monitoring frequency may be reduced if it is demonstrated that the emission levels are consistently within the BAT-AELs set due to the fuel used. In these specific cases, periodic measurements could be carried out each time that a change of the fuel characteristics may have an impact on the emissions, but in any case at least once every three months for plants not operated in emergency- or peak-load modes.

(11) Reduce monitoring frequency in line with IED provisions

HFO / gas oil in engines

BAT 39 in Revised Draft 1

Techniques to reduce dust and metal emissions (1/2) – BP 1.5.2.4.1

BAT 39 In order to prevent or reduce dust and particulate-bound metal emissions from the combustion of HFO and/or gas oil in reciprocating engines, BAT is to use one or a combination of the techniques given below.

Technique		Description	Applicability
a	Fuel choice	See description in Section 10.8	Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State
c	Bag filter	See description in Section 10.8.	Not applicable to combustion plants operated in emergency-load mode

HFO / gas oil in engines

BAT 39 in Revised Draft 1

Techniques to reduce dust and metal emissions (2/2) – BP 1.5.2.4.1

	Technique	Description	Applicability
d	Electrostatic precipitator (ESP)	See description in Section 10.8	Not applicable to combustion plants operated in emergency-load mode
e	~~Multicyclones~~	~~See description in Section 10.8~~	- ~~Generally applicable~~ -
f	~~Dry, semi-dry or wet FGD system~~	~~See descriptions in Section 10.8~~	~~Generally applicable when the technique is mainly used for SO_x, HCl and/or HF abatement~~

Draft

HFO / gas oil in engines

Table 10.22 in Revised Draft 1

BAT-AELs for dust (1/4) – BP 1.5.2.4.2

- The decision on the BAT-AELs is not supported by UK, CY, EL, DE, FR, FI, PT, EEB, CAN Europe, Euromot, Eurelectric.

Draft

HFO / gas oil in engines

Table 10.22 in Revised Draft 1

BAT-AELs for dust (2/4) – BP 1.5.2.4.2

Table 10.22: BAT-associated emission levels (BAT-AELs) for dust emissions to air from the combustion of HFO and/or gas oil in reciprocating engines

Combustion plant total rated thermal input (MW_{th})	BAT-AELs for dust (mg/Nm^3)			
	Yearly average		Daily average or average over the sampling period	
	New plant	Existing plant (1)	New plant	Existing plant
≥ 50	5-10	5-35	10-20	10-45

(1) These BAT-AELs do not apply when plants operate in peak- or emergency-load modes.

Draft

HFO / gas oil in engines

BAT 3 ter in Revised Draft 1

BAT-AELs for dust (3/4) – BP 1.5.2.4.2

Substance/ Parameter	Fuel/Process	…thermal input	Standard(s) (1)	Minimum monitoring frequency	Monitoring associated with
Dust	HFO- and/or gas oil-fired engines	All sizes	Generic EN standards and EN 13284-2	Continuous (7) (10)	BAT 39
(7) In the case of plants operated in emergency-load mode, the monitoring frequency may be reduced to at least once every year. In the case of plants operated in peak-load mode, the monitoring frequency may be reduced to at least once every six months.					

Draft

HFO / gas oil in engines

BAT 3 ter in Revised Draft 1

BAT-AELs for dust (4/4) – BP 1.5.2.4.2

Substance/ Parameter	Fuel/Process	… thermal input	Standard(s) (1)	Minimum monitoring frequency	Monitoring associated with
Dust	HFO- and/or gas oil-fired engines	All sizes	Generic EN standards and EN 13284-2	Continuous (7) (10)	BAT 39

(10) The monitoring frequency may be reduced if it is demonstrated that the emission levels are consistently within the BAT-AELs set due to the fuel used. In these specific cases, periodic measurements could be carried out each time that a change of the fuel characteristics may have an impact on the emissions, but in any case at least once every three months for plants not operated in emergency- or peak-load modes.

(to be adapted in line with other similar footnotes)

Draft

Gas oil in gas turbines

BAT 41 in Revised Draft 1

Techniques to reduce NO_X emissions (1/2) – BP 1.5.3.2.1

BAT 41 In order to prevent and/or reduce NO_X emissions to air from the combustion of gas oil in gas turbines, BAT is to use one or a combination of the techniques given below.

Technique		Description	Applicability
a	Water/steam addition	See description in Section 10.8	The applicability may be limited due to water availability
b	Low-NO_X burners (LNB)	See description in Section 10.8	Only applicable to turbine models for which low-NO_X burners are available on the market

Draft

Gas oil in gas turbines

BAT 41 in Revised Draft 1

Techniques to reduce NO_X emissions (2/2) – BP 1.5.3.2.1

	Technique	Description	Applicability
c	Selective catalytic reduction (SCR)	See description in Section 10.8	Not applicable in the case of plants operated in emergency-load mode. Retrofitting existing plants may be constrained by the availability of sufficient space. There may be technical and economic restrictions for retrofitting existing plants operated in peak-load mode

Draft

Gas oil in gas turbines

BAT 42 in Revised Draft 1

Techniques to reduce CO emissions (1/1) – BP 1.5.3.2.2

BAT 42 In order to prevent and/or reduce CO emissions to air from the combustion of gas oil in gas turbines, BAT is to use one or a combination of the techniques given below.

Technique		Description	Applicability
a	Oxidation catalysts	See description in Section 10.8	Not applicable to combustion plants operated in emergency-load mode. Retrofitting existing plants may be constrained by the availability of sufficient space
b	Combustion optimisation	See description in Section 10.8	Generally applicable

Draft

Gas oil in gas turbines

Table 10.24 in Revised Draft 1

BAT-AELs for NO_X and CO (1/1) – BP 1.5.3.2.3

- Do not set BAT-AELs for NO_X and CO emissions from the combustion of gas oil in gas turbines. Therefore, remove Table 10.24.

Draft

Gas oil in gas turbines

BAT 43 in Revised Draft 1

Techniques/BAT-AELs for SO_X and dust (1/7) – BP 1.5.3.3

- Specify that this section does not apply to off-shore gas turbines.

Draft

Gas oil in gas turbines

BAT 43 in Revised Draft 1

Techniques/BAT-AELs for SO_X and dust (2/7) – BP 1.5.3.3

BAT 43 In order to prevent and/or reduce SO_X and dust emissions to air from the combustion of gas oil in gas turbines, BAT is to use the technique given below.

Technique		Description	Applicability
a	Fuel choice	See description in Section 10.8	Applicable within the constraints associated with the availability of different types of fuel, which may be impacted by the energy policy of the Member State

Draft

Gas oil in gas turbines

Table 10.25 in Revised Draft 1

Techniques/BAT-AELs for SO_X and dust (3/7) – BP 1.5.3.3

Table 10.25: BAT-associated emission levels for SO_2 and dust emissions to air from the combustion of gas oil in gas turbines

Combustion plant total rated thermal input (MW_{th})	BAT-AELs (mg/Nm^3)	
	SO_2	
	Yearly average (2)	Daily average or average over the sampling period
	New plant or existing plant	
≥ 50	35–60	50–66

(2) These BAT-AELs do not apply when existing plants operate in peak- or emergency-load modes.

Gas oil in gas turbines

Table 10.25 in Revised Draft 1

Techniques/BAT-AELs for SO_X and dust (4/7) – BP 1.5.3.3

Table 10.25: BAT-associated emission levels for SO_2 and dust emissions to air from the combustion of gas oil in gas turbines

Combustion plant total rated thermal input (MW_{th})	BAT-AELs (mg/Nm^3)	
	Dust	
	Yearly average (2)	Daily average or average over the sampling period
	New plant or existing plant	
≥ 50	2–5	2–10

(2) These BAT-AELs do not apply when existing plants operate in peak- or emergency-load modes.

Gas oil in gas turbines

Table 10.25 in Revised Draft 1

Techniques/BAT-AELs for SO_X and dust (5/7) – BP 1.5.3.3

Table 10.25: BAT-associated emission levels for SO_2 and dust emissions to air from the combustion of gas oil in gas turbines

Combustion plant total rated thermal input (MW_{th})	BAT-AELs (mg/Nm^3)	
	Dust	
	Yearly average (2)	Daily average or average over the sampling period
	New plant or existing plant	
≥ 50	2–5	2–10
EU Turbines	-8	
EEB	2-3 (new plants)	

(2) These BAT-AELs do not apply when existing plants operate in peak- or emergency-load modes.

Gas oil in gas turbines

BAT 3 ter in Revised Draft 1

Techniques/BAT-AELs for SO_X and dust (6/7) – BP 1.5.3.3

Substance/ Parameter	Fuel/ Process	… thermal input	Standard(s) (1)	Minimum monitoring frequency	Monitoring associated with
SO_2 Dust	Gas oil-fired gas turbines	All sizes	Generic EN standards	~~At least once every three months~~ Continuous (7) (10)	BAT 43
(7) In the case of plants operated in emergency-load mode, the monitoring frequency may be reduced to at least once every year. In the case of plants operated in peak-load mode, the monitoring frequency may be reduced to at least once every six months.					

Draft

Gas oil in gas turbines

BAT 3 ter in Revised Draft 1

Techniques/BAT-AELs for SO_X and dust (7/7) – BP 1.5.3.3

Substance/ Parameter	Fuel/ Process	… thermal input	Standard(s) (1)	Minimum monitoring frequency	Monitoring associated with
SO_2 Dust	Gas oil-fired gas turbines	All sizes	Generic EN standards	~~At least once every three months~~ Continuous (7) (10)	BAT 43

(10) The monitoring frequency may be reduced if it is demonstrated that the emission levels are consistently within the BAT-AELs set due to the fuel used. In these specific cases, periodic measurements could be carried out each time that a change of the fuel characteristics may have an impact on the emissions, but in any case at least once every three months for plants not operated in emergency- or peak-load modes.

(11) Reduce monitoring frequency for SO_2 in line with IED provisions.

Coal and/or lignite

BAT 22 in Revised Draft 1

Techniques to reduce dust and metal emissions (1/4) – BP 1.3.8

BAT 22 In order to reduce dust and particulate-bound metal emissions to air from the combustion of coal and/or lignite, BAT is to use one or a combination of the techniques given below.

Technique		Description	Applicability
b	Electrostatic precipitator (ESP)	See description in Section 10.8	Generally applicable
c	Bag filter	See description in Section 10.8	Generally applicable

Draft

Coal and/or lignite

BAT 22 in Revised Draft 1

Techniques to reduce dust and metal emissions (2/4) – BP 1.3.8

	Technique	Description	Applicability
d	Boiler sorbent injection (in-furnace or in-bed)	See description in Section 10.8 The technique is mainly used for for SO_X, HCl and/or HF abatement Generally used in fluidised bed boilers in combination with an ESP/bag filter	See BAT 21 ~~Generally applicable when the technique is mainly used for SO_X, HCl and/or HF abatement~~

Draft

Coal and/or lignite

BAT 22 in Revised Draft 1

Techniques to reduce dust and metal emissions (3/4) – BP 1.3.8

	Technique	Description	Applicability
e	Dry or semi-dry FGD system (e.g. SDA, DSI)	See descriptions in Section 10.8. The technique is mainly used for for SO_X, HCl and/or HF abatement Generally used in fluidised bed boilers of up to 1500 MW_{th} in combination with an ESP/bag filter	See BAT 21 ~~Generally applicable when the technique is mainly used for SO_X, HCl and/or HF abatement~~

Draft

Coal and/or lignite

BAT 22 in Revised Draft 1

Techniques to reduce dust and metal emissions (4/4) – BP 1.3.8

	Technique	Description	Applicability
f	Wet flue-gas desulphurisation (FGD)	See description in Section 10.8. The technique is mainly used for for SO_X, HCl and/or HF abatement Generally used in combustion plants of ≥ 300 MW_{th} in combination with an ESP/bag filter	See BAT 21 ~~Generally applicable when the technique is mainly used for SO_X, HCl and/or HF abatement~~

Draft

Coal and/or lignite

Table 10.7 in Revised Draft 1

BAT-AELs for dust (1/3) – BP 1.3.9

- The decision on the BAT-AELs is not supported by CZ, EL, PL, ES, SK, EE, EEB, CAN Europe, E&P, Euracoal, Eureelectric.

Draft

Coal and/or lignite

Table 10.7 in Revised Draft 1

BAT-AELs for dust (2/3) – BP 1.3.9

Table 10.7: BAT-associated emission levels (BAT-AELs) for dust emissions to air from the combustion of coal and/or lignite

Combustion plant total rated thermal input (MW_{th})	BAT-AELs (mg/Nm^3)			
	Yearly average ~~(1)~~		Daily average or average over the sampling period	
	New plant	Existing plant (1)	New plant	Existing plant
<100	2–5	2–18	4–16	4–28
100–300	2–5	2–14	3–15	4–25
300–1000	2–5	2–12	3–10	3–20
≥ 1000	2–5	2–8	3–10	3–14

(1) These BAT-AELs do not apply when plants operate in peak- or emergency-load modes. (to be revisited)

Coal and/or lignite

BAT 3 ter in Revised Draft 1

BAT-AELs for dust (3/3) – BP 1.3.9

Substance/ Parameter	Fuel/ Process	… thermal input	Standard(s) (1)	Minimum monitoring frequency	Monitoring associated with
Dust	Coal and/or lignite including waste co-incineration	All sizes	Generic EN standards and EN 13284-2	Continuous (2)	BAT 22

(2) In the case of plants with a rated thermal input of < 100 MW_{th} operated in emergency-load mode, the monitoring frequency may be reduced to at least once every year. In the case of plants with a rated thermal input of < 100 MW_{th} operated in peak-load mode, the monitoring frequency may be reduced to at least once every six months.

Draft