

Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) (Recast) (Text with EEA relevance)

ANNEX VI

Technical provisions relating to waste incineration plants and waste co-incineration plants

PART 1

Definitions

For the purpose of this Annex the following definitions shall apply:

- (a) ‘existing waste incineration plant’ means one of the following waste incineration plants:
- (i) which was in operation and had a permit in accordance with applicable Union law before 28 December 2002,
 - (ii) which was authorised or registered for waste incineration and had a permit granted before 28 December 2002 in accordance with applicable Union law, provided that the plant was put into operation no later than 28 December 2003,
 - (iii) which, in the view of the competent authority, was the subject of a full request for authorisation before 28 December 2002, provided that the plant was put into operation not later than 28 December 2004;
- (b) ‘new waste incineration plant’ means any waste incineration plant not covered by point (a).

PART 2

Equivalence factors for dibenzo-p-dioxins and dibenzofurans

For the determination of the total concentration of dioxins and furans, the mass concentrations of the following dibenzo-p-dioxins and dibenzofurans shall be multiplied by the following equivalence factors before summing:

	Toxic equivalence factor
2,3,7,8 — Tetrachlorodibenzodioxin (TCDD)	1
1,2,3,7,8 — Pentachlorodibenzodioxin (PeCDD)	0,5
1,2,3,4,7,8 — Hexachlorodibenzodioxin (HxCDD)	0,1
1,2,3,6,7,8 — Hexachlorodibenzodioxin (HxCDD)	0,1
1,2,3,7,8,9 — Hexachlorodibenzodioxin (HxCDD)	0,1
1,2,3,4,6,7,8 — Heptachlorodibenzodioxin (HpCDD)	0,01
Octachlorodibenzodioxin (OCDD)	0,001

2,3,7,8 — Tetrachlorodibenzofuran (TCDF)	0,1
2,3,4,7,8 — Pentachlorodibenzofuran (PeCDF)	0,5
1,2,3,7,8 — Pentachlorodibenzofuran (PeCDF)	0,05
1,2,3,4,7,8 — Hexachlorodibenzofuran (HxCDF)	0,1
1,2,3,6,7,8 — Hexachlorodibenzofuran (HxCDF)	0,1
1,2,3,7,8,9 — Hexachlorodibenzofuran (HxCDF)	0,1
2,3,4,6,7,8 — Hexachlorodibenzofuran (HxCDF)	0,1
1,2,3,4,6,7,8 — Heptachlorodibenzofuran (HpCDF)	0,01
1,2,3,4,7,8,9 — Heptachlorodibenzofuran (HpCDF)	0,01
Octachlorodibenzofuran (OCDF)	0,001

PART 3

Air emission limit values for waste incineration plants

1. All emission limit values shall be calculated at a temperature of 273,15 K, a pressure of 101,3 kPa and after correcting for the water vapour content of the waste gases.

They are standardised at 11 % oxygen in waste gas except in case of incineration of mineral waste oil as defined in point 3 of Article 3 of Directive 2008/98/EC, when they are standardised at 3 % oxygen, and in the cases referred to in Point 2.7 of Part 6.

- 1.1. Daily average emission limit values for the following polluting substances (mg/Nm³)

Total dust	10
Gaseous and vaporous organic substances, expressed as total organic carbon (TOC)	10
Hydrogen chloride (HCl)	10
Hydrogen fluoride (HF)	1
Sulphur dioxide (SO ₂)	50
Nitrogen monoxide (NO) and nitrogen dioxide (NO ₂), expressed as NO ₂ for existing waste incineration plants with a nominal capacity exceeding 6 tonnes per hour or new waste incineration plants	200

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Nitrogen monoxide (NO) and nitrogen dioxide (NO ₂), expressed as NO ₂ for existing waste incineration plants with a nominal capacity of 6 tonnes per hour or less	400
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1.2. Half-hourly average emission limit values for the following polluting substances (mg/Nm³)

	(100 %) A	(97 %) B
Total dust	30	10
Gaseous and vaporous organic substances, expressed as total organic carbon (TOC)	20	10
Hydrogen chloride (HCl)	60	10
Hydrogen fluoride (HF)	4	2
Sulphur dioxide (SO ₂)	200	50
Nitrogen monoxide (NO) and nitrogen dioxide (NO ₂), expressed as NO ₂ for existing waste incineration plants with a nominal capacity exceeding 6 tonnes per hour or new waste incineration plants	400	200

1.3. Average emission limit values (mg/Nm³) for the following heavy metals over a sampling period of a minimum of 30 minutes and a maximum of 8 hours

Cadmium and its compounds, expressed as cadmium (Cd)	Total: 0,05
Thallium and its compounds, expressed as thallium (Tl)	
Mercury and its compounds, expressed as mercury (Hg)	0,05
Antimony and its compounds, expressed as antimony (Sb)	Total: 0,5
Arsenic and its compounds, expressed as arsenic (As)	
Lead and its compounds, expressed as lead (Pb)	
Chromium and its compounds, expressed as chromium (Cr)	

Cobalt and its compounds, expressed as cobalt (Co)
Copper and its compounds, expressed as copper (Cu)
Manganese and its compounds, expressed as manganese (Mn)
Nickel and its compounds, expressed as nickel (Ni)
Vanadium and its compounds, expressed as vanadium (V)

These average values cover also the gaseous and the vapour forms of the relevant heavy metal emissions as well as their compounds.

- 1.4. Average emission limit value (ng/Nm³) for dioxins and furans over a sampling period of a minimum of 6 hours and a maximum of 8 hours. The emission limit value refers to the total concentration of dioxins and furans calculated in accordance with Part 2.

Dioxins and furans	0,1
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- 1.5. Emission limit values (mg/Nm³) for carbon monoxide (CO) in the waste gases:
- 50 as daily average value;
 - 100 as half-hourly average value;
 - 150 as 10-minute average value.

The competent authority may authorise exemptions from the emission limit values set out in this point for waste incineration plants using fluidised bed technology, provided that the permit sets an emission limit value for carbon monoxide (CO) of not more than 100 mg/Nm³ as an hourly average value.

2. Emission limit values applicable in the circumstances described in Article 46(6) and Article 47.

The total dust concentration in the emissions into the air of a waste incineration plant shall under no circumstances exceed 150 mg/Nm³ expressed as a half-hourly average. The air emission limit values for TOC and CO set out in points 1.2 and 1.5(b) shall not be exceeded.

3. Member States may lay down rules governing the exemptions provided for in this Part.

PART 4

Determination of air emission limit values for the co-incineration of waste

1. The following formula (mixing rule) shall be applied whenever a specific total emission limit value 'C' has not been set out in a table in this Part.

The emission limit value for each relevant polluting substance and CO in the waste gas resulting from the co-incineration of waste shall be calculated as follows:

$$\frac{V_{\text{waste}} \times C_{\text{waste}} + V_{\text{proc}} \times C_{\text{proc}}}{V_{\text{waste}} + V_{\text{proc}}} = C$$

V_{waste} : waste gas volume resulting from the incineration of waste only determined from the waste with the lowest calorific value specified in the permit and standardised at the conditions given by this Directive.

If the resulting heat release from the incineration of hazardous waste amounts to less than 10 % of the total heat released in the plant, V_{waste} must be calculated from a (notional) quantity of waste that, being incinerated, would equal 10 % heat release, the total heat release being fixed.

C_{waste} : emission limit values for waste incineration plants set out in Part 3

V_{proc} : waste gas volume resulting from the plant process including the combustion of the authorised fuels normally used in the plant (wastes excluded) determined on the basis of oxygen contents at which the emissions must be standardised as set out in Union or national law. In the absence of legislation for this kind of plant, the real oxygen content in the waste gas without being thinned by addition of air unnecessary for the process must be used.

C_{proc} : emission limit values as set out in this Part for certain industrial activities or in case of the absence of such values, emission limit values of plants which comply with the national laws, regulations and administrative provisions for such plants while burning the normally authorised fuels (wastes excluded). In the absence of these measures the emission limit values set out in the permit are used. In the absence of such permit values the real mass concentrations are used.

C : total emission limit values at an oxygen content as set out in this Part for certain industrial activities and certain polluting substances or, in case of the absence of such values, total emission limit values replacing the emission limit values as set out in specific Annexes of this Directive. The total oxygen content to replace the oxygen content for the standardisation is calculated on the basis of the content above respecting the partial volumes.

All emission limit values shall be calculated at a temperature of 273,15 K, a pressure of 101,3 kPa and after correcting for the water vapour content of the waste gases.

Member States may lay down rules governing the exemptions provided for in this Part.

2. Special provisions for cement kilns co-incinerating waste

2.1. The emission limit values set out in points 2.2 and 2.3 apply as daily average values for total dust, HCl, HF, NO_x, SO₂ and TOC (for continuous measurements), as average values over the sampling period of a minimum of 30 minutes and a maximum of 8 hours for heavy metals and as average values over the sampling period of a minimum of 6 hours and a maximum of 8 hours for dioxins and furans.

All values are standardised at 10 % oxygen.

Half-hourly average values shall only be needed in view of calculating the daily average values.

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2.2. C – total emission limit values (mg/Nm³ except for dioxins and furans) for the following –polluting substances

Polluting substance	C
Total dust	30
HCl	10
HF	1
NO _x	500 ^a
Cd + Tl	0,05
Hg	0,05
Sb + As + Pb + Cr + Co + Cu + Mn + Ni + V	0,5
Dioxins and furans (ng/Nm ³)	0,1

^a Until 1 January 2016, the competent authority may authorise exemptions from the limit value for NO_x for Lepol kilns and long rotary kilns provided that the permit sets a total emission limit value for NO_x of not more than 800 mg/Nm³.

2.3. C – total emission limit values (mg/Nm³) for SO₂ and TOC

Pollutant	C
SO ₂	50
TOC	10

The competent authority may grant derogations for emission limit values set out in this point in cases where TOC and SO₂ do not result from the co-incineration of waste.

2.4. C- total emission limit values for CO

The competent authority may set emission limit values for CO.

3. Special provisions for combustion plants co-incinerating waste

3.1. C_{proc} expressed as daily average values (mg/Nm³) valid until the date set out in Article 82(5)

For determining the total rated thermal input of the combustion plants, the aggregation rules as defined in Article 29 shall apply. Half-hourly average values shall only be needed in view of calculating the daily average values.

C_{proc} for solid fuels with the exception of biomass (O₂ content 6 %):

Polluting substances	< 50 MWth	50-100 MWth	100 to 300 MWth	> 300 MWth
SO ₂	—	850	200	200
NO _x	—	400	200	200
Dust	50	50	30	30

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C_{proc} for biomass (O_2 content 6 %):

Polluting substances	< 50 MWth	50 to 100 MWth	100 to 300 MWth	> 300 MWth
SO ₂	—	200	200	200
NO _x	—	350	300	200
Dust	50	50	30	30

C_{proc} for liquid fuels (O_2 content 3 %):

Polluting substances	< 50 MWth	50 to 100 MWth	100 to 300 MWth	> 300 MWth
SO ₂	—	850	400 to 200 (linear decrease from 100 to 300 MWth)	200
NO _x	—	400	200	200
Dust	50	50	30	30

3.2. C_{proc} expressed as daily average values (mg/Nm³) valid from the date set out in Article 82(6)

For determining the total rated thermal input of the combustion plants, the aggregation rules as defined in Article 29 shall apply. Half-hourly average values shall only be needed in view of calculating the daily average values.

3.2.1. C_{proc} for combustion plants referred to in Article 30(2), with the exception of gas turbines and gas engines

C_{proc} for solid fuels with the exception of biomass (O_2 content 6 %):

Polluting substance	< 50 MWth	50-100 MWth	100 to 300 MWth	> 300 MWth
SO ₂	—	400 for peat: 300	200	200
NO _x	—	300 for pulverised lignite: 400	200	200
Dust	50	30	25 for peat: 20	20

C_{proc} for biomass (O_2 content 6 %):

Polluting substance	< 50 MWth	50 to 100 MWth	100 to 300 MWth	> 300 MWth
SO ₂	—	200	200	200

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NO _x	—	300	250	200
Dust	50	30	20	20

C_{proc} for liquid fuels (O₂ content 3 %):

Polluting substance	< 50 MWth	50 to 100 MWth	100 to 300 MWth	> 300 MWth
SO ₂	—	350	250	200
NO _x	—	400	200	150
Dust	50	30	25	20

3.2.2. C_{proc} for combustion plants referred to in Article 30(3), with the exception of gas turbines and gas engines

C_{proc} for solid fuels with the exception of biomass (O₂ content 6 %):

Polluting substance	< 50 MWth	50-100 MWth	100 to 300 MWth	> 300 MWth
SO ₂	—	400 for peat: 300	200 for peat: 300, except in the case of fluidised bed combustion: 250	150 for circulating or pressurised fluidised bed combustion or, in case of peat firing, for all fluidised bed combustion: 200
NO _x	—	300 for peat: 250	200	150 for pulverised lignite combustion: 200
Dust	50	20	20	10 for peat: 20

C_{proc} for biomass (O₂ content 6 %):

Polluting substance	< 50 MWth	50 to 100 MWth	100 to 300 MWth	> 300 MWth
SO ₂	—	200	200	150
NO _x	—	250	200	150
Dust	50	20	20	20

C_{proc} for liquid fuels (O₂ content 3 %):

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Polluting substance	< 50 MWth	50 to 100 MWth	100 to 300 MWth	> 300 MWth
SO ₂	—	350	200	150
NO _x	—	300	150	100
Dust	50	20	20	10

- 3.3. C — total emission limit values for heavy metals (mg/Nm³) expressed as average values over the sampling period of a minimum of 30 minutes and a maximum of 8 hours (O₂ content 6 % for solid fuels and 3 % for liquid fuels)

Polluting substances	C
Cd + Tl	0,05
Hg	0,05
Sb + As + Pb + Cr + Co + Cu + Mn + Ni + V	0,5

- 3.4. C — total emission limit value (ng/Nm³) for dioxins and furans expressed as average value measured over the sampling period of a minimum of 6 hours and a maximum of 8 hours (O₂ content 6 % for solid fuels and 3 % for liquid fuels)

Polluting substance	C
Dioxins and furans	0,1

4. Special provisions for waste co-incineration plants in industrial sectors not covered under Points 2 and 3 of this Part

- 4.1. C — total emission limit value (ng/Nm³) for dioxins and furans expressed as average value measured over the sampling period of a minimum of 6 hours and a maximum of 8 hours:

Polluting substance	C
Dioxins and furans	0,1

- 4.2. C — total emission limit values (mg/Nm³) for heavy metals expressed as average values over the sampling period of a minimum of 30 minutes and a maximum of 8 hours:

Polluting substances	C
Cd + Tl	0,05
Hg	0,05

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PART 5

Emission limit values for discharges of waste water from the cleaning of waste gases

Polluting substances		Emission limit values for unfiltered samples (mg/l except for dioxins and furans)	
		(95 %)	(100 %)
1.	Total suspended solids as defined in Annex I of Directive 91/271/EEC	30	45
2.	Mercury and its compounds, expressed as mercury (Hg)	0,03	
3.	Cadmium and its compounds, expressed as cadmium (Cd)	0,05	
4.	Thallium and its compounds, expressed as thallium (Tl)	0,05	
5.	Arsenic and its compounds, expressed as arsenic (As)	0,15	
6.	Lead and its compounds, expressed as lead (Pb)	0,2	
7.	Chromium and its compounds, expressed as chromium (Cr)	0,5	
8.	Copper and its compounds, expressed as copper (Cu)	0,5	
9.	Nickel and its compounds,	0,5	

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	expressed as nickel (Ni)	
10.	Zinc and its compounds, expressed as zinc (Zn)	1,5
11.	Dioxins and furans	0,3 ng/l

PART 6

Monitoring of emissions

1. Measurement techniques
 - 1.1. Measurements for the determination of concentrations of air and water polluting substances shall be carried out representatively.
 - 1.2. Sampling and analysis of all polluting substances including dioxins and furans as well as the quality assurance of automated measuring systems and the reference measurement methods to calibrate them shall be carried out according to CEN-standards. If CEN standards are not available, ISO, national or other international standards which ensure the provision of data of an equivalent scientific quality shall apply. Automated measuring systems shall be subject to control by means of parallel measurements with the reference methods at least once per year.
 - 1.3. At the daily emission limit value level, the values of the 95 % confidence intervals of a single measured result shall not exceed the following percentages of the emission limit values:

Carbon monoxide:	10 %
Sulphur dioxide:	20 %
Nitrogen dioxide:	20 %
Total dust:	30 %
Total organic carbon:	30 %
Hydrogen chloride:	40 %
Hydrogen fluoride:	40 %.

Periodic measurements of the emissions into air and water shall be carried out in accordance with points 1.1 and 1.2.

2. Measurements relating to air polluting substances
 - 2.1. The following measurements relating to air polluting substances shall be carried out:
 - (a) continuous measurements of the following substances: NO_x, provided that emission limit values are set, CO, total dust, TOC, HCl, HF, SO₂;

- (b) continuous measurements of the following process operation parameters: temperature near the inner wall or at another representative point of the combustion chamber as authorised by the competent authority, concentration of oxygen, pressure, temperature and water vapour content of the waste gas;
 - (c) at least two measurements per year of heavy metals and dioxins and furans; one measurement at least every 3 months shall, however, be carried out for the first 12 months of operation.
- 2.2. The residence time as well as the minimum temperature and the oxygen content of the waste gases shall be subject to appropriate verification, at least once when the waste incineration plant or waste co-incineration plant is brought into service and under the most unfavourable operating conditions anticipated.
 - 2.3. The continuous measurement of HF may be omitted if treatment stages for HCl are used which ensure that the emission limit value for HCl is not being exceeded. In that case the emissions of HF shall be subject to periodic measurements as laid down in point 2.1(c).
 - 2.4. The continuous measurement of the water vapour content shall not be required if the sampled waste gas is dried before the emissions are analysed.
 - 2.5. The competent authority may decide not to require continuous measurements for HCl, HF and SO₂ in waste incineration plants or waste co-incineration plants and require periodic measurements as set out in point 2.1(c) or no measurements if the operator can prove that the emissions of those pollutants can under no circumstances be higher than the prescribed emission limit values.

The competent authority may decide not to require continuous measurements for NO_x and require periodic measurements as set out in point 2.1(c) in existing waste incineration plants with a nominal capacity of less than 6 tonnes per hour or in existing waste co-incineration plants with a nominal capacity of less than 6 tonnes per hour if the operator can prove on the basis of information on the quality of the waste concerned, the technologies used and the results of the monitoring of emissions, that the emissions of NO_x can under no circumstances be higher than the prescribed emission limit value.

- 2.6. The competent authority may decide to require one measurement every 2 years for heavy metals and one measurement per year for dioxins and furans in the following cases:
 - (a) the emissions resulting from co-incineration or incineration of waste are under all circumstances below 50 % of the emission limit values;
 - (b) the waste to be co-incinerated or incinerated consists only of certain sorted combustible fractions of non-hazardous waste not suitable for recycling and presenting certain characteristics, and which is further specified on the basis of the assessment referred to in point (c);
 - (c) the operator can prove on the basis of information on the quality of the waste concerned and the monitoring of the emissions that the emissions are under all circumstances significantly below the emission limit values for heavy metals and dioxins and furans.
- 2.7. The results of the measurements shall be standardised using the standard oxygen concentrations mentioned in Part 3 or calculated according to Part 4 and by applying the formula given in Part 7.

When waste is incinerated or co-incinerated in an oxygen-enriched atmosphere, the results of the measurements can be standardised at an oxygen content laid down by the competent authority reflecting the special circumstances of the individual case.

When the emissions of polluting substances are reduced by waste gas treatment in a waste incineration plant or waste co-incineration plant treating hazardous waste, the standardisation with respect to the oxygen contents provided for in the first subparagraph shall be done only if the oxygen content measured over the same period as for the polluting substance concerned exceeds the relevant standard oxygen content.

3. Measurements relating to water polluting substances
 - 3.1. The following measurements shall be carried out at the point of waste water discharge:
 - (a) continuous measurements of pH, temperature and flow;
 - (b) spot sample daily measurements of total suspended solids or measurements of a flow proportional representative sample over a period of 24 hours;
 - (c) at least monthly measurements of a flow proportional representative sample of the discharge over a period of 24 hours of Hg, Cd, TI, As, Pb, Cr, Cu, Ni and Zn;
 - (d) at least every 6 months measurements of dioxins and furans; however, one measurement at least every 3 months shall be carried out for the first 12 months of operation.
 - 3.2. Where the waste water from the cleaning of waste gases is treated on site collectively with other on-site sources of waste water, the operator shall take the measurements:
 - (a) on the waste water stream from the waste gas cleaning processes prior to its input into the collective waste water treatment plant;
 - (b) on the other waste water stream or streams prior to its or their input into the collective waste water treatment plant;
 - (c) at the point of final waste water discharge, after the treatment, from the waste incineration plant or waste co-incineration plant.

PART 7

Formula to calculate the emission concentration at the standard percentage oxygen concentration

$$E_S = \frac{21 - O_S}{21 - O_M} \times E_M$$

- | | |
|-------|---|
| E_S | = calculated emission concentration at the standard percentage oxygen concentration |
| E_M | = measured emission concentration |
| O_S | = standard oxygen concentration |
| O_M | = measured oxygen concentration |

PART 8

Assessment of compliance with emission limit values

1. Air emission limit values

- 1.1. The emission limit values for air shall be regarded as being complied with if:
- (a) none of the daily average values exceeds any of the emission limit values set out in point 1.1 of Part 3 or in Part 4 or calculated in accordance with Part 4;
 - (b) either none of the half-hourly average values exceeds any of the emission limit values set out in column A of the table under point 1.2 of Part 3 or, where relevant, 97 % of the half-hourly average values over the year do not exceed any of the emission limit values set out in column B of the table under point 1.2 of Part 3;
 - (c) none of the average values over the sampling period set out for heavy metals and dioxins and furans exceeds the emission limit values set out in points 1.3 and 1.4 of Part 3 or in Part 4 or calculated in accordance with Part 4;
 - (d) for carbon monoxide (CO):
 - (i) in case of waste incineration plants:
 - at least 97 % of the daily average values over the year do not exceed the emission limit value set out in point 1.5(a) of Part 3; and,
 - at least 95 % of all 10-minute average values taken in any 24-hour period or all of the half-hourly average values taken in the same period do not exceed the emission limit values set out in points 1.5(b) and (c) of Part 3; in case of waste incineration plants in which the gas resulting from the incineration process is raised to a temperature of at least 1 100 °C for at least two seconds, Member States may apply an evaluation period of 7 days for the 10-minute average values;
 - (ii) in case of waste co-incineration plants: the provisions of Part 4 are met.
- 1.2. The half-hourly average values and the 10-minute averages shall be determined within the effective operating time (excluding the start-up and shut-down periods if no waste is being incinerated) from the measured values after having subtracted the value of the confidence interval specified in point 1.3 of Part 6. The daily average values shall be determined from those validated average values.

To obtain a valid daily average value no more than five half-hourly average values in any day shall be discarded due to malfunction or maintenance of the continuous measurement system. No more than ten daily average values per year shall be discarded due to malfunction or maintenance of the continuous measurement system.

- 1.3. The average values over the sampling period and the average values in the case of periodical measurements of HF, HCl and SO₂ shall be determined in accordance with the requirements of Articles 45(1)(e), 48(3) and point 1 of Part 6.

2. Water emission limit values

The emission limit values for water shall be regarded as being complied with if:

- (a) for total suspended solids 95 % and 100 % of the measured values do not exceed the respective emission limit values as set out in Part 5;
- (b) for heavy metals (Hg, Cd, Tl, As, Pb, Cr, Cu, Ni and Zn) no more than one measurement per year exceeds the emission limit values set out in Part 5; or, if the Member State provides for more than 20 samples per year, no more than 5 % of these samples exceed the emission limit values set out in Part 5;

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- (c) for dioxins and furans, the measurement results do not exceed the emission limit value set out in Part 5.